Final Supplemental Environmental Impact Statement for the Lake Roosevelt Incremental Storage Releases Program

August 29, 2008
Washington State Department of Ecology
Ecology Publication #08-11-034

Final Supplemental Environmental Impact Statement For The Lake Roosevelt Incremental Storage Release Project

This report is available on the Department of Ecology Web site at:
http://www.ecy.wa.gov/programs/wr/cwp/cr_lkroos.html

For a printed copy of this report, contact:

Joanne Wellner
Washington State Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902
jwel461@ecy.wa.gov
509-454-7664

Refer to Publication Number 08-11-034

If you need this publication in an alternate format, please call Tim Hill at 509-575-2490. Persons with hearing loss can call 711 for Washington Relay Service. Persons with speech disability can call 877-833-6341.

This document was printed on recycled paper.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

August 29, 2008

Dear interested parties:

The Washington State Department of Ecology (Ecology) has prepared and issued this Final Supplemental Environmental Impact Statement (EIS) pursuant to the State Environmental Policy Act (SEPA) (Chapter 43.21C RCW) and the SEPA Rules (Chapter 197-11 WAC). This Final Supplemental EIS evaluates impacts associated with the Lake Roosevelt Incremental Storage Releases Project. The project is proposed as a component of the Columbia River Water Management Program and is intended to improve municipal and industrial water supply, provide water to replace some ground water use in the Odessa Subarea, enhance stream flows in the Columbia River to benefit fish, and provide water to interruptible water right holders in drought years.

The Draft Supplemental EIS was issued May 15, 2008. The public comment period was open until June 30, 2008. Open houses were held from 4 p.m. to 7 p.m. on June 16 in Coulee Dam and June 17 in Colville. Additional comments were received via email and mail. The comments received are included in Chapter 5 of the Final Supplemental EIS. Written responses are provided for each comment. Where appropriate, changes have been made to the EIS text in response to comments or to provide clarification or updates to information.

The Draft Supplemental EIS evaluated the impacts of several alternatives for the timing and allocation of flows released for each purpose. Based on further analysis and comments received, Ecology has selected Preferred Alternatives that would use an adaptive management approach to schedule the flow releases. A panel of fisheries and water experts would determine the amount and timing of the flows each year based on runoff predictions for the Columbia River. The flow releases would be timed to provide maximum benefits to fish. The Preferred Alternatives are described and further evaluated in this Final Supplemental EIS.

We believe this Final Supplemental EIS will provide Ecology decision makers with insight into key environmental factors associated with implementation actions related to the Lake Roosevelt Incremental Storage Releases Project. Such implementation actions include Ecology's decision on the Bureau of Reclamation's (Reclamation) application for secondary water right permits to use water stored in Lake Roosevelt. Reclamation will evaluate the steps necessary for compliance with the National Environmental Policy Act (NEPA) when it issues service contracts for use of the water. Ecology will evaluate applications for water rights issued to use the water released from Lake Roosevelt under the authority of Chapter 90.03 RCW.

Sincerely,

Derek I. Sandison
Central Regional Director
SEPA Responsible Official

FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE LAKE ROOSEVELT INCREMENTAL STORAGE RELEASES PROGRAM

FACT SHEET

Brief Description of Proposal:

The Washington State Legislature authorized the Columbia River Water Management Program (Management Program) in 2006 through passage of the Engrossed Substitute House Bill (ESSHB) 2860, codified as Chapter 90.90 of the Revised Code of Washington (RCW). The Management Program recognized that a key priority of water resource management in the Columbia River Basin is the development of new water supplies, including storage and conservation in order to meet the economic and community development needs of people, and the instream flow needs of fish. The Washington State Department of Ecology (Ecology) has identified a number of strategies for implementing the Management Program. In 2007, Ecology evaluated the Management Program in a Programmatic Environmental Impact Statement (EIS) under the State Environmental Policy Act (SEPA). The Programmatic EIS evaluated several early implementation actions, including the Lake Roosevelt Drawdown (now known as the Lake Roosevelt Incremental Storage Releases Project). Since the Programmatic EIS was released in 2007, additional information has become available, allowing a more detailed evaluation of the incremental flow release options in this Supplemental EIS. The Lake Roosevelt Incremental Storage Releases Project is being developed in partnership with the U.S. Bureau of Reclamation (Reclamation). The action subject to SEPA review by Ecology is the issuance of two secondary use permits for water stored in Lake Roosevelt under Reclamation's 1938 storage right.

The Lake Roosevelt Incremental Storage Release Project (the Proposal) involves withdrawing additional water from Lake Roosevelt to provide drought relief, improve municipal and industrial supply, alternatives to ground water use in the Odessa Subarea, and streamflow enhancement for fish downstream of Grand Coulee Dam. The Proposal includes releases that would occur annually and releases that would occur only during drought years. Annually, 82,500 acre-feet will be released from storage, resulting in approximately a 1-foot additional drawdown of the lake at the end of August. In drought years, Reclamation would release 50,000 acre-feet, in addition to the 82,500 acre-feet released for storage. In drought years, this would result in a total of 132,500 acre-feet and an estimated additional drawdown of approximately 1.8 feet at the end of August. The 2007 Programmatic EIS assumed that all incremental releases would occur in July and August. This Supplemental EIS evaluates several options for timing of the storage releases. Ecology has selected Preferred Alternatives for annual and drought year releases in which the exact schedule for the flow releases would be developed annually by a panel of water and fisheries managers to maximize benefits for fish. The Preferred Alternatives are variations of Alternatives 1C and 1E that were evaluated in the Draft Supplemental EIS.

Proposed or Tentative Date for Implementation:

Ecology anticipates making decisions regarding Reclamation's secondary water user permits in early September.

Proponent:

Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

State Environmental Policy Act (SEPA) Lead Agency Responsible Official:

Derek I. Sandison, Central Regional Director
Washington State Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902
Email: dsan461@ecy.wa.gov

Permits, Licenses, and Approvals Required for Proposal:

The Lake Roosevelt Incremental Storage Releases Project requires Ecology to issue secondary use permits for water stored in Lake Roosevelt under Reclamation's 1938 storage right. Ecology will also issue new water rights to municipal and industrial users who receive water from the storage releases. Ecology will also issue stand-by reserve permits for holders of interruptible water rights who receive water from the storage releases. Reclamation will issue service contracts to the Columbia Basin Irrigation District to supply irrigators in the Odessa Subarea. Ecology will issue a superseding certificate or permit to Odessa Subarea water users who exchange ground water use for surface water.

Water for the Odessa Subarea will be routed to the area using existing canals and other irrigation infrastructure. Some alteration of existing infrastructure and new canals may be required to connect to individual farms and individual irrigators may construct new canals or other infrastructure on their land. Construction of the Weber Siphons may require an NPDES stormwater permit. The new construction may be subject review under SEPA or the National Environmental Policy Act (NEPA) depending on the source of funding. Individuals must comply with all applicable local, state, and federal permits and approvals for the new infrastructure.

Authors and Contributors to the Supplemental Environmental Impact Statement

The following **Department of Ecology** individuals were reviewers or contributors to the preparation of the Supplemental EIS:

Derek Sandison – All chapters
Bob Barwin – All chapters
Dan Haller – All chapters
Joanne Wellner – All chapters
John Roland – Environmental Health
Ken Merrill – Water Quality

Teresa Scott of the **Washington Department of Fish and Wildlife** reviewed the sections on fish, plants and wildlife.

The following **contract** individuals were contributors to the Supplemental EIS:

ESA Adolfson – Principal Author, Climate, Wildlife and Plants, Environmental Health, Recreation and Scenic Resources, Transportation
Anchor Environmental – Surface Water, Public Utilities
Cascadia Law Group – Legal Considerations
EcoNorthwest - Socioeconomics
Golder and Associates – Earth, Groundwater, Water Quality
Paragon Research Associates – Cultural Resources
R2 Resource Consultants – Fish

Timing of Additional Environmental Review:

No additional environmental review is required for the Lake Roosevelt Incremental Storage Releases Project. Reclamation will determine the necessary steps for NEPA compliance when it issues service contracts. As noted above, construction may be required for some infrastructure in the Odessa Subarea. Appropriate environmental review will be conducted on those projects prior to construction. Appropriate review will also be conducted on new municipal and industrial water rights and supplemental drought permit issuance, as applicable.

Date of Issue of the Draft Supplemental Environmental Impact Statement

May 15, 2008

Public Comments on the Draft Supplemental EIS

In accordance with WAC 197-11-455, Ecology conducted a public comment period from May 15, 2008 to June 30, 2008. Ecology received written comments from a total of 39 persons or agencies. Ecology conducted public open houses at Coulee Dam and Colville on June 16 and June 17, respectively. No one provided oral comments at those open houses.

Document Availability

Both the Final Supplemental EIS and the Programmatic EIS on the Columbia River Water Management Program are available for review. The Final Supplemental EIS is available on line and can be viewed at: http://www.ecy.wa.gov/programs/wr/cwp/cr_lkroos.html. The Programmatic EIS on the Columbia River Water Management Program is available on line at http://www.ecy.wa.gov/programs/wr/cwp/eis.html.

Both documents can be obtained in hard copy or CD by written request to the SEPA Responsible Official listed above, or by calling 509-454-7664. Persons with disabilities may request this information be prepared and supplied in alternative formats.

Both documents were distributed through the state library system. Copies are also available for review at any Department of Ecology Yakima office located at 15 West Yakima Avenue, Suite 200 Monday through Friday from 8 a.m. to 5 p.m.

Changes to the Draft EIS

For this Final EIS, the Draft EIS has been amended to reflect responses to comments, additional information on the Incremental Storage Releases Project, and to more clearly describe the proposal and impacts. Comments received on the Draft EIS are included in Chapter 5 along with responses to those comments.

Major changes to the Draft EIS include:

- Descriptions of the selected Preferred Alternatives for annual and drought year releases and the allocation of water to municipal and industrial users and holders of interruptible water rights were added to Chapter 2.
- Information from the National Park Service (NPS) on impacts to specific recreational facilities on Lake Roosevelt and measures for mitigating those impacts was added to Chapter 4 and the NPS report was included as Appendix G.
- The discussion of Inchelium-Gifford ferry in Chapter 4 was revised to clarify that the Proposal is not expected to impact ferry operations.
- Information on proposed construction of the Weber Siphons was added to Chapter 2 and to the impacts discussion in Chapter 4.
- The description of the Columbia-Snake River Irrigators Association's Voluntary Regional Agreement (VRA) was revised to reflect the signing of the VRA in July.
- The tables of flow releases in Chapter 2 were revised to reflect the scheduled releases under the Preferred Alternatives and new information on the amount of water that could be released. The figures that illustrated those releases in the Draft Supplemental EIS were removed.
- The tables of drawdowns in Chapter 4 were revised to reflect new information on water releases.

TABLE OF CONTENTS

FACT SHEET FS-1
ACRONYMS AND ABBREVIATIONS AA-1
SUMMARY S-1
CHAPTER 1.0 INTRODUCTION AND BACKGROUND 1-1
1.1 Introduction 1-1
1.2 Organization of the Document 1-1
1.3 Background on the Incremental Storage Releases Project 1-2
1.3.1 Cooperative Agreements 1-2
1.3.1.1 MOU with Reclamation and the Irrigation Districts 1-2
1.3.1.2 Tribal Agreements 1-3
1.3.2 Priority Needs in the Columbia River Water Management Act 1-4
1.4 Background on Lake Roosevelt 1-4
1.4.1 Lake Roosevelt Operations 1-4
1.4.2 River and Reservoir Management 1-9
1.4.3 Lake Roosevelt National Recreation Area 1-9
1.5 Purpose and Objectives 1-10
1.6 Related Projects 1-10
1.6.1 Potholes Reservoir Supplemental Feed Route 1-11
1.6.2 Odessa Subarea Special Study 1-11
1.6.3 Columbia-Snake River Irrigators Association Voluntary Regional Agreement 1-12
1.6.4 Columbia River Mainstem Off-Channel Storage Options 1-13
1.6.5 Yakima River Basin Water Storage Feasibility Study 1-13
1.6.6 Lake Roosevelt Remedial Investigation and Feasibility Study 1-14
1.7 Scoping Process 1-15
CHAPTER 2.0 PROPOSAL AND ALTERNATIVES 2-1
2.1 General Description of the Proposal 2-1
2.2 No Action Alternative 2-1
2.3 Proposal 2-2
2.3.1 Preferred Alternatives 2-5
2.3.2 Annual Releases 2-6
2.3.2.1 Alternative 1A Releases during July and August 2-7
2.3.2.2 Alternative 1B Demand Alternative 2-8
2.3.2.3 Preferred Alternative 1C – Maximize Fish Flows 2-10
2.3.3 Releases for Drought Years 2-13
2.3.3.1 Alternative 1D—Match Demand Drought Years 2-14
2.3.3.2 Preferred Alternative 1E—Maximize Fish Benefits Drought Years 2-15
2.3.4 Construction Required for the Proposal 2-17
2.4 Policy Options for Water Allocation 2-21
2.4.1 Allocation for Municipal and Industrial Supply 2-21
2.4.1.1 Alternatives Considered but not Selected 2-21
2.4.1.2 Preferred Alternatives 2-23
2.4.2 Allocation for Interruptible Water Rights 2-25
2.4.2.1 Alternatives Considered but not Selected 2-25
2.4.2.2 Preferred Alternatives 2-27
2.4.3 What Happens to Water Rights When the Program Ends? 2-28

2.5 Alternatives Considered but Not Carried Forward 2-29
2.5.1 New Storage Reservoir 2-29
2.5.2 Conservation 2-29
2.5.3 Water Markets 2-30
2.5.4 Different Allocations for the Incremental Storage Releases 2-30
2.5.5 In-Time Storage Releases for Municipal Demand 2-30
CHAPTER 3.0 AFFECTED ENVIRONMENT 3-1
3.1 Project Area Description 3-1
3.2 Earth 3-1
3.2.1 Lake Roosevelt 3-1
3.2.2 Columbia River Downstream 3-5
3.2.3 Odessa Subarea and Banks Lake 3-6
3.2.3.1 Odessa Subarea 3-6
3.2.3.2 Banks Lake 3-6
3.3 Climate 3-6
3.3.1 Background on Global Climate Change 3-7
3.3.1.1 Climate and Snowpack in the Pacific Northwest 3-7
3.3.1.2 Columbia River Basin 3-8
3.3.2 Climate Projections 3-8
3.3.3 Potential Climate Change Impacts on Runoff and Surface Water Supplies 3-9
3.4 Surface Water 3-9
3.4.1 Water Quantity 3-9
3.4.1.1 Lake Roosevelt 3-9
3.4.1.2 Columbia River Downstream 3-9
3.4.1.3 Odessa Subarea and Banks Lake 3-9
3.4.2 Water Quality 3-11
3.4.2.1 Lake Roosevelt 3-11
3.4.2.2 Columbia River Downstream 3-20
3.4.2.3 Odessa Subarea and Banks Lake 3-23
3.5 Ground Water 3-23
3.5.1 Lake Roosevelt 3-23
3.5.2 Columbia River Downstream 3-29
3.5.3 Odessa Subarea and Banks Lake 3-29
3.5.3.1 Odessa Subarea 3-29
3.5.3.2 Banks Lake 3-29
3.6 Legal Considerations 3-29
3.6.1 Water Rights 3-29
3.6.2 Endangered Species Act Biological Opinion 3-30
3.6.3 Columbia River Treaty 3-32
3.7 Fish 3-32
3.7.1 Lake Roosevelt 3-33
3.7.1.1 Artificial Propagation Facilities 3-35
3.7.2 Columbia River Downstream 3-39
3.7.3 Odessa Subarea and Banks Lake 3-41
3.7.3.1 Odessa Subarea 3-41
3.7.3.2 Banks Lake 3-41
3.8 Wildlife and Plants 3-44
3.8.1 Lake Roosevelt 3-44

3.8.1.1 Plant Communities and Habitats 3-44
3.8.1.2 Wildlife Species 3-47
3.8.1.3 Lake Rufus Woods 3-49
3.8.1.4 Hanford Reach 3-50
3.8.2 Odessa Subarea and Banks Lake 3-50
3.8.2.1 Odessa Subarea 3-50
3.8.2.2 Banks Lake 3-51
3.9 Cultural Resources 3-51
3.9.1 Lake Roosevelt 3-51
3.9.2 Columbia River Downstream 3-51
3.9.3 Odessa Subarea and Banks Lake 3-52
3.10 Environmental Health 3-52
3.10.1 Lake Roosevelt 3-52
3.10.1.1 Hazardous and Toxic Materials 3-52
3.10.1.2 Public Health and Safety 3-54
3.10.1.3 Mosquitoes 3-56
3.10.2 Columbia River Downstream 3-56
3.10.3 Odessa Subarea and Banks Lake 3-56
3.10.3.1 Hazardous and Toxic Materials 3-56
3.10.3.2 Public Health and Safety 3-56
3.11 Recreation and Scenic Resources 3-57
3.11.1 Lake Roosevelt 3-57
3.11.1.1 Recreation Activities and Use Levels 3-57
3.11.1.2 Recreation Facilities 3-58
3.11.1.3 Reservoir Drawdown 3-70
3.11.2 Columbia River Downstream 3-70
3.11.3 Odessa Subarea and Banks Lake 3-71
3.11.3.1 Odessa Subarea 3-71
3.11.3.2 Banks Lake 3-71
3.12 Socioeconomics 3-72
3.12.1 Lake Roosevelt 3-72
3.12.2 Columbia River Downstream 3-72
3.12.3 Odessa Subarea and Banks Lake 3-72
3.13 Public Services and Utilities 3-74
3.13.1 Lake Roosevelt 3-74
3.13.2 Columbia River Downstream 3-76
3.13.3 Odessa Subarea and Banks Lake 3-76
3.14 Transportation 3-76
3.14.1 Lake Roosevelt 3-76
3.14.2 Columbia River Downstream 3-77
3.14.3 Odessa Subarea and Banks Lake 3-77
CHAPTER 4.0 IMPACTS AND MITIGATION MEASURES FOR INCREMENTAL STORAGE RELEASES 4-1
4.1 No Action Alternative 4-1
4.2 Proposal 4-2
4.2.1 Lake Roosevelt 4-2
4.2.1.1 Earth 4-2
4.2.1.2 Climate 4-3

4.2.1.3 Surface Water 4-4
4.2.1.4 Ground Water 4-10
4.2.1.5 Legal Considerations 4-21
4.2.1.6 Fish 4-23
4.2.1.7 Wildlife and Plants 4-35
4.2.1.8 Cultural Resources 4-37
4.2.1.9 Environmental Health 4-37
4.2.1.10 Recreation and Scenic Resources 4-39
4.2.1.11 Socioeconomics 4-44
4.2.1.12 Public Services and Utilities 4-53
4.2.1.13 Transportation 4-53
4.2.2 Columbia River Downstream 4-54
4.2.2.1 Earth 4-54
4.2.2.2 Climate 4-54
4.2.2.3 Surface Water 4-55
4.2.2.4 Ground Water 4-61
4.2.2.5 Legal Considerations 4-61
4.2.2.6 Fish 4-64
4.2.2.7 Wildlife and Plants 4-66
4.2.2.8 Cultural Resources 4-66
4.2.2.9 Environmental Health 4-67
4.2.2.10 Recreation and Scenic Resources 4-67
4.2.2.11 Socioeconomics 4-68
4.2.2.12 Public Services and Utilities 4-68
4.2.2.13 Transportation 4-72
4.2.3 Odessa Subarea and Banks Lake 4-73
4.2.3.1 Earth 4-73
4.2.3.2 Climate 4-74
4.2.3.3 Surface Water 4-74
4.2.3.4 Ground Water 4-76
4.2.3.5 Legal Considerations 4-76
4.2.3.6 Fish 4-78
4.2.3.7 Wildlife and Plants 4-80
4.2.3.8 Cultural Resources 4-81
4.2.3.9 Environmental Health 4-81
4.2.3.10 Recreation and Scenic Resources 4-81
4.2.3.11 Socioeconomics 4-82
4.2.3.12 Public Services and Utilities 4-82
4.2.3.13 Transportation 4-83
4.3 Cumulative Impacts 4-84
CHAPTER 5.0 COMMENTS AND RESPONSES 5-1
List of Commenters 5-1
Chapter 6.0 References 1
CHAPTER 7.0 DISTRIBUTION LIST 7-1

LIST OF APPENDICES

Appendix A	Memorandum of Understanding Concerning the State of Washington's Columbia River Initiative
Appendix B	Summary of Scoping Comments
Appendix C	Water Quality Parameters
Appendix D	Flow Actions under the Biological Opinion
Appendix E	Lake Roosevelt Artificial Fish Propagation Facilities
Appendix E	Fish Tissue Sampling
Appendix G	Lake Roosevelt Shoreline Management Waterfront Facilities Drawdown Impact Study.

MAP FOLIO

Lake Roosevelt Embayments

LIST OF TABLES

Table 2-1. Alternative 1A—Average Year 2-7
Table 2-2. Demand Option 1B(a)—Average Year 2-9
Table 2-3. Demand Option 1B(b)—Dry Year 2-9
Table 2-4. Preferred Alternative—Maximize Fish Flows Option 1C(a)- Average Year 2-11
Table 2-5. Preferred Alternative—Maximize Fish Flows Option 1C(b)– Dry Year 2-12
Table 3-1 LRFEP Sampling Dates for Each Year 3-15
Table 3-2. Lake Roosevelt National Recreation Area Visitation[1] (2007) 3-57
Table 3-3 Developed Recreation Areas on Lake Roosevelt 3-67
Table 3-4 Demographic Statistics for Counties and Reservations Surrounding Lake Roosevelt 3-73
Table 3-5 Hydroelectric Facilities on the Columbia River 3-75
Table 4-1 Total Exposed Lake Roosevelt Lakebed Area per Foot of Drawdown for the 14 Selected Embayment Areas 4-3

LIST OF FIGURES

Figure 1-1. Lake Roosevelt Water Elevations 1-7
Figure 2-1 Flow Releases for the Purposal 2-3
Figure 2-2 Weber Siphons Grant County, Washington 2-19
Figure 3-1. Project Area 3-3
Figure 3-2 Water Quality Sampling Locations 3-13
Figure 3-3 Total Dissolved Gas and Temperature at Lake Roosevelt Sampling Stations 3-17
Figure 3-4 Temperature and Total Dissolved Gas (TDS) 3-21
Figure 3-5. Lake Roosevelt and Ground Water Fluctuations 3-25
Figure 3-6. Lake Roosevelt Level versus Groundwater Level 3-27
Figure 3-7. Hatcheries 3-37
Figure 3-8. Recreational Areas Northern Lake Roosevelt 3-59
Figure 3-9 Recreation Areas Central Lake Roosevelt 3-61
Figure 3-10 Recreational Areas Southwest Lake Roosevelt 3-63
Figure 3-11 Recreational Areas Southeast Lake Roosevelt 3-65
Figure 4-1. Lake Roosevelt Water Elevation – Alternative 1A 4-11

Figure 4-2. Lake Roosevelt Water Elevations – Alternative 1B 4-13
Figure 4-3. a.. Lake Roosevelt Water Elevations – Alternative 1C. b. Lake Roosevelt Water Elevations - Alternative 1C..... 4-15
Figure 4-4. Lake Roosevelt Water Elevations – Alternatives 1D, 1E 4-17
Figure 4-5. Lake Roosevelt Water Elevations – Alternative 1D (Expanded Scale)..... 4-19
Figure 4-6. Lake Roosevelt Water Elevations for Rainbow Trout 4-25
Figure 4-7. Lake Roosevelt Water Elevations for Kokanee Salmon 4-27
Figure 4-8. Annual Total Boat Launch Visitors and Lake Roosevelt Level 4-47
Figure 4-9. Total Visitors to Boat Launches and Lake Roosevelt Level..... 4-49
Figure 4-10. Boat Launches at High Minimum Launch Sites and Lake Roosevelt Level 4-51
Figure 4-11 Temperature Range 4-59
Figure 4-12. Locations of Interruptible Water Rights 4-71

ACRONYMS AND ABBREVIATIONS

AIP	Agreement in Principle
BMPs	best management practices
BPA	Bonneville Power Administration
C	Celsius
CBA	cost/benefit analysis
CBFWP	Columbia Basin Fish and Wildlife Program
CBP	Columbia Basin Project
CCT	Confederated Tribes of the Colville Reservation
CELP	Center for Environmental Law and Policy
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CRI	Columbia River Initiative
CRMP	Cultural Resources Management Plan
CSRIA	Columbia-Snake River Irrigators Association
CSTAG	Sediments Technical Advisory Group
CY	cubic yards
DAHP	Department of Archaeology and Historic Preservation
DDE	Department of Energy
DNR	Department of Natural Resources
DOH	Department of Health
DPS	distinct population segment
EA	Environmental Assessment
ECID	East Columbia Irrigation District
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ET	evapotranspiration
F	Fahrenheit
FCRPS	Federal Columbia River Power System
FDA	Food and Drug Administration
FERC	Federal Energy Regulatory Commission
FSCA	Fish Sample Collection Areas
gpm	gallons per minute
HPA	hydraulic project approval
IJC	International Joint Commission
IPCC	Intergovernmental Panel on Climate Change
KAF	thousand acre-feet
LRFEP	Lake Roosevelt Fisheries Evaluation Program
LRHCT	Lake Roosevelt Hatchery Coordination Team
LRNRA	Lake Roosevelt National Recreation Area
MDNS	Mitigated determination of non-significance
mg/L	milligrams per liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
msl	mean sea level
MW	Megawatts

MW-hrs	Megawatt-hours
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRC	National Resource Council
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity units
NWI	National Wetland Inventory
OCPI	overriding considerations of the public interest
OHWM	ordinary high water mark
PCBs	Polychlorinated biphenyls
PCOI	Preliminary Contaminants of Interest
PECs	Probable Effects Concentrations
PHS	Priority Habitats and Species
ppm	parts per million
PUD	Public Utility District
RCW	Revised Code of Washington
Reclamation	U.S. Bureau of Reclamation
RI/FS	Remedial Investigation and Feasibility Study
RPA	Reasonable and Prudent Alternatives
SEPA	State Environmental Policy Act
STI	Spokane Tribe of Indians
SWE	Snow Water Equivalent
TCPs	traditional cultural properties
TDG	total dissolved gas
TDS	total dissolved solids
TECs	Threshold Effects Concentrations
TEL	Threshold Effects Level
TEQ	toxicity equivalent
TMDL	total maximum daily load
TMT	Technical Management Team
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRA	Voluntary Regional Agreement
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area
WSF	Washington State Ferries
WSPRC	Washington State Parks and Recreation Commission

SUMMARY

S.1 Purpose and Need for the Proposal

The Washington State Legislature created the Columbia River Basin Water Management Program (Management Program) to address a variety of water resource problems in the Columbia River Basin. Those problems have limited the availability of water for agriculture and economic development and for sufficient stream flows for fish.

The Lake Roosevelt Incremental Storage Releases Project (the Proposal) is one proposal under the Management Program to improve water management in the Columbia River Basin. Specifically, the purpose of the Proposal is to release additional water from Lake Roosevelt to provide drought relief, improve municipal and industrial water supply, provide water to replace some ground water use in the Odessa Subarea, and enhance stream flows in the Columbia River to benefit fish.

S.2 Description of Proposal

The Proposal involves withdrawing additional water from Lake Roosevelt at Grand Coulee Dam to provide water for downstream uses. The program includes storage releases that would occur every year and storage releases that would occur only during drought years.

During non-drought years, an additional 82,500 acre-feet would be diverted or released from Lake Roosevelt to provide the following:

- 25,000 acre-feet of municipal/industrial supply,
- 30,000 acre-feet of irrigation water for replacement of some ground water supplies in the Odessa Subarea, and
- 27,500 acre-feet for stream flow enhancement to benefit fish downstream of Ground Coulee Dam.

During drought years, 50,000 acre-feet would be released from Lake Roosevelt in addition to the non-drought diversion of 82,500 acre-feet. These diversions would provide:

- 33,000 acre-feet of water for Columbia River mainstem interruptible water right holders; and
- 17,000 additional acre-feet for flow augmentation to benefit fish downstream of Ground Coulee Dam.

S.3 Summary of Impacts and Mitigation

The probable significant adverse environmental impacts and proposed mitigation measures associated with the Proposal are summarized in this section. These impacts and mitigation measures are discussed in greater detail in Chapter 4.

S.3.1 No Action Alternative

Under the No Action Alternative, Lake Roosevelt would continue to be operated as it is currently, with no additional releases from storage. Impacts of the No Action Alternative for the Proposal were evaluated in Section 5.4 of the Final Programmatic Environmental Impact Statement for the Columbia River Water Management Program (Ecology, 2007). The Programmatic EIS concluded that the No Action Alternative would have no impacts on most elements of the environment. The following potential impacts were identified to ground water, water rights, fish, and socioeconomics:

- Ground water levels in the Odessa Subarea would continue to decrease at approximately the same rate that they do today.
- There would be less water available for pending municipal/industrial users, and no water from Lake Roosevelt would be available for interruptible water rights during drought years.
- No additional water would be available to supplement stream flows to benefit fish in the mainstem of the Columbia River.
- Farmers in the Odessa Subarea would continue to experience rising costs of pumping ground water, which would diminish the feasibility of irrigation. Some irrigators may shift to crops that require less water or cease operations. This could result in a loss of sales, jobs, and income in the area.

S.3.2 Proposal

Potential impacts associated with the Proposal were described generally in Section 5.1 of the Programmatic EIS (Ecology, 2007). A more detailed analysis of the impacts associated with the Proposal is presented in Chapter 4 of this Draft Supplemental EIS. The impacts are summarized below.

S.3.2.1 Short-term Impacts

In general, the Proposal would not require construction of additional facilities; therefore, there would be few short-term, construction impacts. The exceptions would be improvements to existing infrastructure or the construction of new irrigation infrastructure to deliver surface water to individual farms in the Odessa Subarea and possible infrastructure for the municipal industrial uses. Impacts associated with the individual construction projects were described in Section 5.1 of the Programmatic EIS (Ecology, 2007). Additional information on infrastructure improvements for delivery to the Odessa Subarea is provided in Section 4.2.3.

S.3.2.2 Long-term Impacts

This Supplemental EIS compared the potential impacts of the alternatives and options for flow releases under the Proposal to the No Action Alternative. This Supplemental EIS evaluates the impact of the incremental increases in flow releases to the Columbia River and drawdowns of Lake Roosevelt. These impacts are summarized below for each element of the environment.

Earth

No increased impacts to landslides or alluvial deposition were identified. Little additional lakebed area would be exposed as a result of the Proposal.

Climate

The Proposal will not increase emissions that could affect climate change except for temporary increases in carbon dioxide during construction associated with the Weber Siphons. The effects of climate change could alter runoff to the Columbia River Basin and affect water management of Lake Roosevelt. Ecology will coordinate with other management agencies in the Columbia River Basin to respond to changing conditions as they occur.

Surface Water

The Proposal would result in additional drawdowns of Lake Roosevelt. It is expected that the maximum drawdown for non-drought years would be approximately 1.1 feet on August 31. For drought years, the maximum drawdown would be approximately 1.8 feet on August 31. In both cases, the maximum drawdown is expected to last for a few days to a few weeks with refill of Lake Roosevelt beginning in early September. The timing and amount of flow changes in the Columbia River vary for the different alternatives and flow options. Average monthly flows in the Columbia River will increase between April and August to provide increased benefits to fish. For some alternatives and flow release options, flows will decrease during September. These decreases are most notable in drought years.

Ground Water

The Proposal is not expected to affect ground water levels.

Legal Considerations

The Proposal is not expected to negatively affect water rights, the Biological Opinion, or the Canadian Treaty. Ecology would determine appropriate mitigation measures when processing individual water rights. The Proposal would not reduce flows during the Biological Opinion “salmon flow objective period.” If the Canadian Treaty is renegotiated in the future, the changes may affect water supply to Lake Roosevelt and could require Ecology to adapt the Proposal to changing conditions.

Fish

The Proposal is not expected to have significant negative impacts to fish in Lake Roosevelt. In most years, no additional shoreline would be exposed beyond what is routinely exposed during current operations. During drought years, more shoreline will be more exposed than currently occurs in the summer season, but the drawdown will not expose areas that are not exposed during current operations. The habitat of these shorelines areas has been severely compromised as a result of normal operations and will not be further degraded by the additional storage releases. The capacity of the lake to support growth or rearing of kokanee, rainbow trout, or white sturgeon should not be negatively impacted. The incremental storage releases would increase flows in the Columbia River by a minor amount in most months. Although the flow increases will be small, they are expected to help meet stream flow targets in the Columbia River and provide benefits to fish. Columbia River flows will decrease in September with the biggest decreases in drought years in years when water for Odessa is diverted from Lake Roosevelt in September. The decreases are small relative to Columbia River flows and are not expected to negatively impact fish. Flow targets under the Biological Opinion would be met during the salmon flow objective period from April to August. No negative impacts to fish are expected in Banks Lake. The Water Resources Management Agreements between the State of Washington and the Confederated Tribes of the Colville Reservation (CCT) and the Spokane Tribe of Indians (STI) provide mitigation for potential impacts to fish and aquatic resources in Lake Roosevelt.

Wildlife and Plants

No significant impacts to wildlife and plants are anticipated. The additional drawdown during drought years may slightly increase the distribution and abundance of Eurasian watermilfoil. No mitigation is proposed for impacts to wildlife and plants because impacts are not expected to be significant.

Cultural Resources

Impacts to cultural resources were identified in the Programmatic EIS (Ecology, 2007). No new impacts were identified in the Supplemental EIS. Under the various alternatives, additional drawdowns would occur at different times of the year than under current operations. However, under all alternatives, the drawdowns during peak recreation season are anticipated to be small and within the normal operational range. The agreements between the State of Washington and the CCT and STI provide mitigation for potential impacts to cultural resources on lands managed by the Tribes. Ecology will continue to work with the National Park Service (NPS) to develop appropriate mitigation for potential impacts to cultural resources on lands managed by NPS.

Environmental Health

The Proposal would slightly increase the potential for exposure of contaminated sediments during peak recreation periods. This could increase public exposure to the contamination. The contaminated sediments problem is being studied separately by the Environmental Protection Agency and Teck Cominco. Ecology will consider the results

when they are available to determine if mitigation is required. If it is determined that the project causes re-entraining toxic materials into the air or water, Ecology and the CCT will establish a working group to develop appropriate mitigation measures and pursue funding for the mitigation.

Recreation and Scenic Resources

The additional drawdown of Lake Roosevelt during peak summer recreation periods may cause some water-dependent facilities, primarily boat ramps, to be inoperable for a few days from late August through early September. During the worst-case drought years, a total of eight boat ramps would potentially be inoperable at times during July and August. When some boat ramps are inoperable, it is expected that boating use will shift to other ramps that are operable, similar to existing conditions. This may slightly increase congestion at these areas for a few additional days. Some developed swimming areas, mooring docks, and camping areas may be affected during worst-case drought years. Lower lake levels would also create a change in the lake viewscape for a few days under worst-case drought conditions. The Water Management Agreements between the State of Washington and the CCT and STI provide mitigation for any potential impacts to recreation resources. The NPS has identified potential impacts and mitigation measures for specific recreation facilities. Ecology will work with the NPS to prioritize and implement the mitigation measures. These mitigation measures would extend the time that boat ramps and marins would be operable.

Socioeconomics

The Proposal is not expected to have significant socioeconomic impacts. Although some additional boat ramps may be inoperable for slightly longer periods than under existing conditions, it is expected that visitor use will shift to other areas. Although there could be some decrease in total recreation visits to Lake Roosevelt with resulting economic impacts, data from the 2001 drought indicates that total visitor use did not decline, but shifted to operable ramps. The mitigation measures being developed by Ecology and the NPS are expected to minimize the economic impacts on specific facilities.

Public Services and Utilities

The Proposal would slightly increase hydropower production in spring and slightly reduce hydropower production in some Septembers and in October. The reduction is not expected to significantly affect regional power production. The agreement between the State of Washington and the CCT provides for compensation to mitigate the potential impact to CCT hydropower revenues.

Transportation

The Proposal would have no impact on transportation. The Proposal is not expected to affect operation of the Inchelium-Gifford ferry.

S.4 Areas of Significant Controversy and Uncertainty

Potential impacts associated with the contamination of Lake Roosevelt is an area of uncertainty. Data collection and monitoring are ongoing to better assess and quantify potential adverse impacts to human health and the environment from known sources of contamination; this includes, but is not limited to, contaminants discharged to the Upper Columbia River from the Teck Cominco Trail smelter facility. The Trail smelter facility is considered the primary source of metals contamination, and potentially other hazardous substances, to the Upper Columbia River.

Results of those studies will not be available for this Supplemental EIS, but Ecology will consider the results when they become available in the future. It is not expected that the Proposal will add significantly to the exposure of the contaminants. The Proposal will not expose areas that are not already exposed during normal reservoir operations. Under the Proposal, additional drawdowns will occur during different times than under normal operations, but are expected to last for only a few days to a few weeks. If it is determined that the Proposal adversely affects the Lake Roosevelt environment by re-entraining contaminated sediments, Ecology and the CCT will establish a work group to identify and seek funding for appropriate mitigation.

Operation of Grand Coulee Dam and all the water supply projects in the Columbia River Basin could be impacted in the future by changes in climate and by renegotiation of the Columbia River Treaty with Canada. Climate change may reduce snowpack and alter the amount and timing of runoff to Lake Roosevelt. Any renegotiation of the Columbia River Treaty could require changes in operation of Lake Roosevelt. Ecology will coordinate with other managing agencies in the Columbia River Basin to plan for and adapt to these changes as they occur.

CHAPTER 1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

The Lake Roosevelt Incremental Storage Releases Project (the Proposal) is one of the early actions proposed under the Columbia River Basin Water Management Program (Management Program). The Proposal involves releases of water from Lake Roosevelt to provide water for downstream uses, including drought relief, municipal and industrial supply, alternatives to ground water use in the Odessa Subarea, and stream flow enhancement for fish downstream of Grand Coulee Dam. Some water would be released annually with additional water released in drought years.

The 2006 Washington State Legislature passed the Columbia River Basin Water Management Act, an act relating to water resource management in the Columbia River Basin (Chapter 90.90 Revised Code of Washington [RCW]). The Act directs the Washington State Department of Ecology (Ecology) to "aggressively pursue the development of water supplies to benefit both instream and out-of-stream uses." The Act also establishes the Columbia River Basin Water Supply Development Account and authorizes its use to assess, plan, and develop new storage; improve or alter operation of existing storage facilities; implement conservation projects; or undertake any other actions designed to provide access to new water supplies within the Columbia River Basin.

The environmental impacts of the Management Program and the Lake Roosevelt Incremental Storage Releases Project were evaluated at a non-project level in a State Environmental Policy Act (SEPA) Programmatic Environmental Impact Statement (EIS) (Ecology, 2007). This Supplemental EIS evaluates impacts associated with releases from Lake Roosevelt in more detail.

1.2 Organization of the Document

Chapter 1 of this Supplemental EIS provides background information on water allocation issues in the Columbia Basin, current operations of Lake Roosevelt, and the proposed incremental storage releases from Lake Roosevelt. Chapter 1 also describes the purpose of the project and the EIS scoping process. Chapter 2 presents the Proposal and the alternatives for implementing the storage releases project. The Proposal includes a range of alternatives and options for the timing of the incremental storage releases. Policy alternatives for releasing and allocating the stored water and the No Action Alternative are also described. Preferred Alternatives are identified in Chapter 2 and alternatives that were considered by Ecology, but not carried forward, are also described.

An overview of the affected environment for the Lake Roosevelt area, the Columbia River downstream from Grand Coulee Dam, and the Odessa Subarea is provided in Chapter 3. Chapter 4 evaluates the impacts associated with the Lake Roosevelt Incremental Storage Releases Project. Impacts to Lake Roosevelt, the Columbia River downstream, and the Odessa Subarea are discussed. Potential mitigation measures for identified impacts are described. Comments received on the Draft Supplemental EIS and written responses to those comments are included in Chapter 5. The references used in the document are listed in Chapter 6. Several appendices are attached which include various documents that relate to the Columbia River Water Management Program and the incremental storage releases.

1.3 Background on the Incremental Storage Releases Project

Passage of the Columbia River Water Management Act was the result of nearly 20 years of effort to improve water management in the Columbia River Basin. The history and background of the legislation is described in Section 1.3 of the Programmatic EIS (Ecology, 2007). This section describes the actions that led to the development of the Lake Roosevelt Incremental Storage Releases Project.

1.3.1 Cooperative Agreements

Part of the process of developing the Columbia River Water Management Act included Ecology initiating cooperative agreements with federal and local partners. Three of those agreements relate specifically to the Lake Roosevelt Incremental Storage Releases Project—the Memorandum of Understanding (MOU) between the State of Washington and the Bureau of Reclamation (Reclamation) and the Columbia Basin Project Irrigation Districts, and the Water Resources Management Agreements between the State of Washington and the Confederated Tribes of the Colville Reservation (CCT) and the Spokane Tribe of Indians (STI).

1.3.1.1 MOU with Reclamation and the Irrigation Districts

In 2004, the State of Washington, Reclamation and the South Columbia Basin, East Columbia Basin, and Quincy-Columbia Basin Irrigation Districts entered into a MOU to work together to support projects to optimize existing water management and to explore new storage options to provide additional water for priority uses. A copy of the MOU is included in Appendix A. The MOU has been the basis for Ecology and Reclamation to initiate several projects with funding from the Columbia River Basin Water Supply Development Account, including the Lake Roosevelt Incremental Storage Releases Project, the Columbia River Mainstem Off-Channel Storage Study (Section 1.5.4), the Odessa Subarea Special Study (Section 1.5.2), and the Potholes Reservoir Supplemental Feed Route Project (Section 1.5.1). The MOU also includes an agreement for the parties to seek water from existing Canadian storage facilities.

The MOU specifies that storage releases from Lake Roosevelt will be used for drought relief, municipal and industrial supply, the Odessa Subarea, and enhanced stream flows for fish. The MOU includes specific water allocations for those uses:

- Municipal and industrial supply—25,000 acre-feet for municipal and industrial purposes in non-drought and drought years.
- Fish benefits—127,500 acre-feet available to benefit stream flows and fish in the Columbia River annually and in drought years.
- Odessa Subarea—30,000 acre-feet of water available for delivery to the Odessa Subarea in non-drought and drought years.
- Drought relief—50,000 acre-feet available during designated drought years with 33,000 acre-feet allocated for interruptible water rights and 17,000 acre-feet for stream flows for fish in the Columbia River.

1.3.1.2 Tribal Agreements

The state has developed cooperative agreements with the CCT and with the STI regarding management of Lake Roosevelt. The state entered into an Agreement in Principle (AIP) with the CCT in 2005 and extended that agreement in 2006. Provisions of the AIP included:

- Investigation of potential impacts of the drawdown of Lake Roosevelt and compensation for impacts to the CCT;
- Creation of an economic development capital fund for the CCT;
- Creation of a fisheries enhancement capital fund and provisions for joint work on fisheries management; and
- Tribal participation in investigation of the potential for new off-channel storage in the Columbia River system.

In December 2007, the state announced the signing of Water Resources Management Agreements with the CCT and the STI in support of the incremental storage releases from Lake Roosevelt. The state agreed to provide annual payments to the tribes to mitigate the damage to fish and wildlife, recreation and cultural activities resulting from the release of water from Lake Roosevelt, and for economic development investments to benefit the local economy. The agreements were approved by the 2008 State Legislature in Engrossed Second Substitute Senate Bill 6874, which have been codified in Chapter 90.90 RCW. The legislation also includes provisions to develop agreements with affected counties.

The legislation directs Ecology to allocate funds annually from the Columbia River Basin Water Supply Development Account to the CCT and the STI. Funds are allocated to the CCT to provide mitigation for effects of the Proposal on resident fish, cultural resources, recreation resources, additional exposure of contaminated sediments, and hydropower revenue. Funds allocated to the STI are to provide mitigation for effects of the project on power revenue, recreation resources, and cultural resources. Neither agreement affects the tribal water rights or any other tribal rights.

The legislation also authorizes a study of potential impacts to counties affected by the Proposal. Ecology will assist affected counties to explore options to ensure water resources are available for their current and future needs. A Memorandum of Understanding could be developed between the state and the affected counties.

1.3.2 Priority Needs in the Columbia River Water Management Act

The Columbia River Water Management Act lists the priority needs for developing new water supplies in RCW 90.90.020(3). These are:

- Alternatives to ground water for agricultural users in the Odessa Subarea aquifer;
- Sources of water supply for pending water right applications;
- A new uninterruptible supply of water for the holders of interruptible water rights on the Columbia River mainstem that are subject to instream flows or other mitigation conditions to protect stream flows; and
- New municipal, domestic, industrial, and irrigation water needs within the Columbia River.

1.4 Background on Lake Roosevelt

Lake Roosevelt is the reservoir formed by Grand Coulee Dam. Construction on the dam began in 1933 and was completed in 1941. Congress originally authorized the Grand Coulee project for irrigation, navigation, flood control, and hydropower. Storage and delivery of water for municipal and industrial purposes is a beneficial use and a project purpose. Since the original authorization, recreation and fish management have been added to the authorized purposes of the dam and reservoir. However, recreation and fish management continue to be secondary considerations for the overall operation of the reservoir (NPS, 2000).

Grand Coulee and Lake Roosevelt are part of the complex and highly regulated system of Columbia River dams and reservoirs. The general management and operation of the Columbia River system is presented in Section 3.1 of the Programmatic EIS (Ecology, 2007). The following sections present additional information specifically relevant to management of Lake Roosevelt.

1.4.1 Lake Roosevelt Operations

Reclamation currently operates the dam and reservoir for flood control, hydropower generation, irrigation, recreation, and fish and wildlife. The reservoir is operated in coordination with the U.S. Army Corps of Engineers (Corps) for flood control and the Bonneville Power Administration (BPA) for power production. Reclamation also coordinates with state and federal fish and wildlife agencies to release flows for fish in the Columbia River or to store water in the reservoir for resident fish.

At full pool, the surface elevation of Lake Roosevelt is 1,290 feet mean sea level (msl) and has a capacity of 9 million acre-feet. Lake Roosevelt receives large amounts of runoff from its tributaries with enough runoff to fill the reservoir approximately seven

times in an average year. The minimum pool level of Lake Roosevelt is 1,208 feet msl. To meet the purposes of its operation, Lake Roosevelt is drawn down and filled twice during the year—once for flood control and once for flow augmentation. Figure 1-1 illustrates typical lake levels at Lake Roosevelt for three different years that represent a dry (2003), wet (1997) and average year (2002

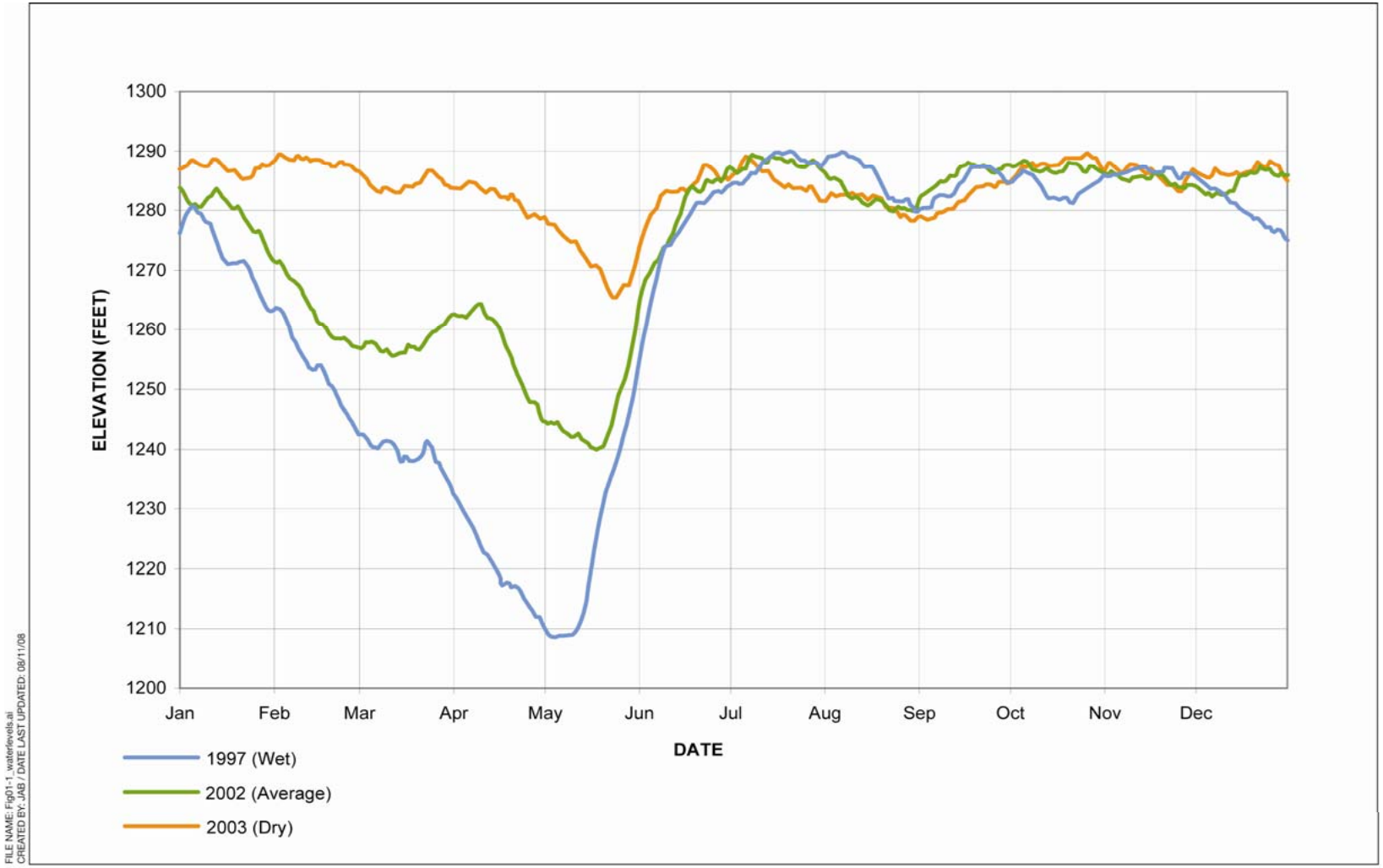
The reservoir is operated under a series of "rule curves" that regulate the amount of fill and drawdown for flood control. In late winter or early spring, flows are released from the reservoir to allow room to store upstream runoff to prevent flooding downstream. In an average year, with normal precipitation, the reservoir can be drawn down 50 feet or more. The level of draw down is set by the Corps based on daily, weekly, and monthly forecasts of precipitation and runoff and other factors. The reservoir typically refills by July 1.

For the remainder of the year, lake levels fluctuate from releases for irrigation and fish flows. Approximately 2.65 million acre-feet is pumped annually to Banks Lake to support irrigation in the Columbia Basin Project. The irrigation season is generally from March through October.

Lake Roosevelt is also operated to provide stream flows downstream to benefit fish. In the Columbia River system, there are 13 anadromous fish species listed as threatened or endangered under the Endangered Species Act (ESA). Under the ESA, NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS) have developed Biological Opinions that include objectives for Columbia River operations to benefit the listed species. The two agencies review annual water management plans developed by the Corps, Reclamation, and BPA to assist in meeting the Biological Opinion fish objectives. Additional information on the Biological Opinions, including on-going litigation, is provided in Section 3.6. The water management plans are intended to manage flows to avoid stranding fish, speed downstream migration of juvenile fish, meet water temperature needs, and avoid creating dissolved gas conditions (Section 3.4).

The general guidelines for Lake Roosevelt operations affecting fish include:

- Operate to achieve 85 percent probability of achieving the upper rule curve by approximately April 10, which will maximize spring flows.
- Inform Tribes of planned lake operations so that releases of kokanee into the lake can be scheduled.
- Refill by approximately July 1.
- Variable draft in July and August to elevation 1,278 or 1,280 feet msl based on the final July forecast for runoff at The Dalles.
- Maintain lake levels between 1,283 and 1,285 in fall to benefit kokanee in the lake.



Lake Roosevelt FSEIS . 207301

Figure 1-1
Lake Roosevelt Water Elevations

In addition to seasonal fluctuations, Lake Roosevelt fluctuates daily because of releases for hydropower production. Grand Coulee Dam is one of 11 hydropower generating facilities on the Columbia River mainstem. Grand Coulee Dam has three power plants with 32 turbines and a maximum generating capacity of 6,809 megawatts. The amount and timing of power generation is regulated by the Pacific Northwest Coordination Agreement (PNCA) and the Canadian Treaty (see Section 1.4.2). Additional information on hydropower production is provided in Section 3.13.

Reclamation also operates Lake Roosevelt for recreation purposes within the limitations of the rule curves for other reservoir purposes. To assure that boat launches and marinas are accessible and beaches and campgrounds can be optimally used, Reclamation tries to maintain lake levels at or above 1,280 feet msl during the summer recreation season.

1.4.2 River and Reservoir Management

The operation of Columbia River dams and reservoirs, including Lake Roosevelt, are governed by a complex system of international treaty, federal and state laws, and management agreements. The river and dams are managed as the Federal Columbia River Power System (FCRPS) and regulated by BPA, Reclamation, and the Corps. These agencies coordinate the operations of the reservoirs to meet their various authorized purposes. In addition, a number of other organizations have management responsibilities related to specific purposes. The FCRPS Regional Forum was established to provide regional discussion and decisions on the operation and configuration of the FCRPS (FCRPS, 2001). The Regional Forum consists of an Implementation Team, the Executive Committee, and various technical teams and work groups, including the Technical Management Team (TMT). The TMT consists of representatives from NOAA Fisheries, USFWS, Reclamation, Corps, BPA, Environmental Protection Agency (EPA), National Weather Service, state agencies, and Indian Tribes. The TMT is responsible for recommendations on day-to-day operations to optimize passage conditions for fish under the Biological Opinions.

Several native tribes have reservations and historic use areas in the Columbia River Basin. The native tribes have historic and treaty rights to take fish from the Columbia River and its tributaries and have treaty rights to fish, hunt, and gather in usual and accustomed places. The federal government has a trust responsibility to provide services that protect and enhance the treaty rights of native people. The tribes implement fish and wildlife management programs in the Columbia River Basin and participate in river governance decisions. In addition to the CCT and STI discussed previously, tribes with interest in the operation of Lake Roosevelt are the Yakama Nation and the Nez Perce, Umatilla, and Warm Springs Tribes.

1.4.3 Lake Roosevelt National Recreation Area

Lake Roosevelt, the reservoir behind the dam, is approximately 150 miles long and extends nearly to the Canadian border. The lake has approximately 600 miles of shoreline. The majority of the shoreline is managed as the Lake Roosevelt National Recreation Area (NRA). From 1946 until 1990, the NRA was managed solely by the

National Park Service (NPS). In 1990, cooperative management was established between NPS, the Confederated Tribes of the Colville Reservation (CCT), and the Spokane Tribe of Indians (STI). The NRA consists of a narrow band of land that extends upland from the maximum high water mark of the reservoir (1,290 feet msl). The NRA encompasses all the lands that were acquired or withdrawn by Reclamation for construction of the reservoir. The CCT and the STI manage the lands on their tribal reservations and the NPS manages the lands in the NRA. Reclamation retains management of the dam, its immediate area, and some other locations deemed necessary for operating the reservoir. Additional information on recreation and shoreline management are provided in Section 3.11.

1.5 Purpose and Objectives

The purpose of the Lake Roosevelt Incremental Storage Releases Project is to improve water management in the Columbia River Basin by releasing additional water from Lake Roosevelt to meet the following objectives:

- Improve municipal and industrial water supply in the Columbia River Basin by providing water to fulfill pending municipal and industrial water rights applications;
- Improve water management in the Odessa Subarea by providing water to replace some ground water withdrawals;
- Enhance stream flows in the Columbia River downstream of Grand Coulee Dam to benefit fish; and
- Provide water to holders of interruptible water rights during drought years.

These objectives address the purposes described in the MOU between Ecology, Reclamation, and the Columbia Basin Project Irrigation Districts (Section 1.3.1). These objectives also address the priority needs identified in RCW 90.90.020(3) (Section 1.3.2). The allocation of water to meet these objectives complies with the allocation in the MOU. In addition, although the Proposal does not involve new storage, it generally meets the allocation requirements of RCW 90.90.020(1)(a) that two-thirds of active new storage must be available for out-of-stream uses and one-third for augmenting instream flows.

1.6 Related Projects

Several other water resource projects are being undertaken in the Columbia River Basin both as part of the Columbia River Water Management Program and separate from it. These projects include some that are being undertaken jointly by Ecology and Reclamation. The potential impacts of these projects are being evaluated separately under SEPA and/or the National Environmental Policy Act (NEPA), as appropriate. These projects are briefly described below and are considered as part of the cumulative effects assessment in this Supplemental EIS. In addition to the projects described below in which Ecology is involved, other projects, such as new flood control and fish

operations at Libby and Hungry Horse Dams in Montana, may affect water resources management of the Columbia River Basin.

1.6.1 Potholes Reservoir Supplemental Feed Route

Reclamation, in cooperation with Ecology, has studied a Supplemental Feed Route to convey water from Banks Lake to Potholes Reservoir to supply water to parts of the East and South Columbia Basin Irrigation Districts. The project is intended to improve the distribution of water to Potholes Reservoir and will carry the same amount of water as the existing routes. This project was evaluated as an early action in the Columbia River Water Management Program Programmatic EIS (Ecology, 2007) which considered three alternative routes. Based on the Programmatic EIS, technical studies of the three routes, and a NEPA Environmental Assessment (EA) prepared by Reclamation (Reclamation, 2007), Reclamation has selected a Supplemental Feed Route that will utilize both Crab Creek, a natural water body, and the existing Frenchman Hills Wasteway.

The Supplemental Feed Route will be constructed in phases. In the first phase, Reclamation and Ecology expanded the culverts at the crossing of Frenchman Hills Wasteway with Road C SE to allow additional flows in Frenchman Hills Wasteway. Ecology prepared a SEPA Checklist on the culvert expansion project and issued a Mitigated Determination of Nonsignificance (MDNS) in January 2008. Construction was completed in March 2008. Reclamation has received funding to proceed with the Supplemental Feed Route project and may begin the remaining phases in 2009. At the time that project is carried forward, Ecology will prepare additional SEPA documentation on the Crab Creek route. Additional information on the Supplemental Feed Route can be found at: www.ecy.wa.gov/programs/wr/cwp/cr_potholes.html.

1.6.2 Odessa Subarea Special Study

The Odessa Ground Water Management Subarea (Odessa Subarea) was designated by Ecology in response to declining ground water levels. Reclamation, in conjunction with Ecology, is studying options for replacing ground water currently used for irrigated agriculture with surface water from the Columbia River. The replacement water would be for the portions of the Odessa Subarea that lie within the Columbia Basin Project. Reclamation has considered four alternatives for conveyance infrastructure to provide surface water to the Odessa Subarea:

- Construct a new East High Canal;
- Construct the northern portion of the East High Canal and enlarge and extend the East Low Canal;
- Enlarge the East Low Canal; and
- Use the existing East Low Canal configuration.

The appraisal level study of the alternatives was completed in April 2008. In that study, Reclamation selected the alternative that includes construction of the northern portion of the East High Canal and enlarging and extending the East Low Canal south of Interstate 90 for further study. Reclamation and Ecology will conduct additional technical and

economic studies and will prepare a joint NEPA/SEPA evaluation starting in 2008. Additional information on the Odessa Subarea Special Study can be found at: http://www.usbr.gov/pn/programs/ucao_misc/odessa/index.html. The proposed release of 30,000 acre-feet of water from Lake Roosevelt proposed in this Supplemental EIS is not considered as an alternative in the Odessa Subarea Special Study. However, the release would supply a portion of the needed replacement water.

1.6.3 Columbia-Snake River Irrigators Association Voluntary Regional Agreement

The Columbia River Water Management Act provides for groups or organizations to enter into Voluntary Regional Agreements (VRAs) with Ecology for the purpose of finding new water for out-of-stream use, streamlining the application process, and protecting instream flow. The VRAs must meet requirements described in RCW 90.90.030(2) to be approved. The 2007 Programmatic EIS evaluated the impacts of VRAs in general, but also focused specifically on a preliminary VRA proposal submitted by the Columbia-Snake River Irrigators Association (CSRIA).

Ecology conducted additional environmental review and negotiated a revised agreement with CSRIA. In July 2008, Ecology signed the CSRIA VRA. The VRA will be implemented in two phases. Phase 1 includes the issuance of drought permits as provided below and pilot projects to demonstrate that proposed conservation projects will result in saved water that could be used for issuing new water rights. Phase 2 would be continued implementation of Phase 1 permits and projects and additional projects that would support the issuance of new water rights. Phase 2 would only be implemented if the pilot projects in Phase 1 demonstrate that conservation projects can provide sufficient water for the issuance of new water rights and if a foundation has been established for a long-term working relationship between Ecology and the CSRIA.

Under Phase 1 of the VRA, Ecology commits to issue supplemental drought permits to interruptible water rights holders that are CSRIA members, provided that mitigation water from efficiency measures and other measures is available to offset their water use during July and August on the Columbia River (and from April to August on the Snake River). In exchange, participating CSRIA members commit to implementing and maintaining state-of-the-art water use efficiency measures and best management practices, and submit their water rights to Ecology for “recalibration” (determination of extent and validity) of actual beneficial use. Any water saved through the recalibration would be placed into Ecology’s Trust Water Rights Program. Ecology is obligated to make a “good faith” effort to develop water supplies necessary to allow issuance of supplemental drought permits consistent with the mitigation standards contained in Chapter 90.90 RCW.

If the Phase 1 pilot projects demonstrate that conservation projects can provide sufficient water, Ecology could grant new interruptible water rights to CSRIA members in Phase 2 of the VRA. The new interruptible water rights would be granted in exchange for CSRIA members agreeing to install or maintain water use efficiency practices. The new water rights would only be issued if the provisions of 90.03.290 are met and if stream flows in

the Columbia and Snake Rivers are not impacted during the critical months. Applicants would need to submit new water rights to Ecology for recalibration and Ecology must certify their best management practices. Where possible, Ecology would manage the saved water in the Trust Water Rights Program to mitigate for out-of-stream water uses for the next water rights applicant and to help meet instream flow objectives. Participating CSRIA members will provide annual mitigation payments that would be placed in the Columbia River Water Supply Development Account. The funds will be used by Ecology to obtain mitigation water. Additional information on the CSRIA VRA can be found at: www.ecy.wa.gov/programs/wr/cwp/cr_vra.html.

1.6.4 Columbia River Mainstem Off-Channel Storage Options

Under the provisions of their MOU with the three Columbia Basin Irrigation Districts (Section 1.3.1), Reclamation and Ecology jointly evaluated the potential for development of a new large, off-channel storage site in the Columbia River Basin. In an appraisal, or preliminary, evaluation released in May 2007, the agencies evaluated four potential sites for a reservoir—Hawk Creek, Foster Creek, Sand Hollow, and Crab Creek. Of the four potential sites, Crab Creek appeared to be viable from a technical and cost perspective, but also appeared to have the most significant adverse environmental impacts. No decision has been made concerning whether to pursue a Feasibility Study, the next step in the federal process for evaluating potential water projects. A Feasibility Study requires Congressional authorization and appropriation, which has not yet been granted. The Feasibility Study, if authorized, would include preparation of a NEPA/SEPA EIS. Additional information on the off-channel storage projects can be found at: www.ecy.wa.gov/programs/wr/cwp/crbwmp_mainstem_storage.html.

1.6.5 Yakima River Basin Water Storage Feasibility Study

Reclamation and Ecology are studying alternatives to improve water supply in the Yakima River Basin. The purpose of the Yakima River Basin Water Storage Feasibility Study according to Congressional authorization is to:

- Improve fish habitat,
- Improve water supply for irrigation, and
- Meet future municipal needs.

Reclamation and Ecology jointly considered three storage alternatives in the Feasibility Study—Black Rock Reservoir, Wymer Reservoir, and Wymer Reservoir combined with a Yakima River pump exchange. The Black Rock alternative would pump water from the Columbia River during high flows and store it in a reservoir near Moxee for release to the Yakima River to provide irrigation water. The Wymer Reservoir alternatives would pump water from the Yakima River during high flows and store it in a reservoir at Lmuma Creek for release during the irrigation season.

In addition, Ecology considered three non-storage alternatives—enhanced water conservation, market-based reallocation of water resources, and ground water storage. The Draft Planning Report and EIS for the Storage Feasibility Study was released in

January 2008. For additional information on the Yakima Storage Project and the Feasibility Study see: www.usbr.gov/pn/programs/storage_study/reports.html.

Based on comments received on the Draft Planning Report and EIS, Ecology determined that it might not have fulfilled its requirements under SEPA to identify and evaluate all reasonable water supply alternatives. Therefore, Ecology has separated from the joint NEPA/SEPA process and is continuing to evaluate a broad range of alternatives to improve water resource management in the Yakima River basin. Ecology plans to issue a Supplemental Draft EIS on the additional alternatives in Fall 2008 with the Final EIS completed in March 2009.

The Columbia River Water Supply Development Account is funding part of the Yakima Storage Feasibility Study, but the project has its own Congressional and legislative authorization.

1.6.6 Lake Roosevelt Remedial Investigation and Feasibility Study

Sediments in Lake Roosevelt have been contaminated by elevated levels of heavy metals, including lead, copper, zinc, arsenic, mercury, and cadmium. Studies also show high levels of dioxins, furans, and polychlorinated biphenyls (PCBs). Smelting operations in Trail, British Columbia are recognized as the primary source of legacy metals contamination to the Upper Columbia River. This metal contamination is considered relevant to the Lake Roosevelt Incremental Storage Releases Project; other secondary point sources of legacy metals pollution of lesser magnitude also may remain, but have yet to be fully documented and characterized. Pulp mill operations near Castlegar, British Columbia, while recognized as a primary source of organochlorine compounds to the Upper Columbia River, may be less relevant to the Proposal. The Trail, British Columbia smelter, owned by Teck Cominco, is approximately 10 miles north of the U.S. and Canadian border. Until the mid 1990s, the smelter discharged metals-laden slag directly to the Columbia River. Contaminant loading has decreased since smelter operations changed in the 1980s and discharges were discontinued in 1995. Sediments in Lake Roosevelt still have high concentrations of the metals and there is evidence that the contaminants are having long-term effects on organisms.

The U.S. Environmental Protection Agency (EPA) began investigating human health and environmental risks of sediment contamination in 1999. In 1999, the CCT petitioned EPA to conduct an assessment of the contamination under U.S. federal law. Because the source of the contamination was outside the United States, there was legal debate over whether the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) regulations applied. In July 2006, the Ninth Circuit Court ruled that CERCLA applied to Teck Cominco even though the contamination originated in Canada. In January 2008, the U.S. Supreme Court denied Teck Cominco's appeal of that ruling.

Teck Cominco entered into a voluntary agreement with EPA in 2006 to assess the extent of the contamination in a Remedial Investigation Study. EPA is currently evaluating Teck Cominco's work plan for the Remedial Investigation Study. The Remedial

Investigation Study will include studies of soils, water quality, and fish along with a human health risk assessment. The results of these studies will not be available for inclusion in this Supplemental EIS.

1.7 Scoping Process

In accordance with SEPA, Ecology implemented a scoping period for the Supplemental EIS on the incremental storage releases from December 13, 2007 to January 4, 2008. A total of 63 letters or emails were received during the scoping period. Written comments were received from the Yakama Nation; Columbia River Intertribal Fish Commission; Washington Departments of Ecology, Natural Resources, and Fish and Wildlife; Okanogan, Stevens, and Ferry Counties; the Cities of Kettle Falls, Bridgeport, and Brewster; American Rivers and the Washington Environmental Council; Center for Environmental Law and Policy; Center for Water Advocacy; Stevens County Farm Bureau; CSRIA, Columbia Basin Development League; and numerous individuals.

The comments received covered a number of subjects and represented a range of viewpoints. The major areas of concern were:

- Effect of lower lake levels on fisheries, wildlife habitat, water quality, bank sloughing, exposure of contaminated sediments, exposure of buried cultural resources, and recreational facilities;
- Effects of increased or decreased flows in the Columbia River on anadromous fish, water quality, riparian vegetation and wildlife;
- Economic impacts to the communities and tribes around Lake Roosevelt;
- Impacts to ground water and tributaries to Lake Roosevelt;
- Impacts to hydropower production at downstream dams;
- Impacts of increased development at areas receiving the storage releases;
- Cumulative impacts of all the water management projects proposed in the Columbia River Basin;
- Ecology should stop “piecemealing” the SEPA analysis of the projects;
- The recommendations of the National Research Council should be considered; and
- Comments opposed to new reservoir construction or allocation of more water to municipal or irrigation uses.

The scoping comments were used to determine which elements of the environment should be evaluated in the Supplemental EIS. In addition, the comments that were received on the Draft Programmatic EIS on the Columbia River Water Management Program were reviewed, and comments relevant to the Proposal were used to develop the scope of the Supplemental EIS.

This Supplemental EIS addresses the relevant and substantive issues identified during scoping. Ecology determined that some of the issues that were raised during scoping merited separate responses. These comments and responses are attached in Appendix B.

CHAPTER 2.0 PROPOSAL AND ALTERNATIVES

2.1 General Description of the Proposal

The Lake Roosevelt Incremental Storage Releases Project involves withdrawing additional water from Lake Roosevelt to provide water for downstream uses, including drought relief, municipal and industrial supply, alternatives to ground water use in the Odessa Subarea, and enhanced stream flows for fish. The storage releases would be diverted from Reclamation's existing 6.4 million acre-foot storage right for water behind Grand Coulee Dam. The storage releases would result in additional drawdown of the lake level during the spring and summer months. The additional drawdown would be within the normal operating range of Lake Roosevelt. Ecology would issue secondary permits to Reclamation for release of water stored in Lake Roosevelt under Reclamation's 1938 storage right. Ultimately, Ecology would issue new water rights for municipal and industrial uses and standby-reserve permits for interruptible water rights holders.

This Supplemental EIS considers two alternatives for the Incremental Storage Releases Project—the No Action Alternative and the Proposal. The No Action Alternative was described in Section 2.5.1.2 of the Programmatic EIS (Ecology, 2007) and is summarized in Section 2.2. The Proposal includes a range of alternatives and options for the timing of the flow releases as well as allocation of the water. These alternatives and options are described in Section 2.3. Ecology has selected variations of Alternatives 1C and 1E as the Preferred Alternatives for the incremental flow releases. The Preferred Alternatives are described in detail in Sections 2.3.1, 2.3.2.3, and 2.3.3.

2.2 No Action Alternative

Under the No Action Alternative, no incremental storage releases would be made from Lake Roosevelt. The reservoir would continue to be operated under existing conditions. Lake levels would continue to fluctuate as they do under the existing operating schedule.

No additional releases would be made from Lake Roosevelt to improve municipal and industrial water supply or provide water for Columbia River mainstem interruptible water right holders. The water users with pending water right applications for municipal and industrial uses would need to seek other sources of water or water rights or reduce their expected water use. The water users with interruptible water rights would continue to have their water diversions interrupted during drought years as conditioned on their existing water rights. There would be no additional water released from Lake Roosevelt to supplement stream flows for fish in the Columbia River during non-drought or drought years. Lake Roosevelt water would not be available to help replace ground water in the Odessa Subarea during non-drought years. Irrigators in the Odessa Subarea would continue to deplete the Odessa Aquifer, find new sources or water, alter their agricultural practices to use less water, or convert to dry land farming.

Other entities may propose releases of water from Lake Roosevelt as separate projects. Those projects would be evaluated under separate environmental review.

2.3 Proposal

Under the Proposal, storage water would be released from Lake Roosevelt to provide water for Columbia River mainstem interruptible water right holders, improve municipal/industrial supply, replace some ground water supplies in the Odessa Subarea, and improve stream flows downstream of Grand Coulee Dam. The Proposal includes withdrawals that would occur annually and withdrawals that would occur only during drought years. The amount of water allocated for each of these uses is prescribed in the MOU between Washington State, Reclamation and the three Columbia Basin Project Irrigation Districts (Section 1.3.1.1).

The water that will be released from Lake Roosevelt is water that is currently stored in the lake as part of Reclamation's 1938 storage water right. Under the Proposal, Ecology would issue Reclamation two secondary water use permits to use the water for the purposes designated in the MOU. Permit 1 is for 37,000 acre-feet for enhanced stream flows with 25,000 acre-feet of that amount to be placed in trust for mitigation of future municipal and industrial use. The instantaneous flow limit on Permit 1 is 305 cfs with 204.66 cfs for municipal and industrial use and 101.33 cfs for fish flows. Permit 2 is for 30,000 acre-feet for the Odessa Subarea to be provide an alternative water supply to existing ground water use and 15,000 acre-feet for stream flow enhancement. The instantaneous flow limit on Permit 2 is 303 cfs with 181 cfs for the Odessa Subarea and 122 cfs for fish flow enhancement.

Annually, 82,500 acre-feet would be released to supply municipal and industrial uses, offset some ground water use in the Odessa Subarea, and provide increased stream flows (Figure 2-1a). In drought years, a total of 132,500 acre-feet (an additional 50,000 acre-feet) would be released with additional water to supply interruptible water rights and for stream flows (Figure 2-1b). See Sections 2.3.2 and 2.3.3 for details on the proposed flow releases.

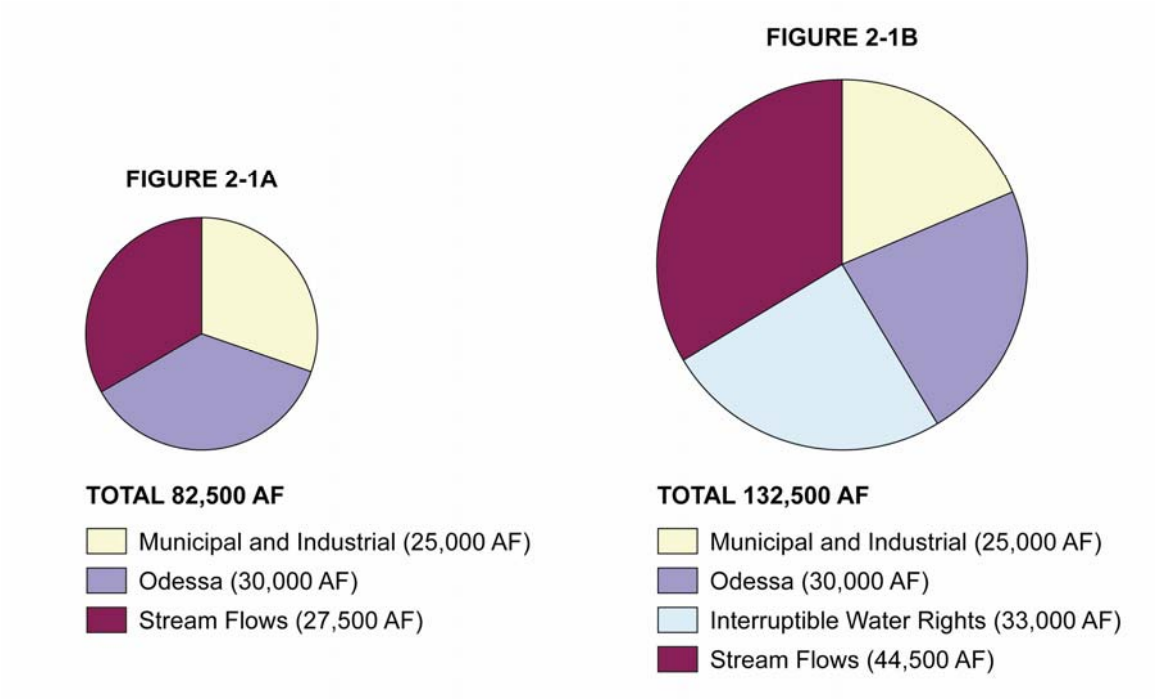


Figure 2-1 Flow Releases for the Purposal

Ecology considered different options for the timing of both annual and drought year flow releases. The different timing is intended to improve benefits to fish. The different options would be used during average, dry, and drought years. The definition of these conditions is based on the amount of runoff predicted at The Dalles Dam.

A drought year is defined by administrative rule and is any year when the March 1 forecast for April through September runoff at The Dalles Dam is less than 60 million acre-feet (WAC 173-563-056). The forecast is made by the National Weather Service. For drought year conditions to apply, Ecology must also make a formal request in accordance with the Reclamation States Drought Relief Act of 1991 (P.L. 102-250). By this definition, a drought year occurs on average once every 26 years based on the period of record (Slattery, 2002).

For the purposes of this Proposal, Reclamation and Ecology have developed definitions for other water year conditions. Unlike the drought year which is defined by state law, the forecast for these years is made for runoff between April and August. A dry year is defined by Reclamation and Ecology as any year in which the predicted runoff is less than 73 million acre-feet at The Dalles Dam. This corresponds to 20 per cent of the driest years which trigger April to June water releases under the Water Resource Management Agreement with the CCT. For the purposes of describing the alternatives in this Proposal, all other years with runoff above 73 million acre-feet are termed “average” years. The term “average” does not imply that the runoff for those years is a mathematical average of historic flows.

Flow releases for the Odessa Subarea would remain the same under all alternatives except for Alternative 1A. To meet irrigation needs, the flows would be released to and

withdrawn from Banks Lake during the entire irrigation season from April to October, except during September. Because Reclamation must meet its target of refilling Lake Roosevelt by October 1 for kokanee and because of the need to meet hydropower production schedules, Reclamation cannot release water for the Odessa Subarea from Lake Roosevelt in September of some years. To meet irrigation needs in September in those Septembers when water is not available from Lake Roosevelt, Reclamation would release the water for Odessa directly from water stored in Banks Lake with no input from Lake Roosevelt. Since all water in Banks Lake is provided by Reclamation's 1938 storage water right, the water is still part of the Lake Roosevelt Incremental Storage Releases Project.

In wet and average years, there would be no additional drawdown of Banks Lake because Reclamation typically pumps additional water from Lake Roosevelt to Banks Lake over Labor Day when power demands are low. This raises the level of Banks Lake above its typical level of 1,565 feet msl. Reclamation is not able to do the Labor Day weekend releases to Banks Lake during dry and drought years. In those years, Reclamation would draft down Banks Lake in September to provide water for the Odessa Subarea. Banks Lake would also be drawn down during years when insufficient time exists between August 31 and Labor Day for sufficient refill to occur to allow pumping from Lake Roosevelt. The Banks Lake drawdowns would occur approximately once every three years and would lower the lake approximately 1.5 inches by the end of September. In all situations, flows released for the Odessa Subarea would not be available for downstream uses in the Columbia River.

Under some of the options for the timing of flow releases, the flows would not be released from Lake Roosevelt at the same time that water would be diverted or withdrawn for some specific beneficial uses. For example municipal and industrial withdrawals would occur year-round, but no flow releases would occur from September to April. Most of the alternatives and options for flow releases do not match the expected out-of-stream water demands; therefore it is likely that new permits would either require a determination of overriding consideration of the public interest (OCPI) or be conditioned to the adopted minimum instream flows.

An OCPI determination is required when water uses would conflict with the instream flow rule for the Columbia River (Chapter173-563 WAC). The administrative rule authorizes the director of Ecology to approve future uses of water that would conflict with the provisions of Chapter 173-563 "only in those situations when it is clear that overriding considerations of public interest will be served" (WAC 173-563-080).

Consideration of the public interest by the director of Ecology includes an evaluation of all uses of the river and their impact on the state of Washington. The uses to be considered include, but are not limited to, uses of water for domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, thermal power production, and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state (WAC 173-563-080). The OCPI determination is to be made in consultation with the directors of the Washington Department of Fish and Wildlife (WDFW) and the state Department of Agriculture, and the state Commissioner of Public Lands.

A 2008 trial court ruling invalidated portions of the state's Municipal Water Law (Lummi Indian Nation v. State of Washington), including the definition of municipal water suppliers. For the purpose of this Proposal and consistent with that ruling, Ecology considers the following public institutions to be municipal water suppliers: cities and towns, counties, public utility districts (PUDs), and water and sewer districts. Other public institutions will be considered on a case-by-case basis.

Ecology would enter into a Memorandum of Agreement (MOA) with Reclamation for service contracts for the incremental storage releases. The MOA would cover annual releases for municipal and industrial uses and flow enhancement for fish and drought water for interruptible water rights and fish flow enhancement. The MOA would govern the term of the service contracts, cost, and other administrative details. Reclamation's service contract with the East Columbia Basin Irrigation District would cover releases for the Odessa Subarea.

2.3.1 Preferred Alternatives

Ecology has selected Preferred Alternatives for the incremental storage releases based on analysis in the Draft Supplemental EIS; further discussions with Reclamation, WDFW, and other interested parties; and comments received on the Draft Supplemental EIS. The Preferred Alternatives, one for annual releases and one for additional releases during drought years, are variations of Alternatives 1C and 1E. These alternatives are intended to maximize the benefits for fish in the Columbia River. In the Draft Supplemental EIS, Alternatives 1C and 1E included specific flow releases for each month and each purpose. Ecology determined that setting specific flows in advance would not allow flexibility in managing the flows for fish under differing conditions. Therefore, the Preferred Alternatives only specify in which months varying flows would be released for the different purposes.

The specific amount of flow released each month would be determined by a panel of fisheries and water managers from Ecology, Reclamation, tribes, the Columbia River Intertribal Fish Commission (CRITFC), WDFW, NOAA Fisheries, and the U.S. Fish and Wildlife Service. The panel would determine specific releases each year based on the March 1 forecast for April through September runoff at The Dalles Dam with the goal of scheduling releases to maximize fish benefits under the specific conditions in any year. The panel would also consider anticipated river conditions and the status of fish runs and outmigration. Ecology is negotiating an MOA with Reclamation to incorporate the adaptive management strategy for the Preferred Alternatives into river operations.

Ecology has determined that the match demand alternatives, Alternatives 1Ba, 1Bb, and 1D evaluated in the Draft Supplemental EIS are not workable alternatives. The intent of those alternatives was to match the releases with the actual demand for specific project purposes. Based on the analysis in the Draft Supplemental EIS, Ecology determined that water was not available in all years to meet the demand. Therefore, those alternatives are not being carried forward. Alternative 1A is also not being carried forward because releasing all the water only in July and August does not fully meet the purpose of providing water for the various project purposes.

The Preferred Alternatives, including the new variations are described in Sections 2.3.2.3 and 2.3.3 below. Revisions have been made to the impacts discussion of the Preferred Alternatives in Chapter 4 as needed.

2.3.2 Annual Releases

Annually, an additional 82,500 acre-feet would be diverted or released from Lake Roosevelt to provide the following:

- 25,000 acre-feet of municipal and industrial supply,
- 30,000 acre-feet of irrigation water for replacement of ground water supplies in the Odessa Subarea, and
- 27,500 acre-feet for stream flow enhancement downstream of Grand Coulee Dam.

Figure 2-1a illustrates the allocation of the flows. Nearly all of the flows for municipal and industrial supply and for stream flow enhancement would be released to the Columbia River below Grand Coulee Dam. The water for the Odessa Subarea would be released to Banks Lake and transported through the existing East Low Canal system to farms in the Odessa Subarea. Water diverted to the Odessa Subarea would not be available downstream on the Columbia River for stream flows or hydropower production.

The water for stream flow enhancement and municipal and industrial uses would be transferred to the Trust Water Rights Program based on the term negotiated under the service contract with Reclamation. After that time, water rights permits would be issued for the water placed in the Trust Program for mitigation for municipal and industrial uses (25,000 acre-feet) with 12,500 acre-feet remaining in the Trust Program for instream flow support. A party that wants to use water for municipal and industrial purposes would be required to file an application with Ecology to obtain a water right permit or have already filed an application.

Reclamation would enter into a contract with the East Columbia Basin Irrigation District which would issue contracts to irrigators for the water released to meet irrigation needs in the Odessa Subarea. It is not known at this time which irrigators would receive the water or how much of the water would be distributed north or south of Interstate 90 (I-90). Reclamation will determine the steps necessary for NEPA compliance on the contracts at the time they are issued.

The annual diversion would result in a maximum additional drawdown of the reservoir of approximately 1.1 feet. The full effect of the drawdown would be observed on August 31. The maximum drawdown would last for a few days. For all release alternatives, the reservoir would refill rapidly after the end of August because Reclamation begins to refill the reservoir at that time to meet lake level requirements for kokanee salmon.

Three alternatives were considered for the annual flow releases. These are described as Alternatives 1A, 1B, and 1C. Alternative 1A represents the alternative considered in the Programmatic EIS (Ecology, 2007), with all releases occurring during July and August. Alternative 1B incorporates flow releases that best match demand, and Alternative 1C times flow releases to maximize benefits downstream for fish. Both Alternatives 1B and 1C include different flow options that would provide different benefits to fish. These

options are described for average and dry year conditions. Ecology has selected Alternative 1C, which would provide maximum benefits to fish as the Preferred Alternative for annual releases.

2.3.2.1 Alternative 1A Releases during July and August

Under Alternative 1A, all storage releases would occur during July and August. This alternative was evaluated in the Programmatic EIS. The July and August period was originally selected to agree with the requirement in the Columbia River Water Management Act (the Act) that Columbia River mainstem flows must be protected during those months (RCW 90.90.030). The requirement for protecting flows during those months specifically relates to the approval of Voluntary Regional Agreements and does not apply to all aspects of the Columbia River Water Management Program. The legislature selected the July and August period based on its interpretation of information contained in the National Resources Council report, *Managing the Columbia River: Instream Flows, Water Withdrawals, and Salmon Survival* (National Resources Council, 2004).

Because this alternative was evaluated in the Programmatic EIS, additional evaluation is provided in this Supplemental EIS only to clarify impacts or to supply additional information received since the Programmatic EIS. For this alternative, flows would be released equally during the months of July and August (Table 2-1). Flows to Odessa would be diverted to and released from Banks Lake while the flows for stream enhancement for fish and municipal and industrial users would be released to the Columbia River. This alternative is not being carried forward because releasing all the water in the two month period would not meet the purposes of the project. Alternative 1A was not selected as a preferred alternative because the release of flows in only July and August would not make water available at the times needed to meet the purposes of the Proposal.

Table 2-1. Alternative 1A—Average Year

Purpose of Flow Releases	***Total Release (acre-feet)***	***Schedule of Incremental Releases from Lake Roosevelt (average cfs)***						
		April	May	June	July	August	September	October
Odessa	30,000	0	0	0	181	181	0	0
Fish	27,500	0	0	0	223	223	0	0
Municipal/ Industrial	25,000	0	0	0	204	204	0	0
Total	82,500	0	0	0	608	608	0	0

2.3.2.2 Alternative 1B Demand Alternative

Under Alternative 1B, the timing of water released from Lake Roosevelt from April to October is intended to match the seasonal demand for the water as closely as possible. Water for municipal/industrial uses and stream flows would be released to the Columbia River between April and September, although water may not be available in all Septembers. Water for the Odessa Subarea would be released to Banks Lake during the irrigation season—April to October, although water may not be available in all Septembers necessitating occasional drafting of Banks Lake. The operational scenarios for Alternative 1B vary for average and dry year conditions (Tables 2-2 and 2-3). The tables show the amount of water that would be released from Lake Roosevelt for the months April to October.

For Demand Option 1B(a), flows for all uses would be released every month throughout the April to October period (Table 2-2). The flows for the Odessa Subarea and for municipal and industrial uses will be prorated by the April to September demand. Those demands are estimated based upon historic use patterns. The exact distribution of demands may vary because of changes in climate conditions and crop types and different municipal and industrial use patterns than assumed. Releases to improve flows for fish were developed by WDFW to benefit outmigration of juvenile salmon in the April to June period and upstream migration of adults in the July to September period. Water for Odessa would be released to Banks Lake.

Table 2-2. Demand Option 1B(a)—Average Year

Purpose of Flow Releases	*Total Release (acre-feet)*	*Schedule of Incremental Releases from Lake Roosevelt (average cfs)*						
		April	May	June	July	August	September	October
Odessa	30,000	34	65	101	130	97	51	17
Fish	27,500	118	57	34	32	106	110	0
Municipal/ Industrial	25,000	46	62	80	73	77	75	0
Total	82,500	198	184	214	235	281	236	0

Demand Option 1B(b) represents flow releases during dry years (Table 2-3). For this option, flows for the Odessa Subarea and municipal and industrial uses would be the same as Demand Option 1B(a), but all of the flows for fish would be released in April, May and June. The April through June releases would meet the requirements of the Water Resources Management Agreement with the CCT (Washington and CCT, 2008). The highest total flows would be released from Lake Roosevelt to the Columbia River during May and June. Based on the analysis in the Draft Supplemental EIS, Ecology determined that water would not be available for release in September because releasing the water would not allow Reclamation to meet its target of refilling Lake Roosevelt in September to benefit kokanee.

Alternative 1B was not carried forward because water is not available in all months to meet demands. Flow releases are constrained by river operations and the instantaneous flow limit of Reclamation's water right.

Table 2-3. Demand Option 1B(b)—Dry Year

Purpose of Flow Releases	*Total Release (acre-feet)*	*Schedule of Incremental Releases from Lake Roosevelt (average cfs)*						
		April	May	June	July	August	September	October
Odessa	30,000	34	65	101	130	97	51	17
Fish	27,500	155	149	154	0	0	0	0
Municipal/ Industrial	25,000	46	62	80	73	77	75	0
Total	82,500	235	216	334	203	175	126	17

2.3.2.3 Preferred Alternative 1C – Maximize Fish Flows

Under Alternative 1C, the flow releases for fish and municipal and industrial users would be timed to maximize the benefits for fish in the Columbia River. Ecology would rely on a panel of fisheries and water managers to determine the release schedule each year that best achieves the fisheries benefits within the constraints of the water budget. Options 1C(a) and 1C(b) represent the differences that could be expected in response to varying water supply and fishery objectives. The amount of water that can be released for municipal and industrial uses or for fish would be constrained by the instantaneous flow limits of Reclamation's secondary water use permit (see Section 2.3). For example, if the advisory panel determined that all of the water should be released in June to benefit fish, the release schedule could not be met because of the instantaneous flow limits.

Option 1C(a) would attempt to provide flexibility to spread water available for fish (fish flows plus municipal and industrial flows) throughout the April to August period and in September when water is available. Water would be released to the Columbia River under a schedule that would be developed by the advisory panel. Table 2-4 illustrates the general flow release strategy. The shading on the table illustrates the months when water would be released for fish and municipal and industrial uses.

Water would be distributed to the Odessa Subarea from Banks Lake in all months. This water would not be available for downstream uses in the Columbia River. Water to supply Odessa would be released from Lake Roosevelt to Banks Lake in all months except in September of some years when it would be drawn directly from Banks Lake (see Section 2.3). The demand hydrograph for the Odessa Subarea in Table 2-4 shows average monthly releases. The actual demand would be dependent on the delivery schedule and lands served. Peak water use could exceed the monthly average.

Table 2-4. Preferred Alternative—Maximize Fish Flows Option 1C(a)- Average Year

Purpose of Releases	***Total Release (acre-feet)***	***Schedule of Incremental Releases from Lake Roosevelt (average cfs)***						
		April	May	June	July	August	September	October
Odessa	30,000	34	65	101	130	97	51[1]	17
Fish	27,500						[1]	
Municipal/ Industrial	25,000						[1]	
Total	82,500							17

Months in which flow releases can occur

[1]Water may not be available in all Septembers.

For the dry year Option 1C(b), all flows for fish would be released to the Columbia River between April and June to meet the requirements of the Water Resources Management Agreement with the CCT (Washington and CCT, 2008) (Table 2-5). Releases for municipal and industrial uses would be on the same schedule to coincide with the fish releases and obtain the maximum benefit for fish. This option would provide the highest release for spring migrating salmonids. Only the flows for Odessa, which go to Banks Lake and not the Columbia River, would be released in July, August, and October. Some water could also be released for municipal and industrial uses in July and August to meet mitigation requirements of Voluntary Regional Agreements. To meet lake level targets for kokanee, no water for Odessa would be diverted from Lake Roosevelt in September of dry years. The 51 cfs for Odessa would be released directly from water stored in Banks Lake during September. Similar to average years (Alternative 1C), Table 2-5 shows the average demand for the Odessa Subarea. Actual demand could vary.

Table 2-5. Preferred Alternative—Maximize Fish Flows Option 1C(b)– Dry Year

Purpose of Releases	***Total Release (acre-feet)***	***Schedule of Incremental Releases from Lake Roosevelt (average cfs)***						
		April	May	June	July	August	September	October
Odessa	30,000	155	149	154	130	97	0	66
Fish[3]	27,500							
Municipal/ Industrial	25,000				0[1]	0[1]		
Total	82,500				130	97	0	66

Months in which flow releases can occur

[1] Mitigation for projects participating in a Voluntary Regional Agreement (VRA) is required by statute in July and August on the Columbia River and April through August on the Snake River. If Ecology agrees to a municipal/industrial VRA, releases would be scheduled to meet or exceed the consumptive impact of projects associated with the VRA.

Table 2-6 summarizes the August 31 lake levels under the proposed flow options. The lake levels were calculated by subtracting the volume released from actual lake levels in a dry year (2003) and an average year (2002). The Biological Opinion Releases represent the lake levels that would result from operations to meet the requirements of the Biological Opinion (Sections 1.4 and 3.6).

Table 2-6. Summary of August 31 Lake Levels Under Average and Dry Year Conditions (feet msl)

Water Year Conditions	*Biological Opinion Requirements*	*Recorded August 31 Water Level*	*Elevation with Incremental Flow Releases*
Alternative 1B(b) (Dry Year, 2003)	1.278	1,278.41	1,276.91
Alternative 1C(b) (Dry Year, 2003)	1.278	1,278.41	1,276.91
Alternative 1B(a) (Average Year, 2002)	1,280	1,280.39	1.278.92
Alternative 1C(a) (Average Year, 2002)	1,280	1.280.39	1.278.92

2.3.3 Releases for Drought Years

During drought years, 50,000 acre-feet would be diverted or released from Lake Roosevelt in addition to the annual diversion of 82,500 acre-feet. This diversion would provide:

- 33,000 acre-feet of water for Columbia River mainstem interruptible water right holders; and
- 17,000 additional acre-feet for stream flow augmentation in the Columbia River downstream of Grand Coulee Dam.

Figure 2-1b illustrates the additional releases that would occur during drought years. Ecology would enter into a service contract as directed by the MOA with Reclamation for delivery of water during drought years (see definition in Section 2.2). The service contract would be issued under the Federal Drought Relief Act (see Section 5.1.2.5 of the Programmatic EIS (Ecology, 2007) for a discussion of the Act).

Use of the 33,000 acre-feet by interruptible water rights holders would require the holder to obtain a standby-reserve permit from Ecology. The drought year diversion would result in a maximum additional drawdown of approximately 0.8 feet in addition to the 1-foot drawdown during non-drought years. Ecology would issue standby-reserve permits for interruptible water rights holders for the entire irrigation season. Allocation of interruptible water rights would be managed through Ecology's drought insurance program. Holders of standby-reserve permits would be required to call the Ecology drought hotline on a weekly basis in a drought year. For weeks when instream flows are met, water right holders could divert water pursuant to their interruptible water rights. For weeks when instream flows are not met, water right holders could divert water pursuant to their standby-reserve permits, subject to the availability of water in Ecology's drought insurance program. Ecology's drought insurance program would include the 33,000 acre-feet from storage releases at Lake Roosevelt, but is also anticipated to include other trust water holdings from dry-year leases, conservation projects, aquifer and surface storage projects and other sources. The amount of water available to an individual standby-reserve permit holder would be dependent on the drought allocation policy options described in Section 2.4.

There are two options for flow releases during drought years—a release option that matches demand (Alternative 1D) and an option to maximize flow enhancement for fish (Alternative 1E). Ecology has selected a variation of Alternative 1E as the Preferred Alternative for drought years. Tables 2-7 and 2-8 illustrate the two options for flow releases.

2.3.3.1 Alternative 1D—Match Demand Drought Years

Under Match Demand Option 1D, all releases to the Columbia River to enhance flows for fish would occur during the April to June period (Table 2-7). Municipal and industrial releases would occur from April through September, but would not be available in some Septembers. Releases for interruptible water rights would occur from April through August. These releases are intended to benefit spring salmonid migration and meet the municipal and industrial and interruptible water rights demand. The highest total flow releases would occur in June. Releases to Banks Lake for the Odessa Subarea would occur from April to October, but would not be available in some Septembers. The water released to Banks Lake would not be available for downstream uses in the Columbia River. Alternative 1D was not carried forward because analysis indicated that water would not be available in all years to meet demand.

Table 2-7. Match Demand Option 1D

Purpose of Flow Releases	*Total release (acre-feet)*	*Schedule of Incremental Releases from Lake Roosevelt (average cfs)*						
		April	May	June	July	August	September	October
Odessa	30,000	34	65	101	130	97	51	17
Fish	44,500	250	242	250	0	0	0	0
Municipal/ Industrial	25,000	46	62	80	73	77	75	0
Interruptible Water Rights	33,000	111	108	111	108	108	0	0
Total	132,500	441	476	542	310	282	126	17

2.3.3.2 Preferred Alternative 1E—Maximize Fish Benefits Drought Years

Under the Preferred Alternative, Maximize Fish Flows Option 1E, flows to benefit fish would be released from April through June, with flows for municipal and industrial uses and interruptible water rights released to the Columbia River from July through September subject to September availability (Table 2-8). This alternative allows the municipal and industrial and interruptible water rights releases to offset the early season releases for fish. This results in a more even seasonal distribution of flows. Ecology would rely on a panel of fisheries and water managers to determine the release schedule each year that best achieves the fisheries benefits within the constraints of the water budget. The timing of the releases would be constrained by the instantaneous flow limit of Reclamation's water use permit as described in Section 2.3.

If out-of-stream uses relying on these releases for mitigation of their impacts are not offset "in-time," an OCPI determination would be required to prevent the uses from being curtailed. Alternatively, if the public benefits were insufficient to support an OCPI finding, the release schedule could be altered to provide "in-time" offsets. This would alter the release schedule presented in Table 2-8. Interruptible water right holders covered under a VRA are not subject to OCPI, but are limited by the statutory mitigation standard of no impact to the Columbia River during July and August. If water is unavailable to meet the July and August mitigation standard, interruptible water right holders covered under a VRA would be subject to curtailments.

Water would be delivered the Odessa Subarea throughout the irrigation season. The numbers shown in Table 2-8 represent an average monthly demand. Actual demand would be dependent on the delivery schedule and lands served. In September, water would be released directly from Banks Lake with no releases from Lake Roosevelt. Under the drought year conditions shown in Table 2-8, Reclamation would not be able to

release water to Banks Lake over Labor Day weekend. Banks Lake would be drawn down during that month with a maximum drawdown of approximately 1.5 inches at the end of September (see Section 2.3).

Table 2-8. Preferred Alternative—Maximum Fish Flows Alternative 1E

Purpose of Flow Releases	***Total Release (acre-feet)***	***Schedule of Incremental Releases from Lake Roosevelt (average cfs)***						
		April	May	June	July	August	September	October
Odessa	30,000	34	65	101	130	97	51	17
Fish	44,500							
Municipal/ Industrial	25,000	[1]	[1]	[1]	[1]	[1]		
Interruptible Water Rights	33,000	[1]	[1]	[1]	[1]	[1]		
Total	132,500							17

Months in which flow releases can occur

[1] Mitigation for projects participating in a VRA is required by statue in July and August for the Columbia River or April through August for the Snake River. If Ecology agrees to address municipal/industrial or interruptible water right holders in a VRA (e.g., the CSRIA VRA), releases would be scheduled to meet or exceed the consumptive impact of projects associated with the VRA.

Table 2-9 summarizes the lake levels that would result from Alternatives 1D and 1E. The Biological Opinion Releases represent the lake levels that would result from releases to meet the requirements of the Biological Opinion.

Table 2-9. Summary of August 31 Lake Levels Under Drought Year Conditions (2001) (feet msl)

Water Year Conditions	*Biological Opinion Requirements*	*Recorded August 31 Water Levels*	*Elevation with Incremental Flow Releases*
Alternative 1D	1,278	1,278.35	1,276.24
Alternative 1E	1,278	1,278.35	1,276.24

2.3.4 Construction Required for the Proposal

No construction will be required to accommodate the incremental storage releases from Lake Roosevelt. The water can be released from the reservoir using existing infrastructure. Municipal and industrial users who receive water from the Proposal may need to construct new conveyance facilities to deliver the water. Irrigators in the Odessa Subarea would need to construct conveyance systems to deliver the water from existing canals to individual farms. The impacts of construction of these facilities were described in Section 5.1.2 of the Programmatic EIS.

Since the Draft Supplemental EIS was released, Reclamation and the East Columbia Basin Irrigation District have identified construction projects that could be required to deliver water from the Lake Roosevelt Incremental Storage Releases Project to the Odessa Subarea. Reclamation has determined that it may need to make improvements to existing facilities to improve delivery efficiency. Specifically, the East Columbia Basin Irrigation District has stated that improvements will be required to the East Low Canal to deliver water to users located south of I-90. The area south of I-90 has experienced the greatest declines in ground water levels and there is a high demand for replacement water supplies. The improvements include upgrading siphons and increasing pumping capacity. The construction needed for the two siphons is described below. Impacts associated with the construction are included in Section 4.2.3.

The two siphons are located near or at the East Low Canal near the canal crossing of I-90, approximately 10 miles east of Moses Lake (Figure 2-2). The siphons are the Weber Branch Siphon and the Weber Coulee Siphon. The first, or upstream, siphon is the Weber Branch Siphon. It is 3,215 feet long and crosses a valley that is approximately 80 feet deep (below the invert of the East Low Canal). U Road SE is located in the center of the valley. The siphon is comprised of reinforced concrete and is 14 feet 8 inches indiameter.

The second siphon, Weber Coulee Siphon, is 6,166 feet long and crosses Weber Coulee, a valley that is approximately 110 feet deep (below the invert of the East Low Canal). Interstate 90 is located in Weber Coulee. The Coulee also contains a wasteway that

conveys some natural runoff and primarily runoff and drainage from agricultural lands. The wasteway drains to Lind Coulee and eventually to Potholes Reservoir. The existing Weber Coulee Siphon is also reinforced concrete and 14 feet 8 inches in diameter. When I-90 was built, a tunnel for a second siphon was constructed for part of the route to avoid having to dig under or tunnel through I-90 when a second siphon was needed. The existence of the tunnel will avoid traffic impacts to I-90 during construction.

Although the size of the new siphon pipe has not been selected, the existing structures and the tunnel for the second siphon were constructed to accommodate a new second siphon identical in size to the existing siphon. The inlet and outlet structures for the existing siphons have already been constructed to the size needed to connect a new second siphon, so minimal work would be needed on those structures.

The new siphons would be constructed adjacent to the existing siphons with approximately 6 feet separation between the new and old siphons. The siphons would be constructed at the same grade as the existing siphons. Excavation would be required to provide a trench for the siphon pipe. The pipe trench would be backfilled and a berm placed over the pipe to ensure a minimum cover is established. The area needed for construction would likely range from 50 to 100 feet wide along the length of the siphon. The right-of-way width for the siphons ranges from 200 feet to 315 feet, so all construction should be contained within existing rights-of-way.

SOURCE: USDA, 2006 (air photo); ESA Adolfson, 2008

Lake Roosevelt SEIS . 207301

Figure 2-2
Weber Siphons
Grant County, Washington

2.4 Policy Options for Water Allocation

Ecology considered a number of alternatives for allocating the water released from Lake Roosevelt to different users. The MOU between Ecology, Reclamation, and the Columbia Basin Project Irrigation Districts specifies how much water will be released from Lake Roosevelt. The MOU and the Columbia River Water Management Act (Chapter 90.90 RCW) describe how the water is allocated to different types of uses. For the releases to supply municipal and industrial users during non-drought years, and the drought year releases for interruptible water right holders, Ecology must develop a program to determine how the water would be allocated among the pending municipal and industrial water rights and to the interruptible water rights holders. For the Preferred Alternatives for allocation of the water from the flow releases, Ecology would charge municipal and industrial water users and holders of interruptible water rights to offset the transaction costs of acquiring the water (RCW 90.90.010(1)).

2.4.1 Allocation for Municipal and Industrial Supply

There are approximately 128 municipal and industrial water right users with pending applications located within one mile of the Columbia River. Other applicants are located farther from the river. In the Draft Supplemental EIS, Ecology proposed four options for allocating storage releases to fulfill pending applications for municipal and industrial uses. This section presents the alternatives that were considered, but not selected by Ecology followed by the Preferred Alternatives for the allocation for municipal and industrial supply.

2.4.1.1 Alternatives Considered but not Selected

Ecology considered the following alternatives for allocation to municipal and industrial users in the Draft Supplemental EIS. Based on comments received and further analysis, these alternatives were not selected.

Allocation only to those Applicants Who Can Physically Capture the Water

Under this allocation option, only those municipal and industrial users who have applications on file that propose to withdraw water from the Columbia River, or ground water in close proximity to the Columbia River, would receive permits. Mitigation for issuing the permits would be provided by the Lake Roosevelt Incremental Storage Releases Project. Ground water applications within one mile of the Columbia River would be evaluated on a case-by-case basis to investigate the proposed well locations, continuity with the Columbia River and propagation of pumping effects on the Columbia River. It is assumed that wells more than one mile from the Columbia River proposing to withdraw water will be largely withdrawing water from tributary aquifers or intercepting ground water flowing to the Columbia River, rather than pumping water directly from the Columbia River itself. The 25,000 acre-feet of water released would mitigate for municipal and industrial applicants in order of priority date of the application. This allocation alternative was incorporated into the Preferred Alternative (Section 2.4.1.2).

Allocation to Users Whose Water Use Would Impact the Columbia River

In addition to those users described in Section 2.3.1.1, this option would allow Ecology to use Lake Roosevelt water to mitigate for municipal and industrial users who cannot physically capture the water from the river, but whose proposed water use would impact Columbia River stream flows. This would include municipal and industrial users that propose tributary surface water diversions or ground water withdrawals that reduce flows in the Columbia River within the same year or storage release period.

For example, an applicant proposing to divert water on a tributary river a few miles upstream of the confluence with the Columbia River may cause impacts to the Columbia River hours or days later. The same applicant proposing to divert water from tributary ground water may have an impact on the Columbia River days to weeks, months or even years later. Allocation of Lake Roosevelt water to these users would mitigate the impact that these users would have on flows in the Columbia River. However, it would not mitigate for local impairment on adopted instream flows in the tributary or to tributary ground water users, which could limit how far away from the Columbia River the Lake Roosevelt mitigation would be practical. A case-by-case determination of each application would be required. Since the timing of mitigation would not coincide exactly with storage releases, an OCPI determination would likely be necessary. This allocation alternative was incorporated into the Preferred Alternative (Section 2.4.1.2).

Allocation Based on Priority Needs

Among the pending municipal and industrial water rights applications are some that could be considered to have higher priority needs than others. One priority need would be those municipalities with moratoria on development because of limited water supplies. Jurisdictions with development moratoria are not permitted to issue building permits for new construction under the Washington State Growth Management Act.

Another priority need identified by Ecology is meeting the obligations of the settlement agreement between the Center for Environmental Law and Policy (CELP); the Cities of Kennewick, Pasco, Richland, and West Richland (Quad-Cities); and Ecology which resulted in the issuance of Permit S4-30976P. The settlement requires Ecology to provide mitigation of consumptive use impacts associated with the first 10 cfs of diversions under the permit when biological flow objectives are not met. Ecology has provided approximately 1,995 acre-feet of this obligation through Trust Water Rights Program acquisitions. Water from the Lake Roosevelt storage releases could provide the remaining mitigation water, estimated at 3,787 acre-feet. This action is supported by RCW 90.90.020(3)(c) which states that Ecology should focus its water allocation efforts on “other mitigation conditions to protect stream flows.”

Depending on the release scenario selected for the municipal and industrial water, the 3,787 acre-feet of water that could be used for the Quad-Cities mitigation may not be sufficient. For example, if the municipal and industrial water were only released in July and August, it could not mitigate for pumping in June when the flows for the Biological Opinion are not met. Ecology would have to rely on other sources of mitigation.

Allocating water based on priority needs, either for cities with moratoria or for the Quad-Cities, could be combined with the alternatives described in Sections 2.3.1.1 and 2.3.1.2. This allocation alternative was incorporated into the Preferred Alternative (Section 2.4.1.2).

Allocation to Achieve Regional Equity

Ecology would develop a system to allocate water on a regional basis with an objective to distribute the benefits evenly throughout the Columbia River Basin. Under this system a certain number of water rights or amount of water could be allocated per county or per Water Resource Inventory Area (WRIA). Water could also be allocated regionally by specifying that a certain amount of water would be allocated above and below Priest Rapids Dam.

Another regional equity issue relates to the pending municipal and industrial water rights applications that would withdraw water from behind Grand Coulee Dam. Another regional allocation option would be to allocate some water to those users. That water would not be released from Lake Roosevelt. The amount of water allocated to the upstream users would be subtracted from the 25,000 acre-feet of water released from Lake Roosevelt for municipal and industrial uses. Because this water for municipal and industrial uses would not be released to the Columbia River, benefits to fish downstream on the Columbia River would be reduced.

These allocation options would more equitably allocate water between upstream and downstream users and could be combined with the any of the allocation alternatives described earlier. This allocation alternative was incorporated into the Preferred Alternative (Section 2.4.1.2).

2.4.1.2 Preferred Alternatives

Based on further analysis and comments received on the Draft Supplemental EIS, Ecology selected the following two alternatives as the Preferred Alternatives for the allocation to municipal and industrial users. The two alternatives are variations of the alternatives that were considered in the Draft Supplemental EIS. The first covers the geographic extent of applicants who can receive mitigation water and the second covers the order in which they will be processed. Ecology intends to charge municipal and industrial users a fee to cover the transaction costs of acquiring the water (RCW 90.90.010(1)).

Allocation to Users Whose Water Use Would Impact the Columbia River and Allocation to Achieve Regional Equity

Ecology will consider the use of Lake Roosevelt incremental flow releases to mitigate for municipal and industrial users who:

1. Can physically capture the released water at their point of diversion or withdrawal, and

2. Cannot physically capture the water from the river, but whose proposed water use would impact Columbia River stream flows within the same season or year without requiring mitigation of impacts in subsequent seasons or years.

Municipal and industrial users whose impacts can be mitigated by Lake Roosevelt releases include:

a. Surface water diverters on the Columbia River in Lake Roosevelt or downstream of Grand Coulee Dam.
b. Surface water diverters on the Snake River in the McNary Pool and Ice Harbor Pool.
c. Surface water diverters, tributary to the Columbia River, where water is available in the tributary[1], and if the impacts of those upstream diversions are mitigated by Lake Roosevelt releases within the same year or season. The objective is to prevent carry-over of impacts to subsequent seasons or years[2].
d. Ground water diverters tributary to the Columbia River, where local availability is not limiting, and whose ground water sources are in bank storage. The objective is to prevent carry-over of impacts to subsequent seasons or years[3]. Wells located in bank storage have a near-immediate effect on the Columbia River.

Ecology will use the one-mile corridor as the surrogate for ground water users in bank storage. Ground water users outside the one-mile corridor could petition for inclusion where hydrogeologic evidence supports it.

Ecology will also apportion mitigation water to pending municipal and industrial applicants to achieve regional equity in Columbia River counties. Ecology will convene an annual meeting of municipal and industrial stakeholders and describe its permitting progress each year. Although there is diversity in the location of pending applicants up and down the Columbia River, until a case-by-case evaluation is made of the 20-year-old applications, it is difficult to conclude whether allocation based on first-in-time, first-in-right will result in regional equity. Ecology will use this annual review process (which could also be described in each year's legislative report and associated public review) to determine whether its regional equity goals are succeeding. It is anticipated that it will take several years to permit all of the municipal/industrial water. If Ecology determines that regional equity is not occurring, it could amend WAC 173-563 to reserve the

---

[1] If a tributary closure or instream flow would prevent the issuance of a new water right, then Lake Roosevelt releases would not be allocated to an applicant unless tributary mitigation was also available.

[2] In practicality, some carry-over of impacts on the order of days may occur. Consider a year-round municipal right issued on a tributary whose impact on the Columbia River occurs two days later. Impacts on December 31, Year 0 would then accrue to the Columbia River on January 2, Year 1.

[3] Pumping effects of wells located outside of bank storage can persist well into future years, which creates difficulty in matching supply and demand or justifying OCPI determinations when the effects are not fully known.

remaining water for a specific geographic location. As an initial screen, Ecology will track permits issued by WRIA, and those issued upstream and downstream of Priest Rapids Dam.

Allocation Based on Priority Needs

Ecology intends to process applications in the order they were received with two exceptions based on priority needs:

1. Applicants that meet the criteria for expedited processing under WAC 173-152.
2. Water required to meet existing settlement agreements or contractual obligations.

Quantities of water allocated to these priority needs will be made with public input and will be summarized in each year's annual legislative report.

All applicants will be expected to meet conservation criteria as part of the public interest test for issuing new water rights. Ecology will meet with the Department of Health and external stakeholders to determine how best to integrate its own statutory conservation mandates with those adopted in rule by the Department of Health and voluntary measures adopted by individual communities through water system planning.

2.4.2 Allocation for Interruptible Water Rights

There are approximately 379 holders of interruptible water rights in the Columbia River Basin totaling 309,159 acre-feet. Most of those water rights are for irrigation along with municipal, power and other uses. Ecology would run a drought insurance program for the 33,000 acre-feet and notify interruptible water right holders of program requirements. Each interruptible water right holder would file an application for a standby-reserve permit. Ecology considered six options for allocating the 33,000 acre-feet of water to those water users during drought years in the Draft Supplemental EIS. This section presents the alternatives that Ecology considered, but did not select followed by the Preferred Alternatives for the allocation for interruptible water rights.

2.4.2.1 Alternatives Considered but not Selected

The following alternatives were considered for allocation of interruptible water rights in the Draft Supplemental EIS, but were not selected as Preferred Alternatives.

Even Distribution Allocation

Under this option an equal percentage of the 33,000 acre-feet of water from Lake Roosevelt would be allocated to all holders of interruptible water rights. No effort would be made to prioritize the water uses or distribute the water equally throughout the basin. This allocation alternative was incorporated into the Preferred Alternative (Section 2.4.2.2).

Allocation Based on Hierarchy of Beneficial Use

Ecology would establish a hierarchy for allocating water rights based on the type of beneficial use. Water would be allocated based on the type of crop being irrigated and the risk to the user of not receiving water. For example, water could be allocated to users with perennial crops such as orchards who risk losing their crops if they cannot irrigate every year. Water could also be allocated based on a priority of use, i.e., between irrigation, power generation and municipal uses. Allocating water based on hierarchy of beneficial use could potentially be supported by the maximum net benefit policy in RCW 90.03.005. The policy states:

> *It is the policy of the state to promote the use of the public waters in a fashion which provides for obtaining maximum net benefits arising from both diversionary uses of the state's public waters and the retention of waters within streams and lakes in sufficient quantity and quality to protect instream and natural values and rights.*

Ecology did not select this allocation alternative as part of the Preferred Alternative because it would not provide flexibility in allocation to holders of interruptible water rights.

Market-Based Allocation

Ecology would allocate the incremental storage release water using a market-based allocation such as an auction or by establishing a rate structure for the water. One option for implementing a market-based allocation would be to charge users for the water. This option would allow Ecology to achieve a return on its water investments to offset the costs of acquiring the water. Any funds received would be placed in the Columbia River Basin Water Supply Development Account to be used for other water management projects in the Columbia River Basin (RCW 90.90.010).

The Market-Based Allocation Alternative could be used in combination with other allocation alternatives to improve the allocation of water. For example, if users who received an even distribution of water (Section 2.3.2.1) were allowed to assign their water to other users, a higher and better use of crops could be promoted. If the Market-Based Allocation Alternative were combined with the Allocation by Lottery (described below), a similar promotion of higher and better use of crops could occur. This allocation alternative was incorporated into the Preferred Alternative (Section 2.4.2.2).

Allocation by Lottery

Ecology would establish a lottery to allocate the storage releases. Holders of interruptible water rights who want the water would buy a lottery ticket and a system would be established for selecting lottery winners. Funds received from the lottery would be placed in the Columbia River Basin Water Supply Development Account. This allocation alternative was not incorporated into the Preferred Alternative because of the complexity of implementing a lottery.

Allocation Based on Priority Date

Under this option, Ecology would allocate water based on the priority date of the interruptible water rights. Those rights with the oldest priority dates would receive the water first. This system would be similar to the existing system for allocating water rights. It is anticipated that this system would result in more water being allocated to users in the lower portion of the basin where the oldest interruptible water rights are located. Ecology did not incorporate this alternative into the Preferred Alternative because it would limit flexibility of the Proposal.

Voluntary Allocation

This option would allocate water to those interruptible water rights holders who request the water. Based on experience with the 2001 drought, Ecology believes that not all interruptible water rights holders would request additional water. Those users have historically found other ways to mitigate the drought. This alternative was combined with other alternatives and included in the Preferred Alternative (Section 2.4.2.2).

2.4.2.2 Preferred Alternatives

Based on further analysis and comments on the Draft Supplemental EIS, Ecology selected a Preferred Alternative that combines even distribution allocation with market-based allocation through a voluntary enrollment program. The selected alternative is a combination of some of the original alternatives described in the Draft Supplemental EIS. For the Preferred Alternatives, Ecology would charge water users to offset the transaction costs of acquiring the water (RCW 90.90.010(1)). The Preferred Alternative is intended to provide Ecology with maximum flexibility in meeting the purpose of the Proposal.

Even Distribution Allocation, Market-Based Allocation, and Voluntary Enrollment

Under this Preferred Alternative, Ecology will run a voluntary enrollment program for the Drought Insurance Program. All interruptible water right holders will be notified of the program requirements and may choose to enroll if the program meets their needs. This will be similar to the program run by Ecology in the 2001 drought. In that instance, about two-thirds of the interruptible water rights holders enrolled in the program. The remaining water right holders either curtailed their use during periods of interruption or sought other temporary water right changes to meet their needs.

Ecology will develop guidelines for its Drought Insurance Program so enrollees understand the criteria. Elements of the Program will include:

1. An equal percentage of the 33,000 acre-feet of water from Lake Roosevelt would be allocated to all holders of interruptible water rights.[4] Water uses would not be

[4] If every interruptible water right holder enrolled in the program, each water right holder would receive an additional 10.7 percent of supply during drought (e.g., 33,000 acre-feet / 309,159 acre-feet). For example,

prioritized or distributed to achieve regional equity. However, significant geographic diversity already exists in the location of interruptible water rights (see Figure 4-12).

2. Water users who receive an even distribution of water would be allowed to assign their water to other users in a drought year. Ecology would develop and manage its permit system to accommodate and reflect the redistribution of the initial allocation through the secondary market-based reallocation.

3. The program will include some mandatory conservation or use restrictions. Ecology may apply the same criteria used in 2001. These could include requirements for best management practices, limits on expansion of permitted acreage during droughts, caps on water duties or other elements.

4. Reimbursement of Ecology's costs to make the water available and to manage it would be required. Any funds received would be placed in the Columbia River Basin Water Supply Development Account to be used for other water management projects in the Columbia River Basin (RCW 90.90.010).

Each standby/reserve permit would issue for the same quantities as the interruptible water right because of the inherent uncertainty about the level of drought to plan for. Ecology's only "on-the-ground" drought experience was in 2001 when instream flows were not met. In 2001, there were 16 weeks of interruption (11 with the critical flow adjustment taken in 2001 by the Ecology Director). Climate change, changes in river operations and other factors may lead to greater drought management needs in the future.

Although the standby/reserve permit would issue for the full interruptible quantity (e.g., 100 acre-feet in the example in Footnote 4), each right would be provisioned to the water availability in the Drought Insurance Program at the time of the next drought. Although initially the 33,000 acre-feet of Lake Roosevelt releases would be the only volume of drought water available, in the future Ecology plans to have a portfolio of drought supplies including Trust Water holdings from conservation, storage releases, dry-year lease acquisitions, and others. Ecology will use the Columbia River Webmap to display how much drought supply it has available for each interruptible water right holder.

2.4.3 What Happens to Water Rights When the Program Ends?

The 2004 MOU between the state, Reclamation, and the Columbia Basin Project Irrigation Districts directs Ecology to find a long-term source of replacement water for the 132,500 acre-feet of storage releases. There is no term or expiration under the agreement; rather, this section of the MOU describes the intent of the parties to provide a meaningful immediate supply of water to benefit both instream and out-of-stream needs in the Columbia River Basin, and to work on other long-term storage and conservation

---

a water right holder with 100 acre-feet of interruptible supply would receive a standby/reserve permit for 10.7 acre-feet to use when the interruptible right is curtailed.

alternatives. Similarly, there are elements of the contracts with Reclamation that cannot be indefinite because of federal law. The water service contract for the municipal and industrial water will be a long-term supply, with renewal options. The supply for interruptible water rights is subject to continued Congressional authorization of the Federal Drought Relief Act. These types of agreements are in place throughout the West, and Ecology views them as permanent sources of supply for the purposes of new water right permitting.

Ecology plans to continue to evaluate long-term storage and conservation plans to add to its water supply development portfolio and at some point replace the water described herein. If the MOU is terminated because Ecology has found replacement water, Ecology intends to provide such water in-kind, in-place, and in-time with this environmental analysis. If this is not possible, Ecology will conduct a separate environmental review prior to terminating the MOU.

Water rights based on the proposed water service contract would be the same as any other water rights held by irrigation districts, municipalities, and individuals in many areas in Washington and the western United States. The federal contracts are for a period of no more than 40 years and can be extended. To the extent that water supplies created through program funding are not permanent or may not be completely reliable, Ecology intends to develop contingency plans to manage the risks associated with the potential future loss of that supply.

2.5 Alternatives Considered but Not Carried Forward

Ecology has considered a number of different alternatives to meet the purposes of the proposal that were not being carried forward for the reasons described below.

2.5.1 New Storage Reservoir

One alternative that was considered was to build a new off-stream reservoir to store the 132,000 acre-feet of water that is proposed for release from Lake Roosevelt. To allow for evaporation from the reservoir, infiltration, sedimentation, and required dead storage, the reservoir would need to have a larger capacity than 132,000 acre-feet to store that amount of water. For planning purposes, Ecology considered a reservoir of approximately 150,000 acre-feet. Allocation of the 132,000 acre-feet of water would be the same as the Proposal. This alternative is not being carried forward because Ecology has determined that releasing water from the existing reservoir would have fewer environmental impacts than constructing a new reservoir.

2.5.2 Conservation

Another option that has been advocated in comments on the Programmatic EIS and scoping comments on this Supplemental EIS is conservation. Commenters have suggested that Ecology should require conservation for all water users and not issue new water rights. Conservation is an important component of the Columbia River Basin Water Management Program which encourages and allocates funding for conservation

projects. A number of conservation projects are being actively pursued in the Columbia River Basin, including on the Columbia Basin Project and in the Odessa Subarea. However, conservation alone is not expected to provide enough water to meet demand in those areas. In its 2007 report to the Washington State Legislature (www.ecy.wa.gov/programs/wr/cwp/cr_07legrpt.html), Ecology reported on the potential water savings from conservations projects identified in the water supply inventory. The report concluded that if all the conservation projects identified in the inventory were implemented (at a cost of $523 per acre-foot), approximately 1,000,000 acre-feet of water could be saved. Most of the projects identified would result in water savings that would be available on a temporary basis and would only provide benefits between the point of diversion and point of return. Therefore, the saved water could not be used to issue new permits. Ecology is continuing to evaluate potential conservation projects.

As described in Sections 2.4.1 and 2.4.2, Ecology will require conservation measures for municipal and industrial users and holders of interruptible water rights who receive water from the Lake Roosevelt Incremental Storage Releases Project.

2.5.3 Water Markets

Ecology is considering expansion of water marketing opportunities in the state. The State of Washington has established a pilot water bank program in the Yakima River Basin and is exploring additional water marketing and banking opportunities as part of the Yakima River Basin Storage Feasibility Study (see Section 1.5.5).

Ecology considered using water markets or banks to resolve water supply problems in the Columbia River Basin; however, it would be cost-prohibitive for the state to acquire the needed volumes of water exclusively through the purchase of water rights. Another water market option would be to allow individual water rights holders to acquire additional water through market mechanisms. Although water transfers are not precluded, Ecology is not promoting the large-scale water marketing that would be required to provide the necessary volumes of water. Ecology chose not to aggressively pursue water marketing because of concerns about the impact to local economies from the transfer of the needed volumes of water. The Market-based Allocation Alternative (Section 2.3.2.3) would incorporate a market-based allocation into the storage releases program.

2.5.4 Different Allocations for the Incremental Storage Releases

Releasing less water from Lake Roosevelt would decrease the amount of drawdown of the reservoir. Changing the allocation of the storage releases could provide more water for stream flows by allocating less water to municipal and industrial uses or interruptible water rights, for example. As described in Section 1.3.1.1, the MOU between Ecology, Reclamation and the Columbia Basin Project Irrigation Districts specifies the purpose of the storage releases and the allocation of those releases. Releasing less water or allocating that water differently would not meet the purposes of the MOU.

2.5.5 In-Time Storage Releases for Municipal Demand

Ecology considered a flow option for non-drought years that would allow releases for municipal and industrial use spread over the entire year. The releases would match estimated demands for municipal and industrial uses, which tend to be year-round. This alternative would have required an OCPI determination (Section 2.3). In coordination with Reclamation, Ecology determined that this option was not possible because of other obligations that must be met to release flows from and to fill Lake Roosevelt.

CHAPTER 3.0 AFFECTED ENVIRONMENT

3.1 Project Area Description

The affected environment for the Lake Roosevelt Incremental Storage Releases Project includes Lake Roosevelt and its shoreline, the Columbia River downstream of Grand Coulee Dam, and the Odessa Subarea (Figure 3-1). Water routed to the Odessa Subarea would flow through the existing conveyance system consisting of Banks Lake, the Main Canal, Billy Clapp Lake, and the East Low Canal. These areas were described in the Programmatic EIS (Ecology, 2007). Additional information is provided in this chapter as needed to help clarify potential impacts. Sections 3.2 through 3.14 provide more detailed information about specific aspects of the project area.

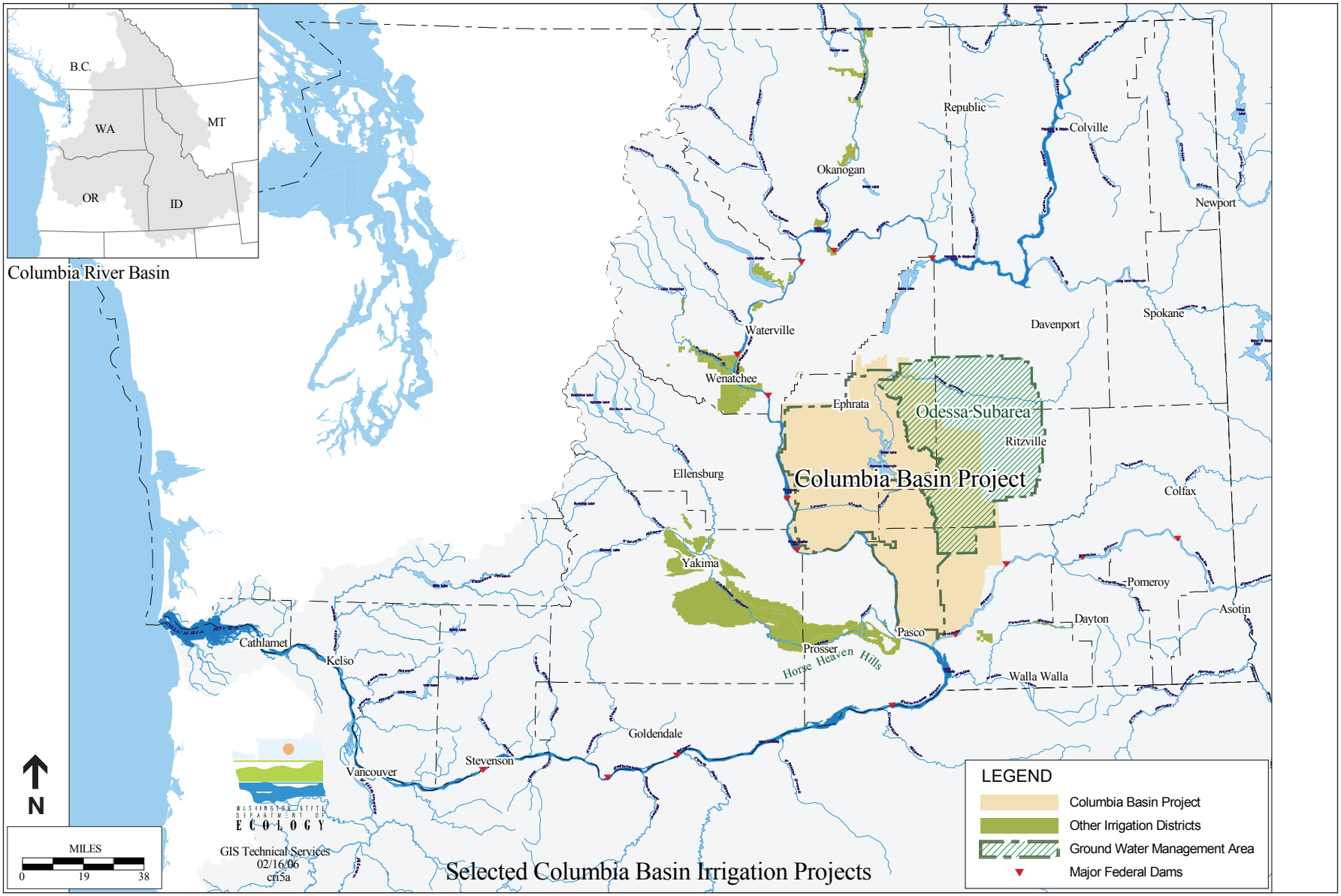
3.2 Earth

3.2.1 Lake Roosevelt

The upper Columbia River has an extensive history of landsliding, both prior to and after completion of Grand Coulee Dam. During the initial filling of Lake Roosevelt (full pool elevation attained in 1942), 245 known landslides occurred along the shoreline of Lake Roosevelt (Hansen, 1987). Between 1943 and 1952, an additional 255 known landslides occurred along the shoreline of Lake Roosevelt (Hansen, 1987). As a result of these frequent landslides, some of which resulted in damage to property and infrastructure, Reclamation commissioned an intensive geologic study to determine areas of the Lake Roosevelt shoreline that are likely to be impacted by landslides. Field work for this study occurred between 1948 and 1955, and is summarized in Jones et al. (1961).

The Jones et al. (1961) study consisted of an in-depth analysis of landslides that occurred between 1948 and 1955 and earlier, and included descriptions of landslide type, geology, and the conditions at the time of landsliding. The Jones et al. (1961) study concluded that the majority of the landslides that occurred along the Lake Roosevelt shoreline and downstream are of the slump-earthflow type, which consists of a slump at the head area, transitioning to an earthflow at the toe. The Jones et al. (1961) study considered multiple variables that contributed to the landslides, including:

- Fluctuations of the Lake Roosevelt water level;
- River flow for areas downstream of Grand Coulee Dam (discussed in Section 3.2.2.1);
- Barometric pressure;
- Maximum and minimum air temperatures;
- Precipitation;
- Earth tides (sub-meter motion of the earth caused by moon and sun gravitation); and
- Earthquakes.



FILE NAME: Fig03-1_projarea.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

SOURCE: Washington State Department of Ecology, 2006.

Figure 3-1
Project Area
Washington

The study concluded that there was a strong correlation between the number of landslides and Lake Roosevelt's water level, with the majority of landslides occurring during the initial filling of Lake Roosevelt, and during major drawdowns (Jones et al., 1961). The Jones study noted that out of approximately 500 known landslides that occurred between 1941 and 1953, 245 (49 percent) occurred during the initial filling, 30 (6 percent) occurred during a 30-foot drawdown in 1944, and 120 (24 percent) occurred during 65-foot drawdowns in 1952 and 1953 (Jones et al., 1961). A secondary correlation was also found with air temperature, with several landslides occurring shortly before or after freezing weather (Jones et al., 1961).

The Jones et al. (1961) study also found that many of the larger landslides occurred in areas where landsliding had occurred prior to the construction of Grand Coulee Dam, and were therefore predisposed to landslide formation. Some of the landslides that had occurred before the construction of Grand Coulee Dam were quite large. In 1894, 1906, and 1929, large landslides temporarily blocked the Columbia River for up to one hour.

Landslides have continued to occur since the completion of the Jones et al. (1961) study, but generally less frequently. Notable periods of landslide activity include the period from 1969 to 1975 (Schuster, 1979) and 1978 (Hansen, 1987). These high landslide-activity periods generally corresponded to major drawdowns. Natural climatic events also have triggered more recent landslides, such as the 1978 Hughes Slide which was most likely caused by rapid snowmelt (Schuster, 1979).

The concern for landslides is identified as minor for lake levels above 1,260 feet, moderate for lake levels between 1,240 and 1,260 feet, and major for lake levels below 1,240 feet (Reidel, 1997). To reduce the frequency and number of landslides, Reclamation has adopted operating procedures to attempt to keep lake drawdown rates at less than 1.5 feet per day or less than 3 feet over 2 days (Reidel, 1997). Reclamation annually inspects the shoreline of Lake Roosevelt to evaluate changes resulting from landslides and erosion, and summarizes the results of these inspections in annual reports.

Shallow embayment areas of the lake include Kettle Falls River, Colville River, Marcus Flats, Hall Creek Bay, Nez Perce Creek, Wilmont Creek, Nine Mile Bay, Spokane River, Hawk Creek Arm, Swawilla Bay, Welch Creek, Jump Canyon, San Poil Arm, Crescent Bay, and Porcupine Bay. The figures in the Map Folio at the end of this document show the elevation contours of the land within each embayment area.

As tributary rivers and streams enter Lake Roosevelt, their water velocities are reduced, resulting in deposition of sediment. The specific location of these alluvial deposits is dependent on the level of Lake Roosevelt. During periods with high lake levels, alluvium is deposited further up the valleys than during drawdown periods.

3.2.2 Columbia River Downstream

The Columbia River downstream of Grand Coulee Dam is an area of ancient and historical landsliding. Landslides downstream of Grand Coulee Dam generally occur as reactivations of ancient landslides, resulting both from natural conditions and operation

of the Grand Coulee Dam. These landslides generally correspond to unusually high or low water levels (Hansen, 1987). In 1948 and 1952, high precipitation and seasonal runoff reactivated several of these landslides (Hansen, 1987). The 1948 Seatons and Koontville Landslides involved reactivations of ancient landslides downstream of the dam and damaged communities built on the landslides (Jones et al., 1961). Movement on these landslides occurred over several years and generally corresponded to low stages of the Columbia River (Jones et al., 1961). The Jones et al. (1961) study also identified several ancient landslides further downstream from the dam, which were not active at the time of the study.

In 1978, landslides occurred along the 6-mile river reach downstream from the dam, reportedly as a result of a 13-foot drop in the mean tailrace elevation caused by failure of one of the units in the Third Powerplant (Hansen, 1987). This 6-mile reach encompassed several communities downstream of the dam. To stabilize the river bank downstream of the Grand Coulee Dam, Reclamation took the following actions (Hansen, 1987):

- Reshaped and rearmored a previously placed embankment;
- Constructed drainage features to reduce pore pressure fluctuations; and
- Installed automated instruments and real-time alarms to monitor the downstream area identified as unstable.

3.2.3 Odessa Subarea and Banks Lake

3.2.3.1 Odessa Subarea

The earth resources in the Odessa Subarea were previously discussed in the Programmatic EIS (Ecology, 2007).

3.2.3.2 Banks Lake

Erosion occurs along the shorelines of Banks Lake due to land use activities, large boat wakes and wind (Reclamation, 2004). Areas identified in Reclamation (2004) where erosion is occurring include the west shore of the Steamboat Rock peninsula; north and south of the Million Dollar Mile North Boat Launch; south of the Million Dollar Mile South Boat Launch; Barker Flat; and Electric City Community Park (Coulee Playland).

3.3 Climate

The Programmatic EIS (Ecology, 2007) described the climate of the Columbia River Basin and briefly summarized findings of climate change modeling for the region. This section provides additional information on predicted climate changes for the Columbia River Basin. Climate models can simulate global to continental scale temperature trends and such information has been shown to be reliable for projecting regional trends. However, smaller scale climate projections are not reliable; therefore, this section discusses climate change on a regional scale.

3.3.1 Background on Global Climate Change

Climate change science has been studied and documented by the Intergovernmental Panel on Climate Change (IPCC) since the late 1980s. The IPCC was created by the World Meteorological Organization and the United Nations Environment Programme. The IPCC is mandated to:

> …assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation.

The global mean surface temperature has increased more during the last few decades of the 20th century than the prior four centuries (National Academy Science, 2006). Global temperature projections forecast continued increases during the 21st century (IPCC, 2001). Climate change has the potential to affect temperature regimes and precipitation events that in turn influence stream runoff rates, the seasonality of runoff, water temperatures, and reservoir operations.

In 2007, the IPCC released the Fourth Assessment Report (*Climate Change 2007*) presenting information based on assessments by the three IPCC Working Groups. The report provides current climate change data and an explanation of the data. The report also presents statements and uncertainties about trends, human influences, and projections for severe weather events.

Climate change science studies the statistically significant variation in either the mean state of the climate or in its variability over an extended period of time, often several decades. The IPCC defines climate variability as variations in the mean state (and other statistics) of the climate on all temporal and spatial scales other than individual weather events. Variability may be caused by natural or anthropogenic factors operating internally or externally. Climate change is any change in climate over time, whether due to variability or a result of human activity (CCTS, 2006).

3.3.1.1 Climate and Snowpack in the Pacific Northwest

Climate data indicate that temperatures in the Pacific Northwest generally increased between 1916 and 1997 (Mote et al., 2003). The warming that occurred in the region increased faster than the global average (CCTS, 2006). Pacific Northwest climate models also project a warming rate for the first half of the 21st century that is significantly higher than warming recorded during the 20th century (Snover et al., 2005).

Analysis of Pacific Northwest snowpack data from 1950 to the present shows a reduction in spring snowpack. Below elevations of approximately 6,000 feet mean sea level (msl), reduced snow water equivalent (SWE) measurements were observed as temperature and the amount of precipitation increased (Mote et al., 2003). A recent study indicates that spring snow melt could occur as much as two months earlier in the Pacific Northwest (Rauscher et al., in press; Purdue University, 2008).

In the Pacific Northwest, snow provides a significant proportion of inflow to lower elevation reservoirs during spring and summer. A warmer regional climate would result in increased temperatures that reduce winter snowpack (with precipitation being equal). This would increase the volume of runoff during the winter, and result in earlier spring peak flows and reduced warm season runoff (Hamlet et al., 2007).

3.3.1.2 Columbia River Basin

Data indicate increased winter runoff volumes associated with increased Columbia River Basin temperatures (Hamlet and Lettenmaier, 1999). Warmer winter temperatures would result in more precipitation falling as rain rather than snow. A reduced winter snowpack would result in less snowmelt during the summer and lower dry season runoff volumes in the region.

Change in seasonal water regimes may have significant implications for water resource management. Greater runoff volumes and stream flows during winter months, and corresponding lower volumes and flows during the summer months, result in the potential for lower reservoir levels earlier in the season. A reduction in reservoir storage may cause increased competition for water during non-winter months.

3.3.2 Climate Projections

There is consensus among the climate models that future warming is likely to occur in the Pacific Northwest region; however, the models are not as consistent regarding increases in mean annual precipitation. A survey of climate model projections for the Pacific Northwest region indicates more projections suggest wetter rather than drier conditions (Reclamation and Ecology, 2008). For the Yakima River Basin Water Storage Feasibility Study, Reclamation sampled the World Climate Research Programme's Coupled Model Intercomparison Project—Phase 3 multi-model dataset. The survey indicates consensus that warming is projected to occur throughout the upper Columbia River Basin, with approximately 75 percent of the studies projecting wetter conditions in the basin. A major uncertainty of precipitation projections is how changes in large-scale weather patterns may interact with local features. For example, the interaction between the Northwest's Pacific storm tracks and the effect of the Cascade Mountains on local weather patterns is not fully represented in the climate change projections (Reclamation and Ecology, 2008).

The uncertainty of the precipitation projections complicates projecting runoff for the Columbia River Basin since runoff is dependent on both temperature and precipitation. Studies have shown that decreased runoff during spring and summer could be offset by an increase in precipitation during these seasons (Hamlet and Lettenmaier, 1999). The inability to reliably project regional precipitation trends affects the ability to accurately determine how climate change may quantitatively affect water resources and their management. Therefore, the discussion in this Supplemental EIS of potential climate change impacts on Columbia River Basin water resources is qualitative rather than quantitative.

3.3.3 Potential Climate Change Impacts on Runoff and Surface Water Supplies

Climate change has the potential to significantly alter the timing of runoff contributing to the Columbia River and its reservoir system. Warming without increases in precipitation during winter would result in a seasonal shift in runoff, with higher flows during winter and decreased volumes during summer. Studies of the Pacific Northwest spring snowpack since the mid 20th century indicate regional increases in temperature leading to declines in snowpack and runoff (Mote, 2003). Other studies have confirmed these hydrologic conditions associated with higher temperatures: a reduced spring snowpack in the mountains and earlier spring snowmelt runoff, coupled with increases in winter flow and decreases in summer flow (Mote et al., 2005).

According to some climate projections, a portion of the decrease in runoff associated with regional warming could be offset with increases in precipitation (Hamlet and Lettenmaier, 1999). This would reduce the impact on dry season water supplies; however, reservoir management and operation would still need to contend with changes in the timing and quantity of winter runoff.

Reductions in summer flows could have a significant impact on summer hydropower production and water available for irrigation. Without proper reservoir management and operation, conflicts could arise between municipal and industrial parties interested in energy and water demand, parties interested in irrigation allocations, and parties interested in maintaining stream flows for fish habitat (Callahan et al., 1999; Miles et al., 2000).

3.4 Surface Water

3.4.1 Water Quantity

3.4.1.1 Lake Roosevelt

A description of surface water resources of Lake Roosevelt is contained in the Programmatic EIS (Ecology, 2007). Additional information on Lake Roosevelt operations is provided in Section 1.4.

3.4.1.2 Columbia River Downstream

A description of surface water resources of the Columbia River downstream of Lake Roosevelt is contained in the Programmatic EIS (Ecology, 2007).

3.4.1.3 Odessa Subarea and Banks Lake

Odessa Subarea

Surface water bodies in the Odessa Subarea include Crab Creek, Rocky Coulee, Weber Coulee, Lind Coulee, Esquatzel Coulee and several smaller coulees and streams. Most streams in the Odessa Subarea are intermittent, but the portion of Crab Creek that flows

through the Odessa Subarea is perennial. The streams convey runoff from precipitation and in some cases intercept seepage flow from irrigation. Runoff from Crab Creek, Rocky Coulee, Weber Coulee and Lind Coulee flows into Moses Lake or the Potholes Reservoir, supplying water for the South Columbia Basin Irrigation District. South of Lind Coulee, some flow from the Odessa Subarea is captured by irrigation drains and canals.

Banks Lake

Banks Lake is a man-made reservoir used to regulate irrigation water prior to entering the Columbia Basin Project canal system. Water is pumped into Banks Lake from Lake Roosevelt via the 1.6-mile-long Feeder Canal using six pumps and six pump-generators (65,000 horsepower each) located at the Grand Coulee pump-generating plant. Banks Lake supplies water to the Main Canal from March to October of each year as required for irrigation. The average annual quantity of water supplied to the Main Canal from Banks Lake for irrigation is 2.4 million acre-feet while the peak monthly supply of water averages 434,000 acre-feet in July (Montgomery Water Group, 2003).

Banks Lake was formed in Upper Grand Coulee by two dams, the North Dam located near Grand Coulee Dam and Dry Falls Dam at Coulee City. The lake is 27 miles long, has a surface area of 28,000 acres (42 square miles), and has a total storage capacity of 1,275,000 acre-feet. About 60 percent of the total storage capacity, or 715,000 acre-feet, is active storage above the minimum outlet elevation. The reservoir's full pool elevation is 1,570 feet. Under current operating conditions, the reservoir is drawn down to a minimum elevation of 1,565 feet in August and refilled by September 22 to elevation 1,570 feet. The total amount of water passing through Banks Lake each year to the Main Canal is equivalent to a little over twice the total storage capacity of the lake.

Periodically Banks Lake is drawn down by over 20 feet during the winter to allow maintenance of the pumping plant, Feeder Canal, and Main Canal headworks, and to control Eurasian watermilfoil, a noxious weed.

Banks Lake acts as an equalizing reservoir, making it unnecessary to regulate pumping of water from Lake Roosevelt to meet the fluctuating daily irrigation demands and also allowing irrigation pumping to occur during off-peak hours when water and electrical demand at Grand Coulee Dam are low. Banks Lake is also used to store water for hydroelectric power generation at the Grand Coulee pump-generating plant. Of the 12 pumps at the plant, six are reversible pump-turbines that can be used for power generation during times of peak demand or for reserve firm capacity.

3.4.2 Water Quality

3.4.2.1 Lake Roosevelt

Water quality data for Lake Roosevelt and the Columbia River below Grand Coulee Dam are available from several sources:

- The Lake Roosevelt Fisheries Evaluation Program (LRFEP) for the STI has sampled water quality parameters from sites on Lake Roosevelt and the Spokane Arm for the past 19 years (1989 to 2007). LRFEP annual reports contain information regarding sampling efforts for total dissolved gas (TDG), water temperature, dissolved oxygen, total dissolved solids (TDS) and turbidity in Lake Roosevelt and the Spokane Arm.
- Water temperature is monitored by the Corps of Engineers at the forebay of Grand Coulee Dam (Reclamation, 2008a). In addition, water temperature and TDG are monitored by the Corps of Engineers on the Columbia River downstream of Grand Coulee Dam (Reclamation, 2008a). Water quality data were reviewed in relation to representative water years, with 1997 representing a wet year, 2002 an average year, 2003 a dry year, and 2001 a drought year.

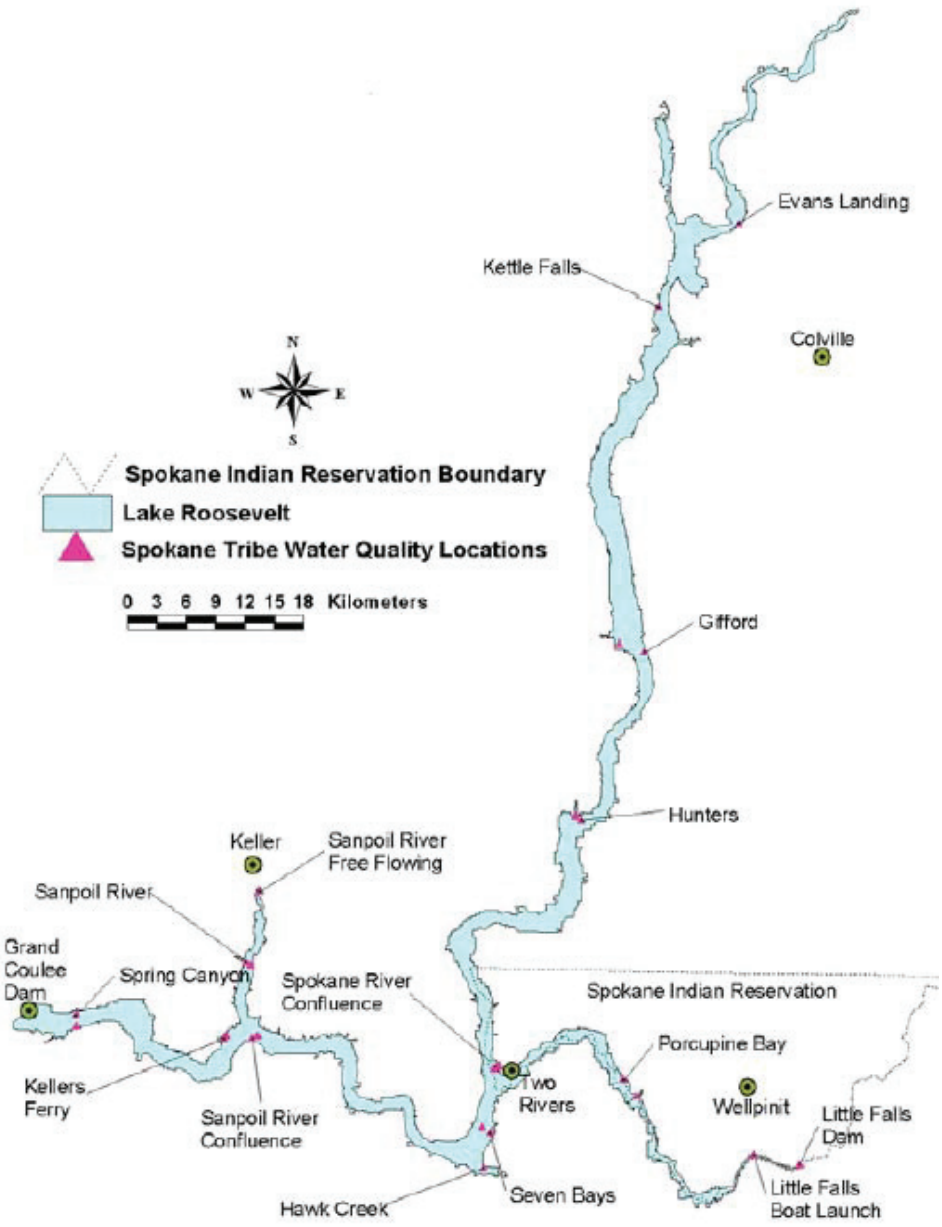
Sampling Efforts

Parameters

From 2002 to 2005, the LRFEP sampled TDG, water temperature, dissolved oxygen, turbidity, and TDS from pelagic zones using a Hydrolab Surveyor 4®. The LRFEP annual reports for sampling efforts in 2006 and 2007 are not yet available. Measurements for TDG were also obtained from fixed monitoring stations (U.S./Canada border and Grand Coulee Dam forebay) on Lake Roosevelt operated by Reclamation (Scofield et al., 2005; Lee et al., 2004; Pavlik-Kunkel et al., 2003; and Fields et al., 2002). Additional samples were also analyzed for turbidity between 2003 and 2005.

Sample Locations and Methods

In 2002, LRFEP sampling on Lake Roosevelt and the Spokane Arm began with 17 different sampling locations during the first month of January (Figure 3-2). However, after January, sampling was reduced to six sampling stations that were located in Gifford, Seven Bays, Keller Ferry, Spring Canyon, Porcupine Bay, and the Little Falls Dam. During the 2003, 2004, and 2005 sample years, the five historic index locations (Gifford, Seven Bays, Keller Ferry, Spring Canyon and Porcupine Bay) plus four locations near Little Falls Dam were sampled by the LRFEP (Table 3-1).



Note: Figure modified from Field, et. al, (2002)

FILE NAME: Fig03-2_waterqualitysamples.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 3-2
Water Quality Sampling Locations

Table 3-1 LRFEP Sampling Dates for Each Year

2005	*2004*	*2003*	*2002*
1. Jan 24 – 26	1. Jan 13 – 15	1. Jan 13 - 16	1. Jan. 15-17, & 22
2. Apr 5 & 7	2. May 10 – 11, & 14	2. May 12 - 13	2. May 13-15
3. May 16 – 18	3. Jun 14 – 16	3. Jun 10 - 12	3. Jun. 12-14
4. Jun 22 – 24	4. Jul 12 – 14	4. Jul 14 - 16	4. Jul. 15-16, & 23
5. Jul 21 – 25	5. Aug 9 – 10, & 12	5. Aug 20 - 22	5. Aug. 12-14
6. Aug 16 – 18	6. Sep 13 – 15	6. Sep 22 - 24	6. Sep. 16 & 18
7. Sep 12 – 15	7. Oct 11 – 13	7. Oct 13 - 15	7. Oct. 14-16
8. Oct 17 – 18, & 20	--	--	--

LRFEP collected Hydrolab® data at each location from the surface to a depth of 108 feet at 10-foot intervals. Additional measurements were taken from 131 feet to 295 feet at 33-foot intervals at Keller Ferry and Spring Canyon to characterize the profundal zones[1] of the lower reservoir (Scofield et al., 2005; Lee et al., 2004; Pavlik-Kunkel et al., 2003; and Fields et al. 2002).

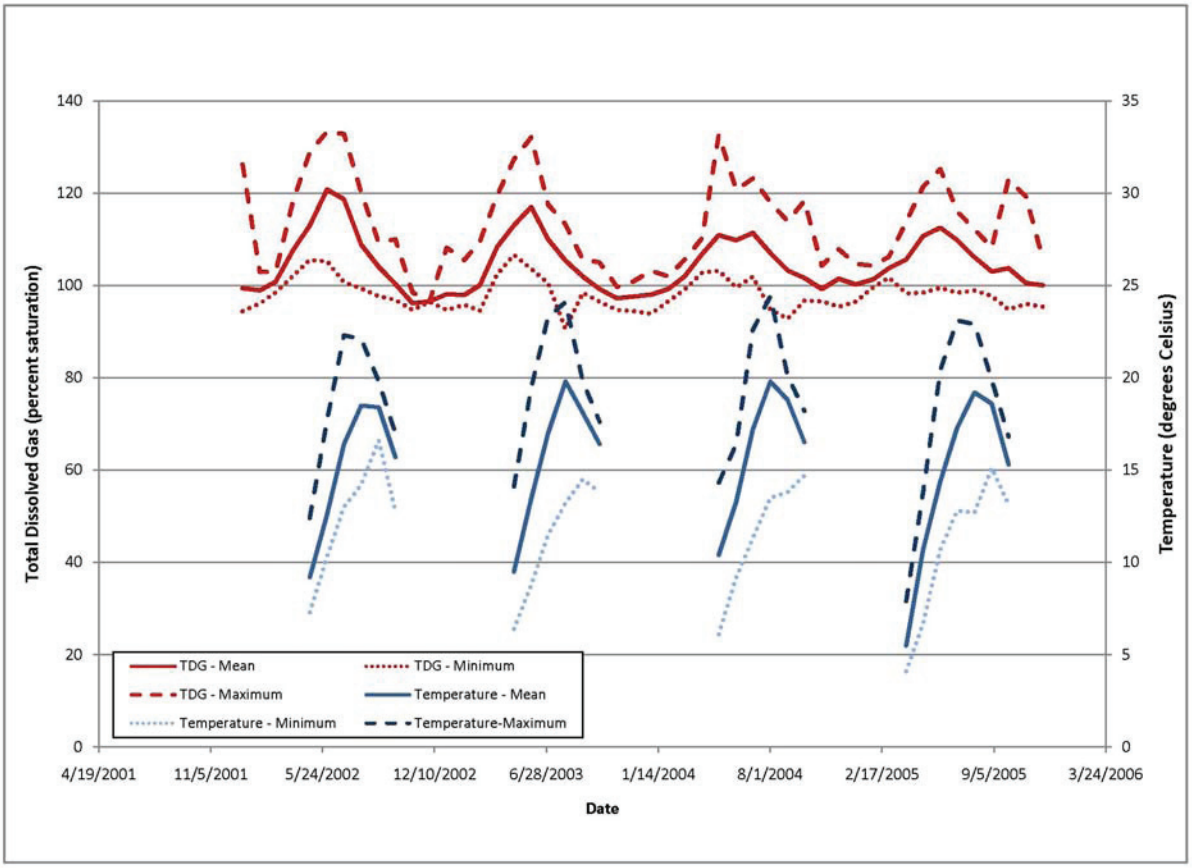
Results

Summaries of LRFEP 2002-2005 sample results (as reported by the STI) for TDG, temperature, dissolved oxygen, turbidity, and total dissolved solids are presented in Tables 1 to 5 in Appendix C, and summarized below.

Total Dissolved Gas

Annual mean TDG saturation within Lake Roosevelt was highest at Keller Ferry at 109.4 percent in 2005 and lowest at Spring Canyon at 104.2 percent in 2004 (Table 1 in Appendix C). Between 2002 and 2005, peak TDG reached as high as 132.6 percent. TDG tended to be highest in the summer months with peaks in June, and lowest in the winter months (Figure 3-3).

[1] The profundal zone is a deep zone of a water body, which is located below the range of effective light penetration.



Note. This figure is based on the monthly TDG and temperature data from Tables 1 and 2 in Appendix 3-A.

FILE NAME: Fig03-3_gas-temperature.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 3-3

Total Dissolved Gas and Temperature at Lake Roosevelt Sampling Stations

Temperature

Based on the data presented in the LRFEP, Lake Roosevelt exhibits thermal stratification during the summer as follows:

- Keller Ferry: Maximum sample depth of 100 meters. August stratification only: 73.4 to 57.2 degrees F (23 to 14 degrees C). Isothermal: 62.6 to 68 degrees F (17 to 20 degrees C) in September and October.
- Spring Canyon: Maximum sample depth of 100 meters. August stratification only: 75.2 to 57.2 degrees F (24 to 14 degrees C). Isothermal: 62.6 to 66.2 degrees F (17 to 19 degrees C) in September and October.
- Porcupine Bay: Maximum sample depth of 35 meters. Stratified in June, July and August: 73.4 to 53.6 degrees F (23 to 12 degrees C). Isothermal: 60.8 to 68 degrees F (16 to 20 degrees C) in September and October.

Mean monthly temperatures across all sampling locations for 2002 to 2005 (as reported by the STI) ranged as follows (Figure 3-3):

- June: 54.7 to 57.9 degrees F (12.6 to 14.4 degrees C)
- July: 61.5 to 63.1 degrees F (17.3 to 16.4 degrees C)
- August: 65.3 to 67.64 degrees F (18.5 to 19.8 degrees C)
- September: 64.6 to 65.8 degrees F (18.1 to 18.8 degrees C)
- October: 59.5 to 61.7 degrees F (15.3 to 16.5 degrees C)

Dissolved Oxygen

Based on the data presented in the LRFEP, thermal stratification of Lake Roosevelt during the summer caused stratification in dissolved oxygen levels. Dissolved oxygen concentrations remained greater than 5 mg/L at most of the sites monitored (Table 3 in Appendix C). However, the hypolimnion (near the bottom) of Lake Roosevelt in Porcupine Bay had anoxic (less than 0.5 mg/L of dissolved oxygen) conditions in 2004 and 2005, and Keller Ferry had dissolved oxygen concentrations of less than 2 mg/L in 2003.

Turbidity

In general turbidity was very low (Table 4 in Appendix C). There were five maximum concentrations above 10 nephelometric turbidity units (NTU). Mean turbidity was less than 3 NTU for all months and all locations.

Total Dissolved Solids (TDS)

Annual mean TDS concentrations at mainstem sites ranged from 74 to 83 mg/L (Table 5 in Appendix C). The annual mean TDS concentrations for Spokane Arm sites were slightly larger (71 to 120 mg/L). TDS concentrations tended to be highest in September and October and lowest in May through July.

3.4.2.2 Columbia River Downstream

Temperature and TDG are monitored by the Corps of Engineers on the Columbia River downstream of Grand Coulee Dam and reported on Reclamation's Hydromet website (Reclamation, 2008a). Variations in daily average water temperature and computed TDG saturation at the monitoring site were analyzed with respect to representative years with 1997 representing a wet year, 2002 an average year, 2003 a dry year, and 2001 a drought year.

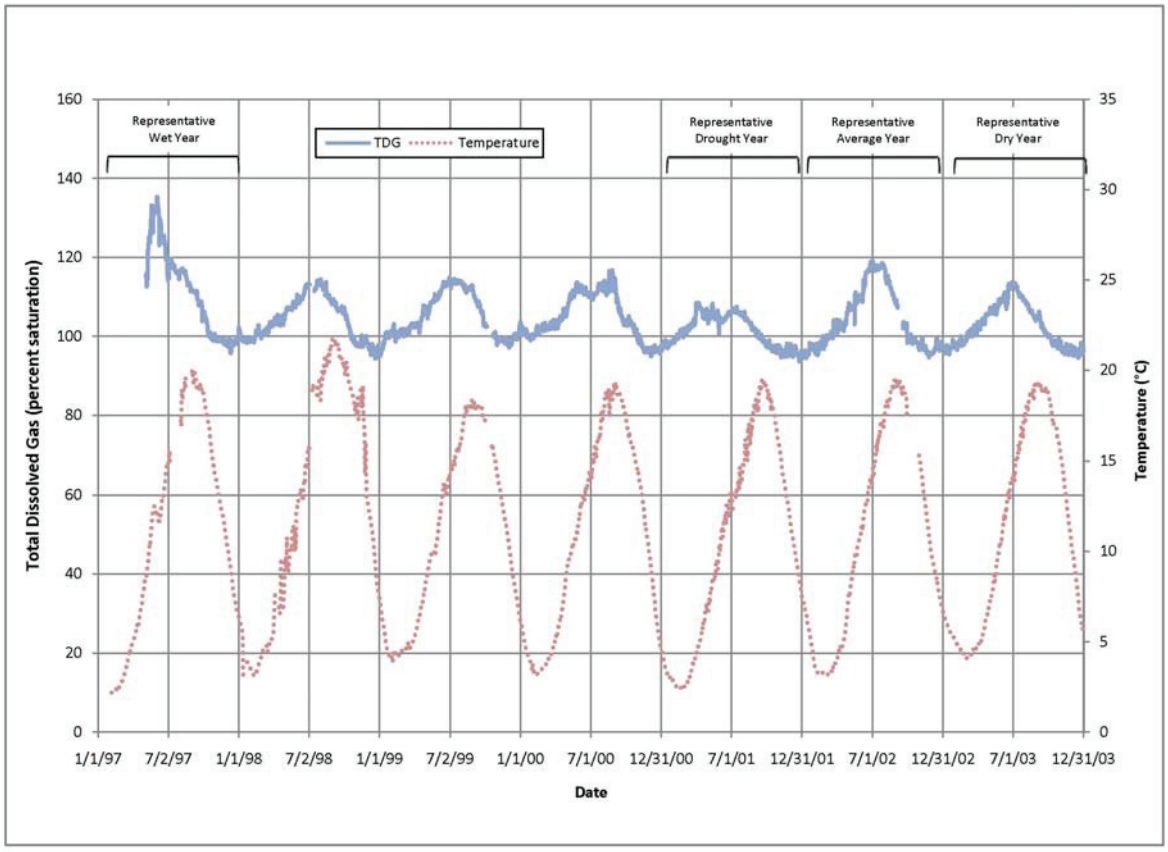
Total Dissolved Gas (TDG)

TDG data are displayed in Figure 3-4. In general, the maximum TDG was monitored in July and August and minimum TDG was recorded in the winter months. For the average year (2002) TDG concentrations ranged from 94.5 percent to 119 percent saturation. The 1997 wet year shows a higher and earlier peak TDG concentration than any other year. The 2001 drought year has the smallest range of TDG concentrations ranging from 93.6 to 108.6 percent saturation.

Temperature

Water temperature downstream of Lake Roosevelt generally ranges from 37.4 degrees F (3 degrees C) in winter to about 68 degrees F (20 degrees C) in summer (Figure 3-4).

Water is released from Lake Roosevelt through power plant intakes and spillways. The Left and Right Power Plant intakes are located at an elevation of 1,041 feet msl and the Third Power Plant is located at an elevation of 1,130 feet msl. The river outlet intakes are located at elevations of 1,136.7 and 1,036.7 feet msl and the spillway release gates can be set at variable elevations between 1,260 and 1,288 feet msl (Reclamation, 2000). Temperature profiles at the Grand Coulee Dam forebay indicate that thermal stratification occurs in the late summer months (Reclamation, 2000). The forebay's water temperature was greater than 64.4 degrees F (18 degrees C) down to an elevation of almost 1,000 feet msl during the summer of 1998. Water temperatures in the summer of 1999 had a greater range, with temperatures greater than 64.4 degrees F (18 degrees C) occurring above 1,210 feet msl, but 60.8 to 64.4 degrees F (16 to 18 degrees C) between 990 and 1,210 feet msl (Reclamation, 2000).



Note. The graph shows how TDG and temperature change throughout the year. Representative water years are also identified.

FILE NAME: Fig03-4_gas-temperature_1997-2003.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 3-4

Temperature and Total Dissolved Gas (TDG) from 1997 to 2003 on the Columbia River Downstream of Grand Coulee Dam

3.4.2.3 Odessa Subarea and Banks Lake

Odessa Subarea

Water quality in the Odessa Subarea was previously discussed in the Programmatic EIS (Ecology, 2007).

Banks Lake

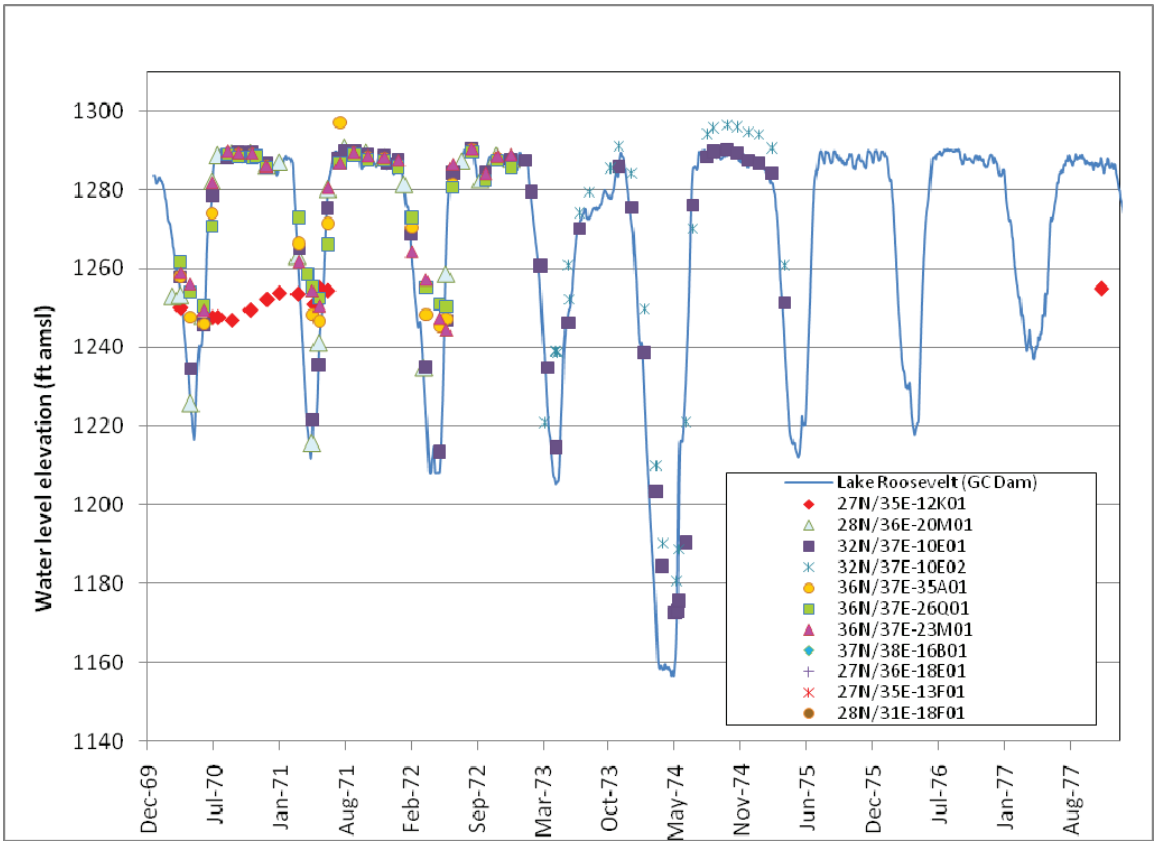
Banks Lake stratifies slightly in the summer; however, mixing of cooler water pumped from Lake Roosevelt limits stratification in the northern part of the lake (Reclamation, 2004). As reported in Reclamation (2004), phosphorus levels range from 10 to 20 mg/L, and surface temperature of the lake ranges from 75.2 to 82.4 degrees F (24 to 28 degrees C). Banks Lake was on the 2004 303(d) list for 2,3,7,8-TCDD and Total PCBs in tissue (Ecology, 2004).

3.5 Ground Water

3.5.1 Lake Roosevelt

Ground water level elevations were compared with Lake Roosevelt water level elevations to evaluate ground water conditions around the Lake Roosevelt area. Historic reservoir surface water level elevations for Lake Roosevelt were obtained from Reclamation's online database (Reclamation, 2008a). Ground water level elevations for U.S Geological Survey (USGS) wells located within approximately 1 mile of Lake Roosevelt were obtained from the USGS online database (USGS, 2008). Wells with more than one ground water level elevation were compared to the water level elevations for Lake Roosevelt. General observed trends from this analysis are as follows:

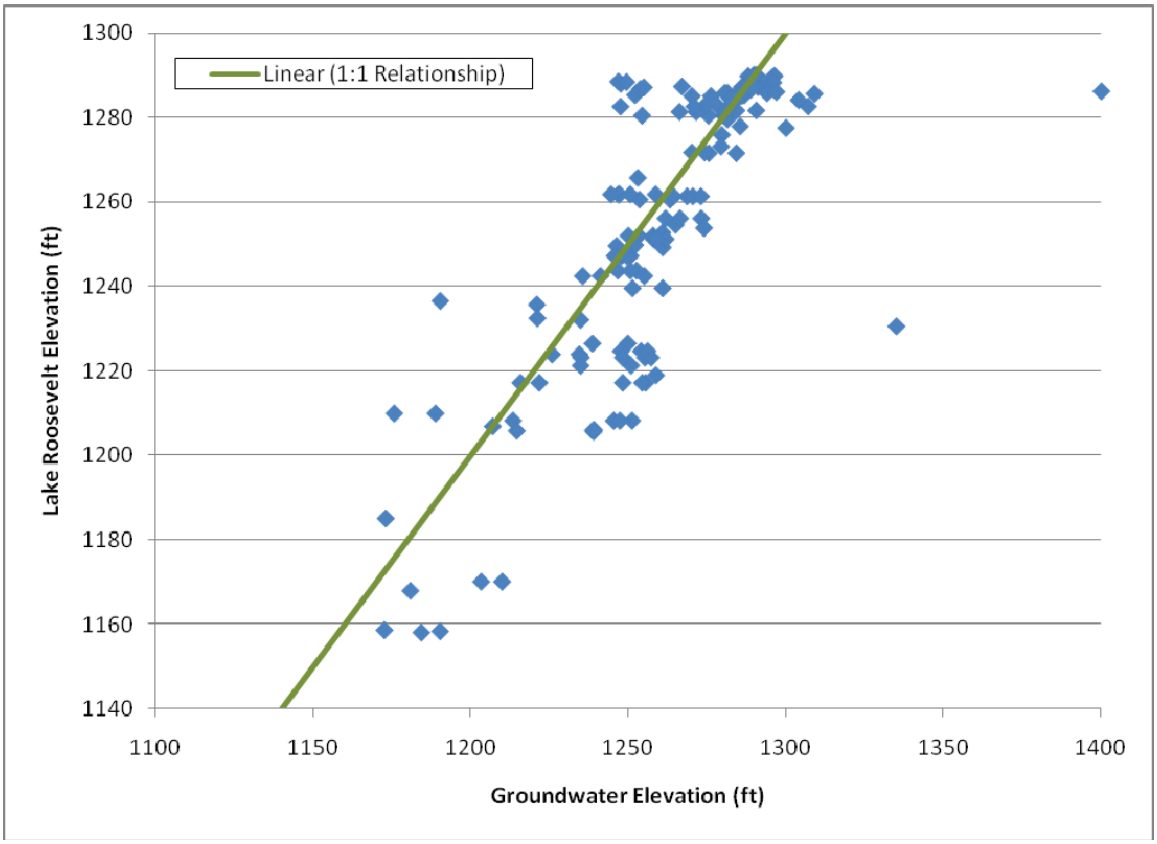
- Ground water level elevations for most wells located within 1 mile of Lake Roosevelt appear to be in hydraulic connection with Lake Roosevelt. Exceptions to this trend are deep wells (greater than 600 feet below ground surface) and wells that are completed above the level of Lake Roosevelt (greater than 1,290 feet msl) (Figure 3-5). Ground water levels are generally higher or equal to the Lake Roosevelt water level elevation (Figure 3-6). Therefore, ground water generally flows toward Lake Roosevelt.
- Ground water level elevations decrease in response to the lowering of the Lake Roosevelt surface water elevation. Ground water continues to flow toward Lake Roosevelt during drawdown and recovers quickly during refilling of the reservoir.



Note. The line traces the water level elevation of Lake Roosevelt at Grand Coulee Dam.
The points on the graph reflect groundwater elevations at different wells within 1 mile of Lake Roosevelt.
The wells are identified based on the USGS name.

FILE NAME: Fig03-5_groundwaterfluct.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 3-5
Lake Roosevelt and Groundwater Fluctuations 1970-1977



Note. This graph shows the groundwater level elevation and corresponding Lake Roosevelt elevation at the same time for a sub-set of wells located within one mile of Lake Roosevelt. The linear (1:1 Relationship) line shows when the groundwater elevation at a well is equal to the water level elevation of Lake Roosevelt. Groundwater levels are higher than the Lake Roosevelt water level elevation for points below the linear (1:1 Relationship) line. Groundwater levels are lower than the Lake Roosevelt water level elevation for points above the linear (1:1 Relationship) line.

FILE NAME: Fig03-6_LR-groundwater.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 3-6

Lake Roosevelt Level Versus Groundwater Level 1970-1985

3.5.2 Columbia River Downstream

Ground water resources were previously discussed in the Programmatic EIS (Ecology, 2007).

3.5.3 Odessa Subarea and Banks Lake

3.5.3.1 Odessa Subarea

Ground water quantity and quality in the Odessa Subarea were previously discussed in the Programmatic EIS (Ecology, 2007).

3.5.3.2 Banks Lake

The Wanapum unit is the upper aquifer beneath Banks Lake. Ground water from the Columbia River moves south/southwesterly (in the direction of Banks Lake) through the Wanapum aquifer (Reclamation, 2004). A confining unit located below the Wanapum aquifer separates it from the deeper Grande Ronde aquifer. Horizontal ground water movement in the Grande Ronde aquifer is also south/southwesterly from the Columbia River (Reclamation, 2004). Ground water in the Banks Lake area generally has less than 450 mg/L total dissolved solids, average nitrate concentrations of 1.9 mg/L and low concentrations of pesticides (Steinkampf, 1989; Cook, 1996; Reclamation, 2004).

3.6 Legal Considerations

Legal considerations associated with the Lake Roosevelt Incremental Storage Release Project were described in the Programmatic EIS (Ecology, 2007). This section provides additional information on relevant legal issues.

3.6.1 Water Rights

The Government-to-Government Agreement in Principle between the State of Washington and the CCT (discussed in Section 1.3.1.2 of the Programmatic EIS) has evolved into Water Resource Management Agreements between the state, the CCT, and the STI. The agreements authorize annual payments in exchange for the tribes' agreement to support incremental storage releases of up to 132,500 acre-feet per year from Lake Roosevelt. "The payments will be used to mitigate the damage on fish and wildlife, cultural resources, and recreational activities resulting from the release of water from Lake Roosevelt, and for economic development investments to benefit the local economy. The funding is not for purchase of water or water rights from the tribes" (Office of Governor Christine Gregoire, 2005). The agreements also do not affect either tribe's future water right claims. The tribes' water rights to Lake Roosevelt are not quantified and to do so would take many years. These agreements facilitate the immediate need for more water in the Columbia Basin.

3.6.2 Endangered Species Act Biological Opinion

Reclamation's Columbia Basin Project, which includes Grand Coulee Dam and Lake Roosevelt, is part of the Federal Columbia River Power System (FCRPS). Operation of the FCRPS has been embroiled in legal challenges since the 1990s. The issue has been the application of the Endangered Species Act to management of the FCRPS. A total of 13 anadromous salmonid species have been listed as threatened or endangered under the ESA between 1991 and 2005 (NOAA Fisheries, 2008). The seven listed species from the interior Columbia Basin are Snake River fall Chinook salmon, Snake River sockeye salmon, Upper Columbia River steelhead, Middle Columbia River steelhead, Snake River spring/summer Chinook salmon, Snake River steelhead, and Upper Columbia River spring Chinook salmon.

Whenever a federal action may adversely affect listed species, the ESA requires that the "action agencies" consult with a consulting agency that evaluates the effects of the proposed action on the listed species. The evaluation is contained in a biological opinion. For operation of the FCRPS, the action agencies are the Corps of Engineers, Bonneville Power Administration (BPA), and Reclamation. The consulting agency is the National Marine Fisheries Service (NOAA Fisheries).

As discussed in Section 3.6.1.6 of the Programmatic EIS (Ecology, 2007), in October 2005, Judge Redden of the U.S. District Court in Oregon remanded the 2004 Biological Opinion to NOAA to make a jeopardy determination for operation of the FCRPS that complies with ESA requirements. On appeal of the 2004 Biological Opinion both Judge Redden and the Ninth Circuit Court of Appeals held that the jeopardy standard requires NOAA Fisheries to consider two things: (1) whether the species will survive, and (2) how the proposed action will affect the species' prospects for recovery (NOAA Fisheries, 2007).

On remand, a Policy Working Group including a representative from each of the sovereign entities (federal, state and tribal) provided input to the Action Agencies on development of a Biological Assessment and proposed reasonable and prudent alternatives (RPA). The group focused on "narrowing our areas of disagreement and clarifying policy issues" (Graves, 2007). Other parties to the litigation were involved in technical working groups.

In August 2007, the FRCPS Action Agencies released a Biological Assessment for the Effects of the FCRPS and Mainsteam Effects of Other Tributary Actions and Reclamation released a Biological Assessment on the operations and maintenance of its projects in the Snake River Basin above Brownlee Reservoir. The Action Agencies that operate the FCRPS had already concluded that operation of the hydropower projects would jeopardize listed species unless further mitigation was provided. The FCRPS Biological Assessment included a proposed RPA to address impacts to ESA-listed species. The RPAs contain "73 detailed sets of additional mitigation actions that are required to avoid jeopardy and adverse modification of critical habitat" (NOAA Fisheries, 2007).

On October 31, 2007, the Draft FCRPS Biological Opinion and the Upper Snake River Biological Opinion were released. The Biological Opinions analyze the Biological Assessments, including the proposed RPA (Graves, 2007). On May 5, 2008, NOAA Fisheries issued the 2008 Biological Opinion (NOAA Fisheries, 2008).

Reasonable and Prudent Alternative Action 4 in the 2008 Biological Opinion addresses Storage Project Operations, including those at Lake Roosevelt. Operations specific to Grand Coulee Dam include drafting the reservoir to support salmon flow objectives during July and August with a variable draft limit of 1,278 to 1,280 feet by August 31 based on the water supply forecast. Currently, the lower draft of 1,278 feet is to be limited to those years when the April to August runoff volume is less than 92 million acre-feet (approximately 50 percent of the years of record)[2] (Graves, 2007). This element of RPA Action 4 is subject to future evaluation and modeling (NOAA Fisheries, 2007 and 2008).

Reasonable and Prudent Alternative Action 14 is for Dry Water Year Operations. A "Dry Water Year" is defined as "the lowest 20th percentile years based on the Northwest River Forecast Center's averages for their statistical period of record (currently 1971-2000) using the May final Water Supply Forecast for the April to August period as measured at The Dalles Dam" (Graves, 2007). Two of the specific elements within Action 14 call for the Action Agencies to convene a technical workshop to scope and investigate alternative strategies for dry water years, and to consider annual and future long-term agreements between the U.S. and Canada (NOAA Fisheries, 2008).

Several Northwest tribes recently entered into new agreements with the Action Agencies that resolve the tribes' objections to the Biological Opinion. On March 25, 2008, the CCT agreed to a Draft Memorandum of Agreement (MOA) with the Action Agencies in which the Action Agencies agree to provide long-term commitments for funding and implementation activities to support the recovery of listed species in the Columbia River. The parties agree that the MOA is intended to resolve issues associated with tribal claims related to the effects of construction and operation of the FCRPS and Reclamation's Upper Snake River projects on fish and wildlife resources of the Columbia River Basin (CCT et al., 2008). A second draft agreement was entered into between the Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, and The Confederated Tribes and Bands of the Yakama Nation (3 Treaty Tribes, 2008). Both agreements are for a term of 10 years.

The Draft MOA with the CCT states that nothing in the agreement is intended to "concede, quantify, settle or diminish any aspects of the Tribes' water or fishing rights" (CCT et al., 2008). The agreement is intended to build upon the Action Agencies' proposed RPA for the FCRPS/Upper Snake River projects (CCT et al., 2008). Section A.1.e of the Draft MOA, entitled Flow Actions, specifically addresses operations of Lake Roosevelt. These flow actions are included in Appendix D. The agreements were signed

[2] A study will be conducted that looks at draft to elevation 1,278 feet msl in only the driest 20 percent of water years.

by all parties on May 2, 2008 and are now referred to as The Columbia Basin Fish Accords.

3.6.3 Columbia River Treaty

As discussed in Section 3.6.1.5 of the Programmatic EIS, International-Interstate Issues, the Columbia River Treaty was signed by the U.S. in 1961 and ratified by Canada in 1964. The Treaty may be terminated by either party in 2024 with 10 years notice. The Treaty may also be renegotiated under the same terms. It is anticipated that the Treaty will be renegotiated with notice to be given in 2014.

The Treaty was designed to provide more flood control after the 1948 flood showed that Grand Coulee Dam alone was not adequate (Showman, 2003). Three large dams built in British Columbia pursuant to the Treaty help prevent flooding and also firm up the U.S. power generation year-round. The U.S. and Canada split the benefits from the power: 50 percent for the U.S. ("downstream power") and 50 percent for Canada (the "Canadian Entitlement") (Showman, 2003). At the time of the Treaty, Canada did not need its share of the power and sold it to a consortium for 30 years. In 2003, British Columbia started getting its share of the firm power back. BPA must now make sure the Canadian Entitlement is generated and delivered to the border (Showman, 2003).

The Treaty terms have been augmented by agreements to address flows for Columbia River salmon, sturgeon, whitefish, and rainbow trout (Osborn, 2007). The Treaty has been implemented on a day-by-day basis by BC Hydro for Canada and BPA and the Corps of Engineers for the U.S. One dispute arose in 1993 and 1994, which Canada elevated to the national level. When nothing was resolved at that level, the operations managers in Canada and the U.S. quickly negotiated a resolution (Showman, 2003).

As the time approaches for either party to give notice for renegotiation of the Treaty, issues are being identified that may arise in any future negotiations. There are general concerns that some in Canada want changes in the management of Canadian dams, which could impact water supply and/or timing of supply to U.S. reservoirs (Osborn, 2007). Some Canadians do not like the system being run to preserve fish because the Chief Joseph Dam and Grand Coulee Dam were built without fish passage and destroyed the salmon runs into Canada (Showman, 2003). Others note that with more pressure on water supply and the impacts of global warming, water disputes are expected between Canadian Provinces as well as internationally (Pynn, 2007). Of note, one provision in the 2004 MOU between the state of Washington, Reclamation, and the three Columbia Basin Irrigation Districts, is an agreement to seek water from existing Canadian storage facilities (see Section 1.3.1.1 of the Programmatic EIS).

3.7 Fish

Resident and anadromous fish and their habitats in the project area were described in the Programmatic EIS (Ecology, 2007). Additional information specific to fish and habitat conditions in Lake Roosevelt, the Columbia River downstream of Grand Coulee Dam, Banks Lake, and the Odessa Subarea is described below.

3.7.1 Lake Roosevelt

Construction of the Grand Coulee Dam ending in 1941 eliminated migratory forms of anadromous fish species from Lake Roosevelt and all upstream areas. A fishery survey in 1963 found native fish such as peamouth, northern pikeminnow, suckers, shiners, kokanee, and rainbow trout dominated the fish community (Earnest et al., 1966; Scholz et al., 1986). A variety of non-native fish had also been introduced, including carp, yellow perch, smallmouth bass, pumpkinseed, lake whitefish, brook trout, walleye, and bullheads. By 1973, yellow perch and walleye comprised 32 percent of the catch, suggesting a shift in dominance in the fish community to walleye (Harper et al., 1981; Scholz et al., 1986).

At full pool, Grand Coulee Dam inundated 151 miles of habitat in the Columbia River mainstem from the dam to the Canadian border, 28 miles of the lower Spokane River, 12 miles of the Sanpoil River, and 15 miles of the Kettle River. The shallow, free-flowing river system was converted to a deep reservoir. The impoundment likely selected against the native westslope cutthroat trout, rainbow trout, bull trout, and mountain whitefish that were adapted to a fluvial environment. Unfavorable conditions for existing fish populations in the reservoir, combined with fish entrainment past the dam, resulted in declining native fish populations. Resident fish species were further impacted through lost productivity (i.e., absence of marine derived nutrients from anadromous fish) and habitat degradation related to land use practices (e.g., agriculture, grazing, logging, and municipal development).

The U.S. Fish and Wildlife Service (USFWS) conducted a comprehensive limnology and fisheries study on Lake Roosevelt between 1980 and 1982 (Beckman et al., 1985). They determined the Lake Roosevelt recreational fishery consisted primarily of walleye with a limited rainbow trout fishery in the lower reaches of the reservoir.

Walleye were illegally stocked into Lake Roosevelt in the 1950s. They are opportunistic feeders and have been known to feed on other fish including yellow perch, rainbow trout and kokanee in the reservoir. Between 1980 and 1982, walleye harvest ranged between 128,000 and 108,000 fish per year (Beckman et al., 1985). A decline in yellow perch abundance initiated a concern that the walleye fishery could collapse. Additionally, the average size of walleye harvested by anglers decreased from 18.5 inches in 1973 to 14.1 inches from 1980 to 1983 (Beckman et al., 1985). A collapse in the fish population could shift the age and size structure of the spawning population to the point where it may not be able to replace itself (WDFW, 1994). In 1995, walleye spawning areas in the Spokane Arm, below Little Falls Dam, Sanpoil River, and Kettle River were closed to fishing between April and May. The bag limit was reduced to eight fish. A minimum recreational harvest size of 16 inches was established to allow all walleye to reproduce at least once before harvest.

Nearly 7.5 million kokanee were stocked in Lake Roosevelt from 1942 to 1945 (Scholz et al., 1985). A report by the Bureau of Commercial Fisheries indicated that “sizeable kokanee populations were present in the lake” (Snyder, 1967, as cited in: Stober et al., 1977, and Scholz et al., 1985). Snyder (1967) indicated reservoir conditions were

favorable for kokanee in the mid-1960s. Following construction of Grand Coulee Dam's third powerhouse in 1968, fisheries and fishery managers began working with a new set of operational dynamics. Scholz et al. (1985) suggested the third powerhouse increased fish entrainment through the dam.

Historically, rainbow trout inhabited tributaries of the reservoir. However, the rainbow trout fishery was noted as "mediocre" by Earnest et al. (1966). Before the mid-1980s, little historical data were documented for rainbow trout in Lake Roosevelt. In the early 1980s, migrating adult rainbow trout averaging 16.2 inches were captured in the Sanpoil River (Beak Consultants, 1980; Scholz et al., 1985). A population of approximately 9,113 rainbow trout existed in Blue Creek, a tributary to the Spokane River (Scholz et al., 1985).

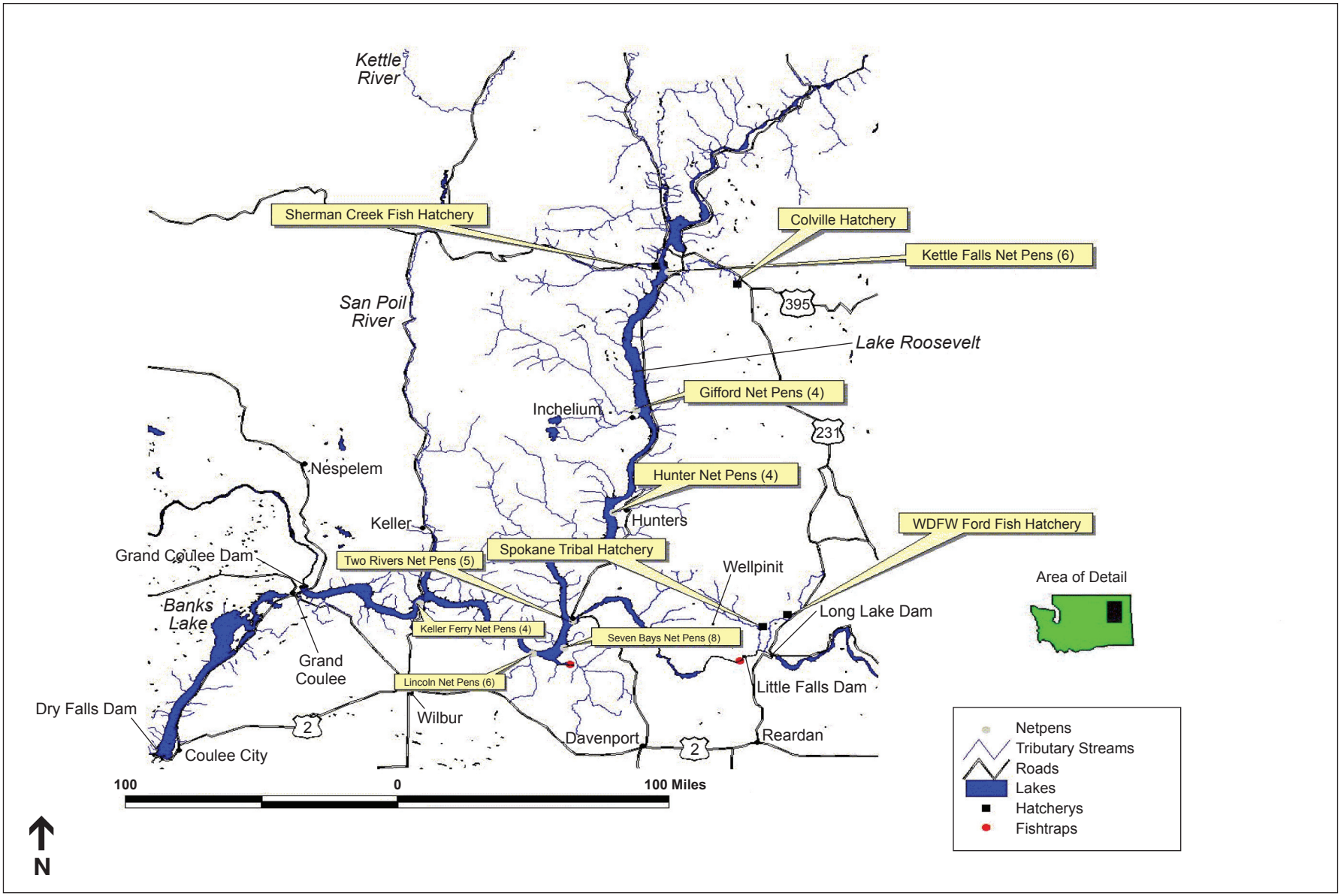
It was clear that reservoir operations negatively affected salmonid fish reproduction and limited juvenile rearing habitat. Nevertheless, a large food base of zooplankton existed that was capable of supporting a substantial number of adult rainbow trout and kokanee salmon. Continued research in the early 1980s determined artificial production was a viable alternative to restore and enhance kokanee salmon and rainbow trout in Lake Roosevelt (Scholz et al., 1986).

In the Northwest Power Planning Council's (NPPC) 1987 Columbia River Basin Fish and Wildlife Program (NPPC, 1987), the Council recommended that the Bonneville Power Administration (BPA) support construction of two kokanee salmon hatcheries to enhance the Lake Roosevelt fishery. Rainbow trout production objectives were added before completion of the hatcheries. To accomplish this goal, the Lake Roosevelt Fishery Enhancement Program (LRFEP) was formed. The LRFEP is a cooperative effort between the STI, , CCT, Washington Department of Fish and Wildlife (WDFW), Eastern Washington University, the Lake Roosevelt Development Association (now known as the Lake Roosevelt Voluntary Net Pen Program), and the National Park Service. The purpose of the LRFEP is to develop a collaborative multi-agency artificial production program as a mitigation measure to restore and enhance kokanee salmon and rainbow trout populations in Lake Roosevelt. Since 1987, annual funding from BPA's Columbia Basin Fish and Wildlife Program (CBFWP) has been instrumental in developing a robust, harvestable fishery in Lake Roosevelt.

From 1988 to 1998, the principal sport fishery on Lake Roosevelt shifted from walleye to rainbow trout and kokanee salmon (Underwood et al., 1997; Tilson and Scholz, 1997). The angler use, harvest rates for rainbow and kokanee and the economic value of the fishery has increased substantially during the latest 10-year period. The investigations on the lake also suggest the hatchery and net pen programs have enhanced the Lake Roosevelt fishery while not negatively impacting native stocks within the lake (Lake Roosevelt Forum, 2008b). Fishermen praise the volunteer net pen program and the hatchery efforts since an extremely high percentage of the rainbows and kokanee caught during the lake fishing derbies are of hatchery origin (Lee, 2002). Hatchery and other programs supported by BPA's CBFWP are described below.

3.7.1.1 Artificial Propagation Facilities

Artificial propagation facilities in the region are an important management component to supplement subsistence and recreational fisheries, to offer short-term opportunities for population recovery and to provide species and genetic conservation. Three primary kokanee salmon and rainbow trout artificial propagation facilities in the area, including WDFW's Sherman Creek and Ford Hatcheries as well as the Spokane Tribal Hatchery, are utilized to partially mitigate for the loss of anadromous fish habitat in northeastern Washington (Figure 3-7). The purpose of these hatcheries is to reestablish fish populations in the upper Columbia River Basin following construction of the Grand Coulee Dam in 1941. When funding and stocks are available, the WDFW Colville Hatchery and Colville Confederated Tribal Hatchery also contribute additional fish to Lake Roosevelt.



FILE NAME: Fig03-7_waterlevels.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/18/08

Figure 3-7
Hatcheries

The Ford Trout Hatchery is located at the eastern edge of the STI Reservation, on the upper unit of the Chamokane Valley Aquifer system. The Sherman Creek Hatchery is located at a northern tributary in Lake Roosevelt near Kettle Falls, Washington. The Spokane Tribal Hatchery is located at Galbraith Springs on the STI Reservation. The operation of these facilities, in conjunction with the Lake Roosevelt Volunteer Net Pen Program, complement each other in the annual rearing and release goal of 1,000,000 yearling, 700,000 fingerling, and 700,000 kokanee salmon fry as well as 500,000 yearling rainbow trout. A current policy for the regional hatchery program includes the increased use of native kokanee salmon, where available, for propagation into the upper Columbia River Basin waters.

The annual production goals and objectives for the Sherman Creek, Ford, and Spokane Tribal Hatchery are developed from the interagency Lake Roosevelt Hatchery Coordination Team (LRHCT) consisting of the WDFW, STI and the CCT. The coordination team was formed in 1988 and is independently advised, through the LRFEP, BPA, Eastern Washington University, Fishery Science Center, and the Lake Roosevelt Net Pen Coordinator. Details of the artificial propagation facilities are included in Appendix E.

3.7.2 Columbia River Downstream

Water flow from Grand Coulee Dam discharges into Lake Rufus Wood, the reservoir impounded behind Chief Joseph Dam. Since no upstream passage facilities exist, Chief Joseph Dam currently represents the most upstream extent of anadromous fish production in the Columbia River basin.

Lake Rufus Woods

The habitat conditions found in Lake Rufus Woods are largely controlled by the operation of Grand Coulee and Chief Joseph Dams. Lake Rufus Woods Dam has very little storage capacity and functions as a re-regulating reservoir passing the water released from Grand Coulee Dam either by spilling or power generation. This creates highly variable water levels in the lake. Grand Coulee Dam operations (power production and spill) contribute to dissolved gas saturation that has been recorded to 138 percent in Lake Rufus Woods (Corps, 2000). The Lake Rufus Woods fish assemblage is likely influenced by downstream migrating fish entrained through Grand Coulee Dam from Lake Roosevelt.

Fisheries projects on the reservoir are partial substitution for lost anadromous fish caused by construction of Chief Joseph Dam. As part of the Columbia River Fish and Wildlife Mitigation Program basinwide effort, the CCT coordinates the BPA's Chief Joseph Kokanee Enhancement Project. A component of this effort includes evaluating the status of the natural production kokanee in streams tributary to Lake Rufus Woods and examining entrainment through Grand Coulee Dam. Historical information alludes to wild kokanee production in the Nespelem River, the largest tributary to Lake Rufus Woods (LeCaire, 2000). The genetic makeup of these native fish and their contribution to

the lake and river fisheries are unknown. Similarly, the level of influence of hatchery releases on wild fish stocks is unknown.

The goal of the Chief Joseph Kokanee Enhancement Project is to protect and enhance the natural production of kokanee stocks above Chief Joseph and Grand Coulee dams to provide successful subsistence and recreational fisheries and potentially provide a broodstock source for artificial production in Lake Roosevelt. Critical ongoing activities include:

- Monitoring emigrating kokanee stocks into Lake Rufus Woods from upriver areas;
- Determining the genetic structure of all in-basin (upriver) stock using micro-satellite DNA analysis;
- Examining methods of reducing entrainment using strobe light technology and hydroacoustic monitoring.

Data collected by the Enhancement Project supplements fishery data collected by other BPA-funded projects in the region. The Enhancement Project is addressing methods of reducing or eliminating entrainment; assessing genetic introgression between hatchery and wild-origin stock; and evaluating adult spawner escapement in tributaries to Lake Roosevelt and Lake Rufus Woods. Updated results of these efforts will be available in the near future.

Similar to Lake Roosevelt, Lake Rufus Woods supports resident fisheries primarily for rainbow trout, and kokanee salmon. Major fisheries occurring in Lake Rufus Woods are described by species below.

Rainbow Trout

The popular rainbow trout fishery in Lake Rufus Woods consists mainly of fish originating from the Spokane Tribal Hatchery and Trout Lodge. Spokane Tribal Hatchery fish collected in Lake Rufus Woods are likely fish released from Lake Roosevelt net pens that have moved downstream past Grand Coulee Dam. The Trout Lodge stock is a triploid steelhead stock that is planted by the Colville Tribe in Lake Rufus Woods to supplement subsistence and recreational opportunities (Truscott, 2000). Trout Lodge stock also is known to escape from the Columbia River Fish Farms net pens in Lake Rufus Woods and enter the fishery.

Kokanee

An adfluvial population of kokanee salmon maintains a sustainable wild population in the reservoir by successfully spawning in the Nespelem River below the barrier falls at River Mile 1.5 (LeCaire, 1999; LeCaire, 2000). The primary kokanee hatchery stock in the area is released in Lake Roosevelt. Since 1995, adult kokanee returns have been monitored annually in the lower Nespelem River with adult returns ranging from 6 to 389 in 1997 and 1999, respectively. Upstream migration into the Nespelem River begins as early as mid-July and spawning occurs between August and November (LeCaire, 1999). The behavior of juvenile fish is unknown. Redd capping attempts to assess fry production have been unsuccessful due to unusually high flows during the spring months

(LeCaire, 1999). Juvenile fish are hypothesized to migrate to the reservoir shortly after emergence in the spring (LeCaire, 2000).

Mainstem Columbia River Further Downstream

Five Mid-Columbia PUD dams with linking reservoirs are located further downstream of Lake Rufus Woods. Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids Dams are located upstream of the only free-flowing stretch of the Columbia River remaining at Hanford Reach. Anadromous fish species dominate the species composition in these areas. The anadromous fish resource assemblages for the Mid-Columbia region were presented in the Programmatic EIS (Ecology, 2007) and will not be further discussed here.

Since kokanee salmon and rainbow trout comprised 89 percent of experimental gillnetting efforts in the Grand Coulee Dam forebay, it is assumed a large number of fish immigrating to Lake Rufus Woods are kokanee and rainbow trout (LeCaire, 1999). Data suggest some fish passing Grand Coulee Dam may continue to entrain downstream, although estimates of total fish migrating downstream do not exist (LeCaire, 2000).

3.7.3 Odessa Subarea and Banks Lake

3.7.3.1 Odessa Subarea

There is no additional fish or fish habitat information for the Odessa Subarea presented in the SEIS. Refer to the Programmatic EIS (Ecology, 2007) for a discussion of the existing conditions of fish and fish habitat features in the Odessa Subarea.

3.7.3.2 Banks Lake

Banks Lake covers 27,000 acres with a 91-mile shoreline. The water source for Banks Lake is pumping from Lake Roosevelt. Since the storage capacity of Banks Lake is a little over 1 million acre-feet, the reservoir's water volume is completely flushed out about 2.5 times during the irrigation season for an average water retention time of 146 days (Lewis et al., 2002). Water withdrawal for the Columbia Basin Project causes the elevation of Banks Lake to vary during the irrigation season between late March and late October, annually. Normally, small water level fluctuations occur, but a maximum drawdown of 45 feet is possible. The lake is regularly drawn down as much as 25 feet for maintenance of reservoir facilities. Banks Lake reaches its maximum elevation (1,570 feet msl) in September or October, and remains in full pool status through the winter. Irrigation demand, rainfall, runoff, and power demand contribute to changes in water surface elevations (Stober et al., 1974). Reclamation pumps additional water into Banks Lake over Labor Day weekend each year when power costs are low. The additional water raises the lake level above 1,565 feet msl in early September.

Nearshore aquatic plants (macrophytes) serve as critical spawning and nursery habitat for many of Banks Lake fish species. Most aquatic plants in the Banks Lake littoral zone occur in a band from water surface elevation 1,569 feet to 1,566 feet msl (Reclamation, 2004). The number of days that the littoral zone is currently exposed during lake level drawdown below elevation 1,566 feet msl ranges from approximately 6 to 36 days (Reclamation, 2004).

There are 22 fish species in Banks Lake of which 11 are actively pursued by anglers. The reservoir supports a variety of non-game, warmwater and cold water game fish species most notably walleye, bass, trout, and kokanee salmon.

Kokanee salmon are known to naturally spawn in the lake during October and November, with peak spawning around the first week of November. Generally, Banks Lake is operated favorably with respect to the kokanee life cycle and the lake supports an ongoing population of natural spawners. As discussed below, populations of kokanee are supplemented with annual fish plants. However, the kokanee population may be more dependent on lake shore spawning than hatchery supplementation to perpetuate the population and fishery (Washington Department of Game, 1986). In the early 1970s, kokanee were the mainstay of the fishery in Banks Lake. Unfortunately kokanee are also the most sensitive fish species in the lake to environmental manipulations (Washington Department of Game, 1982) and their numbers have widely fluctuated over the years.

Planting of hatchery rainbow trout fingerlings has resulted in a successful non-seasonal boat and bank fishery. This species is a prized gamefish in Banks Lake. Operation of the reservoir influences rainbow trout far less than kokanee. Lakeshore spawning of rainbow trout is not significant and annual hatchery fingerling plants must be made to sustain a viable fishery (Washington Department of Game, 1986).

Warmwater game fish initially held the spotlight in Banks Lake; however, these populations have declined and stabilized. Today, yellow perch, bass, and walleye remain a popular fish species with anglers on Banks Lake. The average size of yellow perch has decreased slightly over time, yet this species provides an excellent year-round fishery (Washington Department of Game, 1986). Largemouth bass are a target fishery for Banks Lake anglers today. This species, though widespread throughout the lake, is somewhat confined to specific areas of preferred habitat. Current lake management focuses on mixed-species recreational fisheries.

A cooperative rainbow trout rearing project between WDFW, an Electric City sportsmen's group, and Coulee City Chamber of Commerce has been conducted to improve trout fishing. Other major fisheries projects on the lake, including hatchery releases of game fish and fishery surveys, are partial substitution for lost anadromous fish caused by construction of Grand Coulee Dam. These topics are described below for Banks Lake.

Artificial Propagation

Species stocked in Banks Lake since 1959 include kokanee, rainbow trout, cutthroat trout, coho salmon, and walleye. Since 1990, stocking has concentrated on rainbow trout, kokanee, and walleye. Rainbow trout have been stocked every year since 1990 at an average of over 188,000 fish annually. Average kokanee stocking between 1990 and 1999, was more than 915,000 fish annually. Walleye were stocked in 1992, and 1995 through 1998 at an average of 125,000 fish annually.

Current management calls for stocking Banks Lake with one million kokanee annually as part of the Columbia River Fish and Wildlife Mitigation Program. The goal for kokanee salmon at the Ford Hatchery includes the incubation, hatching, and rearing of 700,000 kokanee fry released into Banks Lake in spring, and another 700,000 kokanee fingerlings planted into Banks Lake in the fall (Lewis, 2003).

Historical and Current Fishery

The Banks Lake fishery has undergone many changes, both favorable as well as adverse since its construction in 1951. Soon after the formation of Banks Lake, a noted year-round kokanee fishery developed when these fish entrained to Bank's Lake from Lake Roosevelt.

Large numbers of kokanee are entrained downstream of Banks Lake despite a barrier net at the outlet (Stober et al., 1976). As reported in the Programmatic EIS, kokanee are caught in the unstocked Billy Clapp Lake, downstream from Banks Lake (Ecology, 2007). The University of Washington Fisheries Research Institute conducted a creel census of Billy Clapp Lake in 1978 and found the catch to consist almost entirely of kokanee salmon (Stober et al,. 1979). More recent WDFW surveys continue to report kokanee in the creel at Billy Clapp Lake, and since 1997, few anglers reported an improvement in the kokanee fishery (USFWS, 2002).

Although the Ford and the Spokane Tribal Hatcheries continued to release kokanee annually into Banks Lake, creel studies to quantify the Banks Lake fishery were lacking between the early 1980s and the 1990s. Information from anglers indicated a continued reduction and general disappearance of kokanee from the creel in Banks Lake. The kokanee currently stocked have been somewhat fewer but considerably larger than those stocked during the 1950s and 1960s. Despite stocking 600,000 to 1.2 million kokanee annually since 1989, the kokanee fishery failed to rebound during the 1990s (WDFW, 1996).

In September 2001, the Bonneville Power Administration (BPA) allocated funds to WDFW through the Ford Hatchery Renovation Project to conduct a 10-year creel study on Banks Lake. The objective of the study was to evaluate the Banks Lake fishery, and to determine if hatchery stocked kokanee and rainbow trout were being targeted and harvested by anglers. First year results of this effort indicate:

- Kokanee harvest in 2001 and 2002 from Banks Lake was near zero; however, 2,064 rainbow trout, 3,453 smallmouth bass, 6,768 walleye, and 2,300 yellow perch were harvested from Banks Lake during this period.
- Banks Lake was primarily a rainbow trout/yellow perch fishery in the winter and spring and a smallmouth bass/walleye fishery in the spring, summer, and fall.

As noted, a limited number of kokanee were harvested during the study. Local fishermen and guides have indicated there are a few anglers who target and catch kokanee from boats. However, creel clerks did not encounter these individuals (Baldwin et al., 2003). It is possible the 2001 netting survey sampled a strong year class of age 3 or 4 kokanee and that subsequent year class survival was poor. Several more years of creel data, in conjunction with data from the Banks Lake Fishery Enhancement Project, will be required to quantify the future abundance and harvest of kokanee in Banks Lake.

The study determined that smallmouth bass and lake whitefish dominated the nearshore species composition in May. However, yellow perch replaced lake whitefish as the second most common species to smallmouth bass in July. On a pelagic basis, lake whitefish dominated the offshore catch during May and July. The May hydroacoustic survey revealed highest densities of fish in the upper one-third of the water column in the mid- to northern sections of the reservoir near Steamboat Rock.

3.8 Wildlife and Plants

The Programmatic EIS (Ecology, 2007) contains a broad discussion of wildlife and plants in the Columbia River Basin. Specific information regarding federal and state listed species has been presented in the Programmatic EIS and will not be further discussed herein. Additional information specific to wildlife, habitat conditions, and plants in Lake Roosevelt, the Columbia River downstream of Grand Coulee Dam, Banks Lake and the Odessa Subarea is described below.

3.8.1 Lake Roosevelt

Lake Roosevelt is surrounded by multiple vegetation communities including mixed conifer forests, shrub-steppe, riparian wetlands, open water, and mixed agriculture and pasture grasslands. These communities provide abundant and diverse habitats for wildlife species. Due to the annual and rapid fluctuation of water levels within the reservoir, there are limited aquatic bed and wetland communities.

3.8.1.1 Plant Communities and Habitats

Vegetation along the 150-mile-long lakeshore gradually transitions from conifer forests in the north to semiarid grassland and sagebrush communities in the south. Conifer forests north of Kettle Falls are dominated by second-growth ponderosa pine, Douglas-fir, and western larch. Dry, rocky areas within the forest are dominated by shrub thickets of elderberry, snowberry, deer brush, chokecherry, Oregon grape, and buck brush. South of Kettle Falls, riparian areas characterized by alder, willow, hazelnut and black cottonwood are present next to ponderosa pine and Douglas-fir dominated forests. Shrub

areas are dominated by wild rose, serviceberry and Douglas hawthorn with scattered forb species of hairy goldaster, phlox, and nodding onion.

Cliff and bluff, shrub-steppe, and riparian priority habitats are most prevalent in the southern portion of the lake and on its eastern side (WDFW, 2008). The southern end of the lake also contains areas of disturbed shrub-steppe and irrigated agricultural lands.

The National Wetland Inventory (NWI) maps wetlands in the lake area that are primarily associated with its tributaries, including the Kettle, Sanpoil, and Spokane Rivers (USFWS, 1987). Wetland priority habitats mapped by WDFW are extensive around the northern portion of the lake where fewer disturbances have occurred. Due to the fluctuating water levels, there are few perennial wetlands along the shoreline of Lake Roosevelt. The two largest wetlands are at the mouths of the Kettle and Colville Rivers (NPS, 2000). Intermittent wetlands that flood seasonally are more common along the shoreline.

Littoral and Riparian Zones

Lake Roosevelt has more than 600 miles of shoreline. The shore ranges from 100 to 300 feet wide when the reservoir is full, and in locations, it is wider when water levels are lower. The littoral zone of the lake is generally the interface between dry land and open water. It extends from the shore to a depth where the light is barely sufficient for rooted aquatic plants to grow (Goldman and Horne, 1994). This zone supports aquatic plants, such as bulrushes, sedges, reeds and cattail, which provide food and cover for waterfowl, mammals, and amphibians. Submersed aquatic plants include water starwort, waterweed, common watermilfoil, common hornwort, pondweeds, and pygmy weed.

Also present along the shoreline is riparian vegetation, including cottonwood trees and willow. Cottonwood trees can provide important roosting and perching sites for bald eagle and other raptors.

There is little available information for emergent and riparian vegetation distribution and quality for the Lake Roosevelt shoreline. The northern portion of the lake is flanked by conifer forests that are relatively undisturbed with the exception of developed areas. Transportation corridors, including roads and a railway, extend parallel to the shoreline for much of its length. Land use activities such as agriculture, dispersed recreation and roads are present throughout the central and southern portions of the lake, contributing to a lack of riparian vegetation.

Invasive and Noxious Species

Noxious weeds are a problem in the Lake Roosevelt area despite control efforts by NPS. The most common problem terrestrial plants are thistle (Canadian, star, and Russian), diffuse and spotted knapweed, Dalmatian toadflax, cheatgrass, common mullein, wormwood, leafy spurge, houndstongue, rush skeletonweed, goat weed, and baby's breath (NPS, 2000).

Both Eurasian watermilfoil and yellow flag iris are invasive aquatic species that have been noted in Lake Roosevelt. Eurasian watermilfoil is a submersed perennial plant that can thrive in a variety of aquatic environments. This species can develop into a land based form when water levels recede slowly and gradually strand the plant. It requires high light and grows best on fine-textured, inorganic sediments and is typically most abundant in 1 to 4 meter-deep waters (Smith and Barko, 1990). Because of its high photosynthetic rate and rapid ability to grow new shoots, Eurasian watermilfoil can easily form thick canopies that shade out native aquatic vegetation. As vegetative spread is considered the primary means for this plant's reproduction, recreational activities such as boating, which disturb water and separate plants into fragments, have a high likelihood of spreading existing infestations. Infestation of this noxious weed is heaviest in shallow water areas where sunlight is plentiful. In average or above average water years, Lake Roosevelt is dropped to 1,280 feet msl in mid-August to provide ample water flow for salmon. In low water years, the lake is dropped an additional 2 feet in mid-August, to 1,278 feet. Residents and recreationalists in the lower Spokane Arm of Lake Roosevelt have noted a much higher incidence of Eurasian watermilfoil growth in shallow and sunny areas when the lake level is dropped to 1,278 feet msl (Lake Roosevelt Forum, 2006a).

Yellow flag iris is most commonly found in temperate wetlands and along the margins of lakes and rivers. It can grow in up to 10 inches of inundation, although very shallow water or muddy areas are preferred habitat. Yellow flag iris grows well in nutrient-rich soils and prefers partial shade to full sun exposure. Rhizomatic spread causes dense stands of yellow flag iris to form, creating monocultures and excluding native wetland vegetation. A scattered stand was found along a stretch of Lake Roosevelt between Long Lake Dam and Porcupine Bay, causing Lincoln County to add yellow flag iris to its noxious weed list in 2007.

Winter drawdowns for flood control can help contain aquatic invasives by exposing beach areas. In some cases, the control of invasive plants, including Eurasian watermilfoil, has been the driver behind operation regimes at various reservoirs across the country. Reducing lake and reservoir elevation to allow dessication of shallow water habitats has proven an effective control of invasive plant communities (Cooke, 1980; Cooke et al., 1986). Where shallow water habitats are extensive throughout a reservoir, an extended period of drawdown during freezing temperatures is the only practical means of control (Smith and Barko, 1990).

Reservoir Drawdown

The biological compositions of habitats within the littoral zone of Lake Roosevelt have been developed over a period of nearly 70 years since the construction of the Grand Coulee Dam in 1939-1941. Significant water level fluctuations have occurred during most years of reservoir operation. The aquatic plant communities and riparian vegetation in Lake Roosevelt have been influenced by spring and early summer drawdown. In years when spring runoff is high, reservoir levels are drawn down more than 80 feet to accommodate the anticipated inflows.

The reservoir levels determine the extent of littoral habitat and the fluctuations determine the function of the littoral habitat. Emergent and floating-leaved plants seldom grow in water exceeding 10 feet deep, so deep lakes also have limited emergent communities. Vegetation growth in the littoral zone is also affected by water clarity (light availability), nutrient richness, water chemistry, and substrate.

Above the littoral zone, many species of riparian vegetation, especially cottonwood, have specific soil moisture requirements needed for germination and seedling survival. These requirements typically involve early spring high water levels that recede just prior to fall, providing a moist seedbed (Bradley and Smith, 1986). The normal operating conditions of the reservoir include low water levels during spring and high levels in fall (Figure 1-1), the opposite water regime needed for cottonwood growth.

A study of Lake Roosevelt's biological resources in 1993 found that the littoral zone of the lake has limited production of emergent and aquatic bed vegetation due to reservoir fluctuation. Voeller (1993) observed little aquatic plant community growth and low benthic macroinvertebrate assemblages due to the lack of stable littoral habitats. For an approximately three-month period, the lake drawdown separates the riparian habitats from the reservoir by an expanse of barren land.

3.8.1.2 Wildlife Species

Vegetation communities in the Lake Roosevelt area support abundant wildlife, including an estimated 75 species of mammals, 200 species of birds, 10 species of amphibians and 15 species of reptiles (NPS, 2000). Systematic surveys of wildlife have not been conducted in the area, but Priority Habitats and Species (PHS) data (WDFW, 2008) note the presence of elk, deer, and bird species, as discussed in the following sections.

Much of the upland area surrounding Lake Roosevelt is occupied by herds of Rocky Mountain elk, mule deer, and white tailed deer (WDFW, 2008). Hunting is permitted within the National Recreation Area during established seasons as regulated by WDFW. Other mammal species that are likely to occur in habitats along the lake are black bear, mountain lion, beaver, river otter, bobcat, coyote, mink, badger, skunk and red fox. A grizzly bear was observed near the northern portion of the lake in 1983 (WDFW, 2008). Small mammals include marmot, ground squirrels, chipmunks, deer mice, and house mice (NPS, 2000).

Upland habitats near Lake Roosevelt support several species considered priority species by WDFW. These species, though not abundant in the area, include bald eagle, golden eagle, osprey, northern goshawk, Merriam's wild turkey, Rio Grande wild turkey, blue grouse, Lewis woodpecker, and white headed woodpecker (WDFW, 2008). Some areas along the shoreline are identified by WDFW as providing roosting and breeding habitats, including several communal bald eagle roosts found in proximity to the lake. WDFW has identified areas that support high concentrations of waterfowl in Lake Roosevelt including large numbers of migrating or wintering ducks and geese. Waterfowl species present during the winter months include mallard, northern pintail, cinnamon teal, redhead, canvasback, lesser scaup and Canada geese. Areas of emergent vegetation not

impacted by rapid reservoir fluctuations are important for nesting for species such as red-winged and yellow-headed blackbird, marsh wren, grebe, bittern, Canada geese, and muskrat.

WDFW has noted single occurrences of California floater, western toad, and Pacific western Townsend's big eared bat, which are all priority species (WDFW, 2008). Other priority reptiles and amphibians that have been documented in the area include sagebrush lizard, short-horned lizard, western rattlesnake, bull snake (also known as gopher snake), western terrestrial garter snake, and salamander species. Bullfrog, a nonnative species that is considered invasive, is also present where suitable emergent habitats or shallow open water habitat exists.

Reservoir Drawdown

The rapid annual fluctuation of water levels due to reservoir operations limits the establishment of shoreline vegetation and the amount of suitable habitat for nesting waterfowl and breeding amphibians along the edge of Lake Roosevelt. However, in some areas, the 20- to 25-foot drawdown between early April and mid-May affects wildlife species through the loss of floating vegetation and draining of side channels (USFWS, 1982). Where suitable habitats exist, a loss of nests, eggs, and young occurs each year.

In some embayment areas, such as Marcus Flats and Kettle River (Figures 17 and 18 in the Map Folio at the end of this document), reservoir drawdown can result in increased benthic invertebrate prey for shorebirds and waterfowl as additional mudflat areas are exposed. The current drawdown schedule provides some exposed areas during spring migration. Mihuc et al. (1997) studied various habitats within an irrigation reservoir in southern Idaho for shorebird predation on benthic macroinvertebrate populations. They observed significant predation by shorebirds on a medium size class of chironomid (midge) larvae in an area that had higher sediment slope and slower water receedence than other areas. These conditions resulted in a higher concentration of shorebirds on a smaller area of newly exposed sediment.

Sprandel et al. (2002) observed changes in bird usage of Lake Talquin, a reservoir managed for recreation and hydroelectric power, following drawdown, with increased use by some species and decreased use by others. As would be expected, waterfowl and cormorant were more abundant during the months when the reservoir remained at full pool elevation. Fish-eaters such as wading bird species, bald eagles and gulls were more abundant during the drawdown due to the availability of trapped fish and increased exposed areas for gull foraging. Increased shorebird usage may also occur, but is dependent on substrate composition of the exposed areas (soft sediment versus hard clam shell-lined). Early spring drawdowns can provide habitat for migrating shorebirds, depending on the reservoir latitude and timing of drawdown. A drawdown resulting in a littoral zone composed of shallow water that is interspersed with mudflats is considered ideal for shorebirds (Fredrickson and Taylor, 1982). Columbia River Downstream

The mainstem of the Columbia River consists of a series of dams linked by reservoirs with the exception of the only free-flowing stretch remaining at Hanford Reach. The Programmatic EIS (Ecology, 2007) broadly characterized plants and vegetation communities in the Columbia River Basin. Specific information regarding priority habitats and species identified by WDFW and from other existing information for the Columbia River is described in the following sections.

3.8.1.3 Lake Rufus Woods

Once released from the Grand Coulee Dam, water flows through Lake Rufus Woods to the north and west through arid habitats and along the CCT Reservation. Pothole springs and lakes are present south of the lake and the CCT Reservation comprises the northern border. Wetland habitats along the shoreline provide foraging and breeding habitat for waterfowl concentrations and Canada geese. However, highly variable water levels due to the operating regimes of Chief Joseph Dam and Grand Coulee Dam have influenced establishment of wetland vegetation. Cliff and bluff habitat is extensive along this 50-mile stretch. Bald and golden eagles are present, and have nesting territories throughout the area.

LeCaire (2000) notes that winter surveys for both mule and white-tailed deer indicated that populations are declining on the CCT Reservation side of Lake Rufus Woods. Conversely, mule deer populations are stable in the area south of the lake since implementation of the three-point harvest restriction rule throughout the State of Washington. During winters with heavy snow accumulation on the plateau, mule deer move down to lands adjacent to the reservoir and may move further downriver and outside of the subbasin, thus accounting for the surveyed decline. However, other reasons behind the decline are likely. LeCaire (2000) concludes that additional research and monitoring are needed to determine mule deer population trends and limiting factors before determining strategies to reverse negative population trends.

Mule and white-tailed deer are culturally significant: They contribute subsistence to CCT members and are an important big game species. Elk and moose populations are also present and increasing in the Lake Rufus Woods area (LeCaire, 2000). However, similar to the mule deer, some proportion of the increase could be attributable to animal/herd movement from adjacent subbasins.

South of Bridgeport, the central portion of the Columbia River flows through arid habitats, including disturbed shrub-steppe and irrigated agricultural fields. Documentation of priority species by WDFW includes several bald eagle communal roosts, nesting records of prairie falcon, Swainson's hawk, loggerhead shrike, and long-billed curlew (WDFW, 2008). Waterfowl concentrations occupy the area, and woodhouse toad and sagebrush lizard have been documented in the area, both of which are priority species.

3.8.1.4 Hanford Reach

The Hanford Reach of the Columbia River supports remnant habitat for aquatic organisms that were widespread before the remainder of the Columbia River system was converted to reservoirs (USFWS, 2006). In addition, dune, instream, riparian, and urban natural open space priority habitats are located along the shoreline (WDFW, 2008). WDFW notes occurrences of breeding Swainson's hawk, burrowing owl, long-billed curlew, and Canada geese in this area. The Reach's riverine habitat provides large trees and abundant cover for wildlife, comprising the most intact and valuable riparian habitat along the Columbia River. Wading birds, wintering waterfowl, double-crested cormorants, American white pelicans, gulls and terns use the islands within the Reach. The islands are vegetated by willow, poplar, Russian olive and mulberry (USFWS, 2006). Surveys have identified several rare plant associations along the shoreline and islands of the Reach. The bluffs and rock outcrops provide perching, nesting and escape habitat for prairie falcons, red-tailed hawks and multiple swallow species.

Similar to riparian and emergent habitats in Lake Roosevelt, shoreline areas along the Hanford Reach are affected by fluctuating water levels due to operation schedules at Priest Rapids Dam. As a result of daily fluctuations in discharges from Priest Rapids Dam, the depth and width of the river varies significantly over a short time. Width of the river varies from approximately 1,000 feet to 3,300 feet along the Hanford Reach (USFWS, 2006). The width also varies temporally as the flow rate changes, which causes repeated wetting and drying of an area along the shoreline.

Multiple priority species occurrences have been recorded by WDFW, including mule deer, Rocky Mountain elk, Rocky Mountain bighorn sheep, black-tailed jackrabbit, and Ord's kangaroo rat. Golden eagle, prairie falcon, peregrine falcon, Swainson's hawk, common loon, and chukar have also been observed multiple times. Racer, striped whipsnake, night snake, and sagebrush lizard are reptiles that have been documented in the vicinity of the river (WDFW, 2008).

3.8.2 Odessa Subarea and Banks Lake

3.8.2.1 Odessa Subarea

The Odessa Subarea comprises a large area within Adams and Grant Counties with a small portion in Franklin County. The subarea mainly supports arid lands that have been converted to irrigated agricultural land.

Some areas of intact and disturbed shrub-steppe are present. WDFW notes shrub-steppe, wetland, and riparian priority habitats throughout the northern portion of the Odessa Subarea. Priority species documented in this area include ferruginous hawk, sage sparrow, sharp-tailed grouse, Washington ground squirrel, and white-tailed jackrabbit. All of these species are state or federally listed or are candidate species due to low abundance.

Extensive wetland habitat containing waterfowl concentrations is present in northwestern portion of the Odessa Subarea. Mule deer and ring-necked pheasant habitat is common. American white pelican and tundra swan have been documented occur in the north-central portion, while swan, prairie falcon, loggerhead shrike, sage thrasher, and tiger salamander have been recorded in the northeastern portion. Washington ground squirrel, a state and federal candidate species, have been documented in the western and southern portions of the subarea.

3.8.2.2 Banks Lake

Banks Lake is an artificial impoundment that stores and subsequently supplies irrigation water. As discussed in Section 3.7.3.2, water elevations in the lake vary during irrigation season (March to October) and this impedes the development of extensive wetland and riparian vegetation. However, water levels fluctuate only 3 to 5 feet annually and the lake does provide areas of aquatic plants between 1,569 feet and 1,566 feet msl (Reclamation, 2004). Shallow, low-gradient shorelines are present in bays and along shorelines throughout the lake. The ability to tolerate periodic drawdown and drying determines which aquatic species survive (Reclamation, 2004). There are over 20 islands in the lake, including Steamboat Rock, a granite outcrop in the northern portion of the lake, which contain undisturbed vegetation communities. Shrub-steppe priority habitats are present to the southeast and rural natural open space is relatively common. The lake supports several concentrations of waterfowl (WDFW, 2008).

Records of priority species include greater sage grouse, which have been documented west of the lake, and sandhill cranes that are also known to inhabit the land west of the lake. Mule deer occur in the lake vicinity, especially to the northwest and northeast. Chukar, a priority game species, have been documented southwest of the lake. Several bald eagle communal roosts exist around the lake.

Multiple occurrences of golden eagle, prairie falcon, peregrine falcon, Swainson's hawk, and loggerhead shrike have been recorded near Banks Lake. American white pelican, long-billed curlew, black-crowned night heron, common loon, and western grebe have also been reported. A gull colony is located within the lake boundaries, and Canada geese frequent the area (WDFW, 2008).

3.9 Cultural Resources

3.9.1 Lake Roosevelt

Cultural resources in the Lake Roosevelt area were described in Section 3.10.4.1 of the Programmatic EIS (Ecology, 2007).

3.9.2 Columbia River Downstream

Cultural resources in the Columbia River downstream area were described in Section 3.10.2 of the Programmatic EIS (Ecology, 2007).

Archaeological sites on islands in the Columbia River were not specifically discussed in the Programmatic EIS, but incorporated into the general overview of cultural resources in the project area. Land that is now considered an island, in many cases, would not have been an island prior to inundation in the 20th century. Many island sites are included in the counts of Historic Properties on Project Lands in Table 3-26 of the Programmatic EIS (Ecology, 2007).

3.9.3 Odessa Subarea and Banks Lake

Cultural resources in the Banks Lake area were included in the region described in Section 3.10.2 of the Programmatic EIS (Ecology, 2007). In addition, evaluation of cultural resources within the Odessa Subarea was conducted by Reclamation as part of an evaluation of the water delivery alternatives possible in the Odessa Subarea. Research was conducted to identify previously recorded cultural resources and previous cultural investigations in the 2,000-square-mile study area; no fieldwork was undertaken. Previous cultural resource investigations were found to have been conducted in less than 1 percent of the study area; only six prehistoric and nine historic sites have been previously recorded (Ives, 2007). Additionally, a preliminary TCP (Traditional Cultural Property) study was conducted for the Odessa Subarea (Shannon, 2007).

3.10 Environmental Health

Specific environmental health issues were not discussed in the Programmatic EIS. Therefore, information specific to hazardous and toxic materials and public health and safety in Lake Roosevelt, the Columbia River downstream of the Grand Coulee Dam, Bank's Lake, and the Odessa Subarea is described below.

3.10.1 Lake Roosevelt

3.10.1.1 Hazardous and Toxic Materials

Located 10 river miles upstream of the U.S.-Canadian border, Teck Cominco has been in operation as a smelting facility since 1896. As stated in the US Environmental Protection Agency 2007 Contaminated Sediments Technical Advisory Group (CSTAG) Recommendations for the Upper Columbia River Memo:

> This facility either produces or has historically produced lead, zinc, cadmium, silver, gold, bismuth, antimony, indium, germanium, arsenic, mercury, sulfuric acid, liquid sulfur dioxide, ammonia, ammonium sulfate, and phosphate fertilizers. The smelter complex has discharged liquid effluent and water-granulated fumed slag into the Columbia River, including a number of accidental spills and releases to the river (CSTAG, 2007).

In 2004, the EPA began a Remedial Investigation and Feasibility Study (RI/FS) of contaminants in the upper Columbia River above Grand Coulee Dam. Sediment sampling conducted as Phase I of the Draft RI/FS highlighted the following metals and organic compounds as preliminary Constituents of Interest:

- Metals: antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, uranium, and zinc
- Organics:
  - Pesticides: 2,4-DDE, 2,4-DDT 4,4-DDD, 4,4-DDE, 4,4-DDT, and aldrin
  - Polychlorinated Biphenyls: Aroclor 1016 and Aroclor 1260
  - Dioxins and furans: 2,3,7,8 TCDD toxicity equivalent (TEQ) and 14 congeners, as listed in Table 4-1
  - Polycyclic Aromatic Hydrocarbons: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene (CH2M Hill, 2006).

Screening levels for Constituents of Interest were defined both by human health (EPA Standards, STI Human Health Values, CCT Human Health Values) and ecological values (Probable Effects Concentrations (PECs) and Threshold Effects Concentrations (TECs)).

While Teck Cominco has been identified as a primary source of discharge and pollution into the upper Columbia River, other potential sources of pollution were also identified, including: mining and milling operations, smelting, pulp and paper operations, sewage treatment plants, other industrial activities, and municipal and agricultural runoff.

Metal Contamination

Coarse-grained water-granulated fumed slag was the primary source of metal contamination (antimony, arsenic, chromium, copper, iron, lead, manganese, zinc, and lesser constituents). The following accumulation areas were noted in the 2006 CH2M Hill report:

- Side-bank beach and point bar areas in the upriver reaches (e.g., Black Sand Beach at RM 742; large point bar deposit at RM 738) deposited during high river flow events;
- Dispersed accumulations to an unknown depth within the interstices of the coarse, cobbly sediments in the main river channel upstream of approximately RM 729 (Onion Creek);
- Localized accumulations within the original pre-reservoir river channel downstream from approximately RM 729 to approximately RM 710 (near the entrance to Marcus Flats); and
- Within Marcus Flats, accumulations concentrated in the original pre-reservoir river channel.

Downstream accumulations of water-granulated fumed slag were not identified, but are possible based on historical quantities discharged into the Columbia River. Downstream sources are most likely related to effluent discharges, fine-grained water-granulated fumed slag, or weathering of more coarse-grained slag particles. Sediments downstream of Marcus Flats at an elevation below 1,255 feet have greater concentrations of metals than those above 1,255 feet due to washing of fine particulates and transport of contaminants from higher elevations (CH2M Hill, 2006).

Organic Compound Contamination

Concentrations of organic compounds within the upper Columbia River are generally low; however, where present, these compounds are typically above human health standards. No patterns of organic compound movement or areas of accumulation were identified (CH2M Hill, 2006).

Beach Screening

In June 2006, the EPA published a draft report outlining the general results of sediment sampling at recreational beaches along Lake Roosevelt. Screening was conducted based on limited recreational use. Samples revealed that 12 of the 15 sites sampled were below detection limits for all contaminants tested, and were designated as safe for use. Three sites (Black Sand, Northport, and Dalles) had arsenic and/or lead concentrations slightly above screening levels; these beaches were designated as safe for seasonal recreation (EPA, 2006a).

Risk Assessment

The EPA is conducting a human health risk assessment and Teck Cominco is conducting an ecological risk assessment regarding upper Columbia River contamination. These assessments have not yet been completed and results will not be available for this Supplemental EIS.

3.10.1.2 Public Health and Safety

Sanitation

Sanitation issues (e.g., human waste left on beaches) have been noted along Lake Roosevelt. The problems occur mainly in dispersed areas and other shoreline areas where restroom facilities are not provided. Bacteria in human waste present potential health risks for beach users.

Fish Advisory

The Washington State Department of Health (DOH) currently has an updated fish advisory in effect for walleye due to high mercury levels. DOH recommends that "women who might become pregnant, are pregnant, nursing, and young children should not eat more than 2 meals per month of walleye caught from Lake Roosevelt" (DOH, 2008). Also recommendations are in place to eat no more than four meals per month of burbot or sucker.

Fish Consumption Survey

A fish consumption survey conducted in 1994 and 1995 by the STI and the DOH examined fish catch and consumption for anglers at Lake Roosevelt. Anglers consumed an average of 42 fish meals per year; furthermore, 75 percent of those surveyed ate 48 or fewer fish meals per year (DOH, 1997). Rainbow trout were the primary fish caught and

consumed (86 percent), followed by walleye (66 percent), kokanee (40 percent), and bass (28 percent) (DOH, 1997).

The majority of anglers surveyed were Caucasian males, with only 2.4 percent of the population surveyed being Native American (DOH, 1997). This survey notes that "only a limited portion of the Spokane Tribe of Indians and the Colville Indian Nation use the lake as a fisheries resource." However, due to the small percentage of Native Americans questioned, fish consumption for these groups is not adequately represented (DOH, 1997).

Although specific studies for the CCT and STI have not been conducted, fish consumption surveys were completed in 1992 for the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes along the Columbia River. Rates of fish consumption for these tribes were approximately nine times higher than the national consumption rate for adults surveyed. Rates of fish consumption for the tribes were approximately three times higher than the national consumption rate for children (Columbia River Inter-Tribal Fish Commission, 1994).

Fish Tissue Sampling Studies

According to a fish sampling study conducted during the summer of 1994 by the USGS and the Spokane Walleye Club, average mercury concentrations in walleye from Lake Roosevelt were 0.3 parts per million (ppm), below the national average of 0.52 ppm (Erwin and Munn, 1997). Furthermore, mercury levels in Lake Roosevelt fish were below the 1.0 ppm limit set by the Food and Drug Administration (FDA) (Erwin and Munn, 1997).

A fish sampling study was also conducted in 2005 as part of the Phase I RI/FS Report for the upper Columbia River (CH2M Hill, 2007). The study included sampling walleye, rainbow trout, lake whitefish, largescale sucker, and burbot tissues for metals and toxic compounds. Comparison Values (CVs), which were based on published risk based data, were used to identify broad trends and patterns in contaminant data. This process provided an initial evaluation of fish tissue analytical data.

Metals that most often exceeded their CV included: total mercury, arsenic, selenium, chromium, copper, zinc, aluminum, lead, and cadmium. PCB and dioxin/furan (s, 3, 7, 8-Tetrachlorodibenzofuran [TCDF]) compounds also exceeded the CV for most fish species and sample types. General results from the study found that contaminant concentrations were similar across species for aluminum, barium, cadmium, chromium, copper, iron, selenium, uranium, and zinc. Results suggested that contaminant levels appear to be unchanged or declining in some cases, especially with declining mercury levels in walleye and rainbow trout and declining 2,3,7,8-TCDF in lake whitefish. A more detailed discussion of sampling results, general trends, and statistical analyses is presented in Appendix H. (CH2M Hill, 2007)

Results from the 2007 sampling analysis were used to update the fish advisory for Lake Roosevelt.

3.10.1.3 Mosquitoes

Mosquitoes are a concern due to risk of transmission of mosquito-borne pathogens such as West Nile Virus. Summer and early fall are the most common times for human infections with West Nile Virus (Campbell et al., 2002 in Reclamation, 2004). Shallow, stagnant waters with dense, emergent vegetation are prime mosquito breeding habitat; conversely, "wind-swept shorelines lacking vegetation and pools containing fish and other mosquito larvivores are not conducive to mosquito production" (Pratt and Moore, 1993 in Reclamation, 2004).

3.10.2 Columbia River Downstream

Sediment sampling discussed in the 2006 upper Columbia River Report did not continue below Grand Coulee Dam. Although specific data were not readily available, some transport of contaminants from Lake Roosevelt is likely present downstream in the Columbia River.

Specific data for areas directly downstream of Grand Coulee Dam were not readily available. Larger-scale studies of the entire Columbia River have noted contaminants (a variety of organic compounds and heavy metals) in fish tissues (EPA, 2002).

3.10.3 Odessa Subarea and Banks Lake

3.10.3.1 Hazardous and Toxic Materials

Sediment sampling discussed in the 2006 upper Columbia River Report did not continue below Grand Coulee Dam. However, sediment samples were analyzed for mercury concentrations at Banks Lake as part of an Ecology study reviewing statewide mercury levels in fish tissues. Sediment samples from Banks Lake were found to have some of the lowest mercury concentrations (12 parts per billion [µg/kg] dry weight) compared to other state lakes. Sediment samples were well below the Threshold Effects Level (TEL) of 170 µg/kg dry weight. TEL is defined as the level below which adverse effects rarely occur in bioassays and benthic communities (Ecology, 2003).

3.10.3.2 Public Health and Safety

Largemouth bass tissues sampled as part of the 2003 Ecology study were found to have a mean mercury concentration of 114 µg/kg. Two of the 10 fish sampled had mercury levels above the DOH criteria of 150 µg/kg wet weight; however, all fish sampled in Banks Lake were below the EPA 2001 Revised Fish Tissue Residual Criterion of 300 µg/kg wet weight. When compared to other Washington state lakes in the study, Banks Lake was found to have significantly lower mercury concentrations in fish (Ecology, 2003).

3.11 Recreation and Scenic Resources

3.11.1 Lake Roosevelt

The Programmatic EIS (Ecology, 2007) contains general information on recreation and scenic resources in the Columbia River Basin. The following section provides additional information on recreation facilities and uses in the Lake Roosevelt area to support the evaluation of impacts associated with releases from Lake Roosevelt in more detail. The discussion is based on readily available information from the National Park Service (NPS), the CCT, and the STI.

3.11.1.1 Recreation Activities and Use Levels

Lake Roosevelt provides recreation opportunities for 1.2 to 1.5 million visitors annually. Most visitors come from Washington and the immediate region, including Canada (NPS, 2000). The lake is popular because of its size, surrounding scenery, the quality of its water, and the fact that it is one of the few large lakes in the region that has an extensive amount of shoreline and adjacent lands that are publicly owned and available for public use.

Visitor use at Lake Roosevelt is unevenly distributed throughout the year, with peak activity and visitation occurring from June through September, which accounts for nearly 75 percent of visitor use. In general, visitor use dramatically increases in June, peaks in August, and falls off dramatically in September. The latest NPS visitation data (2007) show visitation at a high of 357,742 in August and a low of 23,265 in January (Table 3-2).

Table 3-2. Lake Roosevelt National Recreation Area Visitation[1] (2007)

Month	*Visitors*
January	23,265
February	25,392
March	48,244
April	61,028
May	106,819
June	191,062
July	335,533
August	357,742
September	149,654
October	83,062
November	41,064
December	27,573
2007 Total	1,450,438

Source: NPS Public Use Statistics Office (2008a)

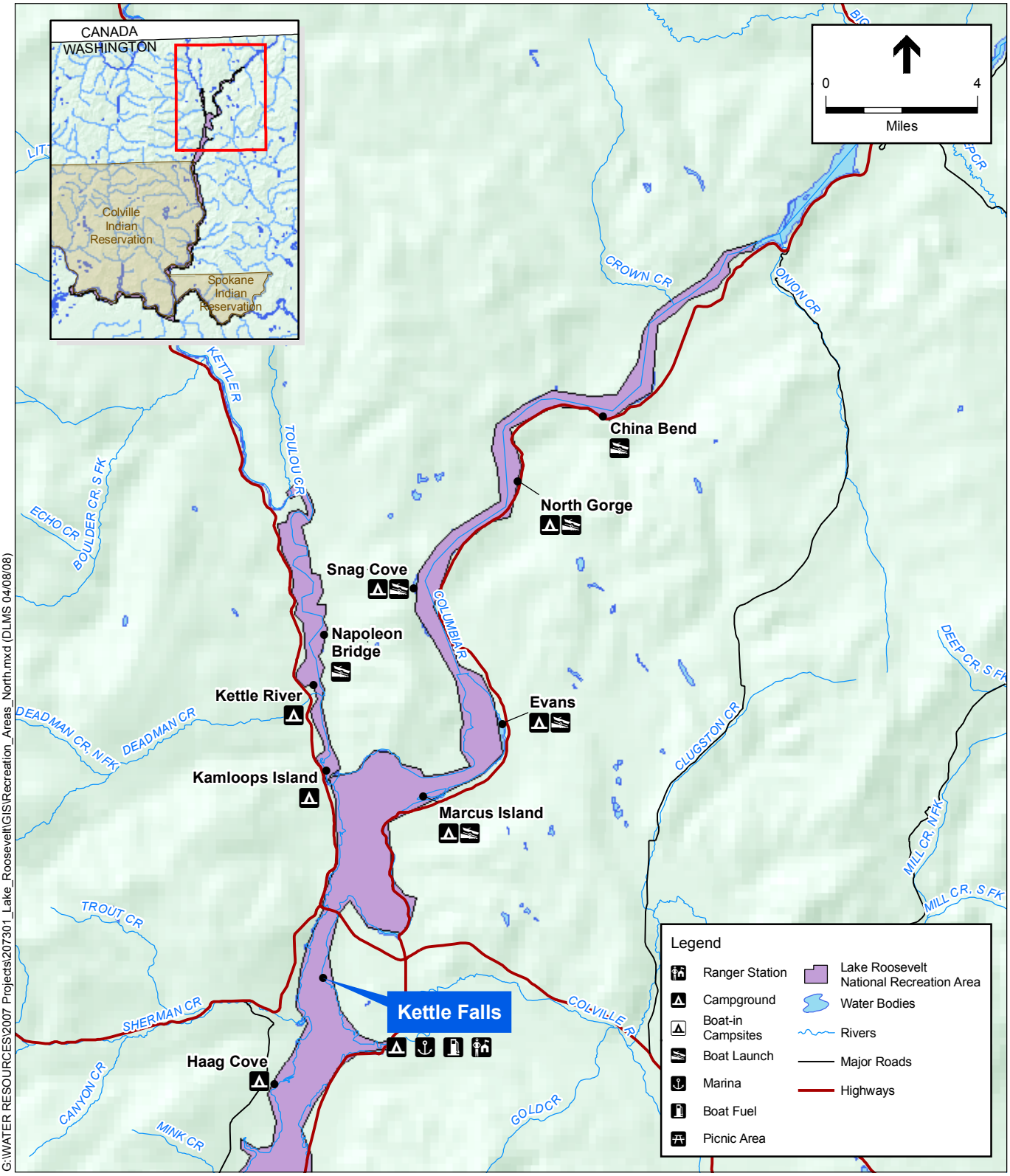
[1] Recreation visits are the entries of persons, for any part of a day, onto lands or waters administered by the NPS for recreation purposes.

A visitor use study was conducted by the NPS in 1996. Survey results indicated that most visitor respondents were from the state of Washington (74 percent). About 13 percent of the respondents were from Canada, and an additional 5 percent of the respondents were from other Pacific Northwest areas. About 7 percent of the respondents were from other parts of the United States. About 46 percent of the respondents were repeat visitors. The most popular activities with visitor survey respondents were camping in a developed campground (16 percent), swimming (15 percent), motor boating (11 percent), and fishing (10 percent) (NPS, 2000).

3.11.1.2 Recreation Facilities

Recreation areas at Lake Roosevelt are managed by the NPS, the CCT, and the STI (Figures 3-8, 3-9, 3-10, and 3-11). The recreation areas managed by these entities serve a wide range of developed day and overnight recreation sites and facilities, and are located throughout the reservoir (Table 3-3).

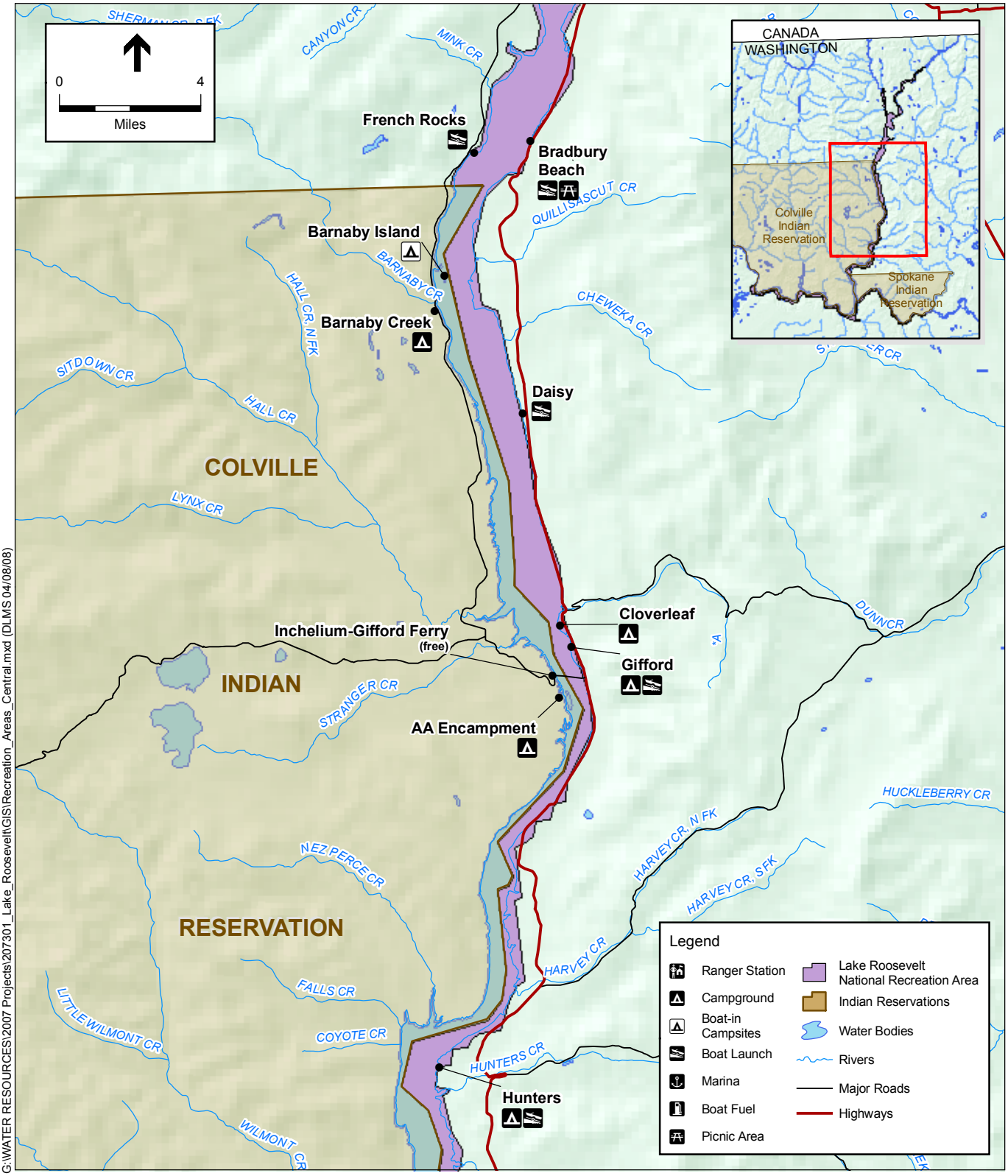
The NPS manages the Lake Roosevelt National Recreation Area (LRNRA), which has 26 public campgrounds and boat-in-only campgrounds, 11 designated swimming beaches, and three concessionaire-operated marinas at Kettle Falls, Keller Ferry, and Seven Bays that provide moorage, boat rental, fuel supplies, sanitary facilities, and other miscellaneous services. The CCT operates 1 developed boat ramp (AA Campground), 7 developed campgrounds, and several primitive camping areas on reservation lands (see Figures 3-9, 3-10, and 3-11) (Palmer, pers. comm., 2008). The CCT also operates concessions on the lake through its Roosevelt Recreation Enterprises. The STI operates 1 developed boat ramp (Two Rivers), 2 primitive boat ramps, 11 developed campgrounds, and several primitive camping areas (see Figure 3-10).



FILE NAME: Fig03-8_Recreation_Areas_North.ai
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 08/11/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Recreation_Areas_North.mxd (DLMS 04/08/08)

SOURCE: ESA Adolfson, 2008;
WSDOT, 2005 (roads), 1996 (NRAs), 1994 (reservations);
Ecology, 1998 (streams); WA DNR, 1997 (hillshade)

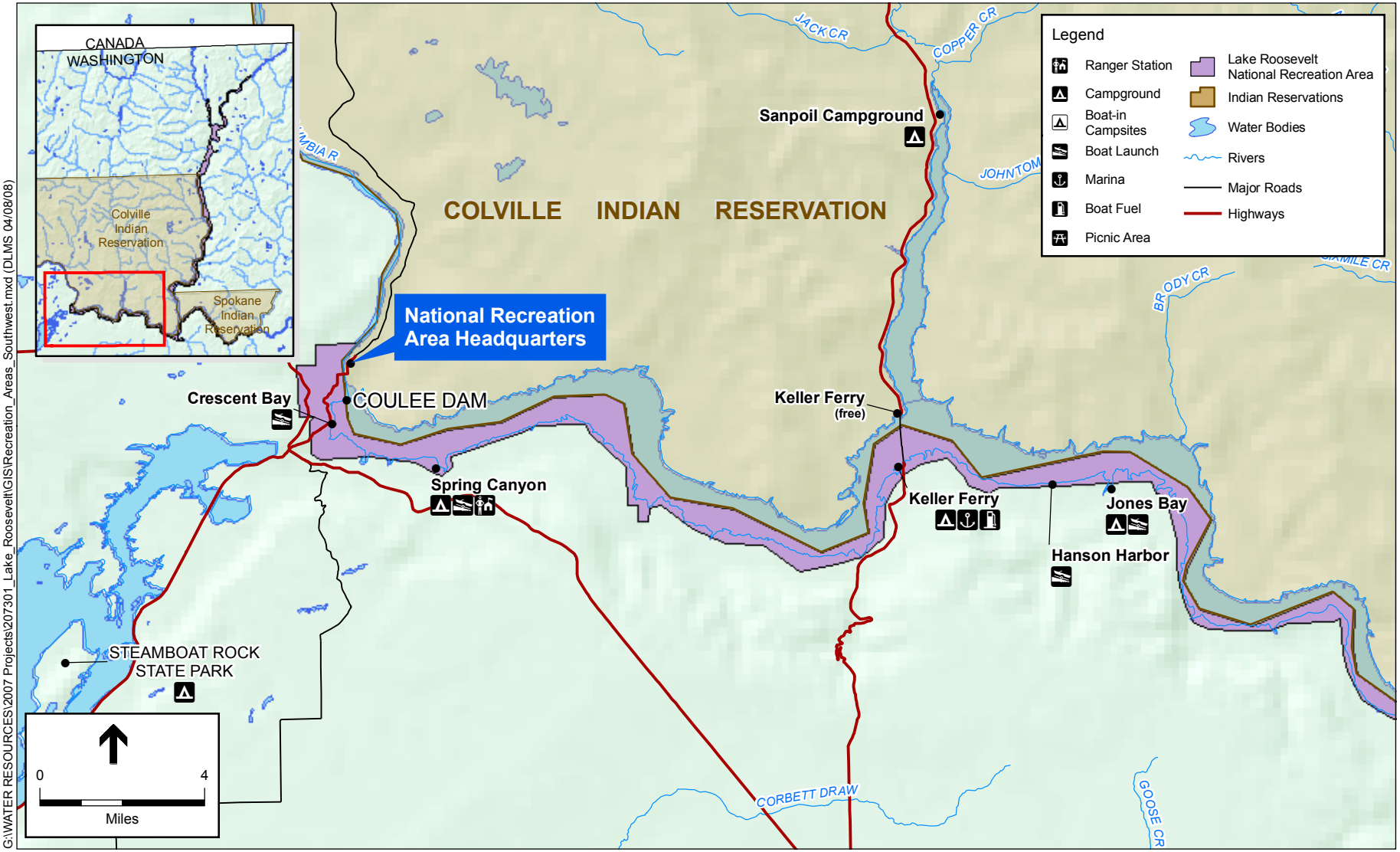
Figure 3-8
Recreation Areas
Northern Lake Roosevelt



FILE NAME: Fig03-9_Recreation_Areas_Central.ai
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 08/11/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Recreation_Areas_Central.mxd (DLMS 04/08/08)

SOURCE: ESA Adolfson, 2008;
WSDOT, 2005 (roads), 1996 (NRAs), 1994 (reservations);
Ecology, 1998 (streams); WA DNR, 1997 (hillshade)

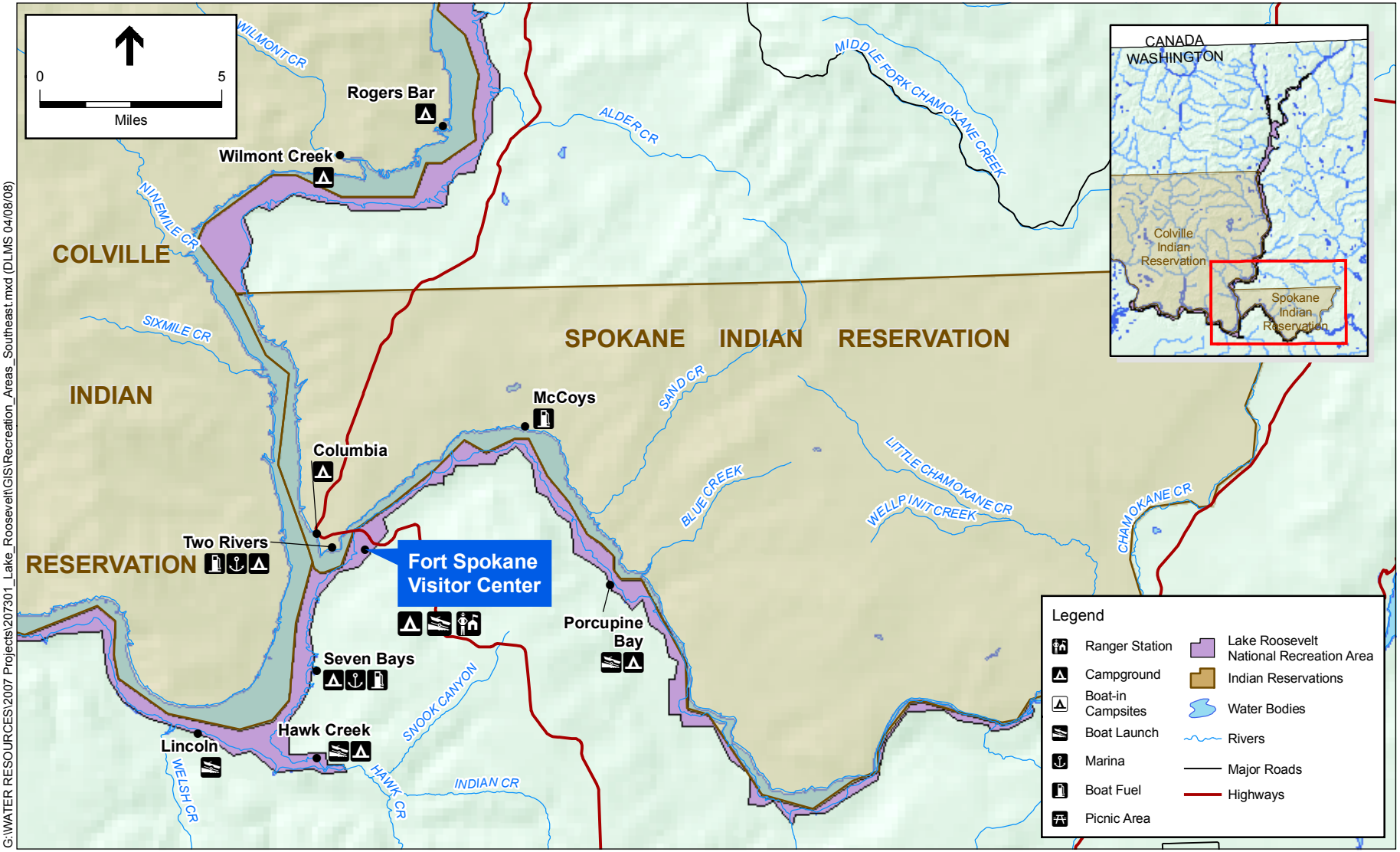
Figure 3-9
Recreation Areas
Central Lake Roosevelt



FILE NAME: Fig03-10_Recreation_Areas_Southwest.ai
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 08/11/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Recreation_Areas_Southwest.mxd (DLMS 04/08/08)

SOURCE: ESA Adolfson, 2008;
WSDOT, 2005 (roads), 1996 (NRAs), 1994 (reservations);
Ecology, 1998 (streams); WA DNR, 1997 (hillshade)

Figure 3-10
Recreation Areas
Southwest Lake Roosevelt



FILE NAME: Fig03-11_Recreation_Areas_Southeast.ai
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 08/11/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Recreation_Areas_Southeast.mxd (DLMS 04/08/08)

SOURCE: ESA Adolfson, 2008;
WSDOT, 2005 (roads), 1996 (NRAs), 1994 (reservations);
Ecology, 1998 (streams); WA DNR, 1997 (hillshade)

Figure 3-11
Recreation Areas
Southeast Lake Roosevelt

Table 3-3 Developed Recreation Areas on Lake Roosevelt

Developed Area	*Minimum Boat Launch Elevation*[1]	*Campgrounds*	*Marina*	*Developed Swimming Area*
National Park Service – Lower Lake				
Crescent Bay	1,265	no	no	no
Spring Canyon	1,222[2]	yes	no	yes
Keller Ferry (Marina)	1,229[2]	yes	yes	yes
Hanson Harbor	1,253	no	no	no
Jones Bay	1,268	yes	no	no
Lincoln Mill	1,245[2]	no	no	no
Hawk Creek	1,281	yes	no	no
Sevens Bay Marina	1,227[2]	no	yes	no
National Park Service – Spokane River Arm				
Fort Spokane	1,247[2]	yes	no	yes
Porcupine Bay	1,243	yes	no	yes
National Park Service – Upper Lake				
Hunters	1,232[2]	yes	no	yes
Gifford	1,249[2]	yes	no	no
Cloverleaf	no boat launch	yes	no	yes
Daisy	1,265[2]	no	no	no
French Rocks	1,265	no	no	no
Bradbury Beach	1,251[2]	no	no	yes
Haag Cove	no boat launch	yes	no	no

Developed Area	*Minimum Boat Launch Elevation*[1]	*Campgrounds*	*Marina*	*Developed Swimming Area*
Kettle Falls (Marina)	1,234[2]	yes	yes	yes
Marcus Island	1,281	yes	no	yes
Kamloops	no boat launch	yes	no	no
Kettle River	no boat launch	yes	no	no
Napoleon Bridge	1,280	no	no	no
Evans	1,280	yes	no	yes
Snag Cove	1,277	yes	no	no
North Gorge	1,280	yes	no	no
China Bend	1,280	no	no	no
Colville Indian Reservation				
Reynold's Resort	no boat launch	yes	no	no
Rogers Bar	no boat launch	yes	no	no
Wilmont Creek	no boat launch	yes	no	no
Barnaby Island	no boat launch	yes	no	no
Barnaby Creek	no boat launch	yes	no	no
Inchelium Ferry (AA Camp)	1,270	yes	no	no
Keller Park	no boat launch	yes	no	no
Spokane Indian Reservation				
Blackberry Cove	no boat launch	no	no	no
McGuires Place	no boat launch	yes	no	no
Balcomb's Landing	no boat launch	yes	no	no

Developed Area	*Minimum Boat Launch Elevation*[1]	*Campgrounds*	*Marina*	*Developed Swimming Area*
Upper Columbia	no boat launch	yes	no	no
Lower Columbia	no boat launch	yes	no	no
Abraham Cove	no boat launch	no	no	no
Two Rivers (Marina)	1,280	yes	yes	no
Cornelius	no boat launch	yes	no	no
Hidden Beach	no boat launch	yes	no	no
Chief 3 Mountain	no boat launch	yes	no	no
Raccoon Cove	no boat launch	no	no	no
Maggie Shoup	no boat launch	yes	no	no
No Name	no boat launch	yes	no	no
Sand Creek	no boat launch	yes	no	no
McCoys (Marina)	no boat launch	no	no	no

Source: NPS (2008b)
[1] Minimum operating elevation for developed boat launches
[2] Winter boat launch (accessible at low lake levels)

Visitation statistics for August 2007 indicate the highest boat launch use by visitation is at Fort Spokane (1,456), Porcupine Bay (1,381), Hunters (1,289), Kettle Falls (1,239), Keller Kerry (1,237), and Lincoln Mill (1,120) (NPS, 2008c). The Kettle Falls camping area in the North District accounted for more than 21 percent of the total LRNRA visitation. In the South District, visitor use is more evenly spread among several sites.

While much of the recreation use on Lake Roosevelt is concentrated at developed recreation sites, a large amount of dispersed use occurs in undeveloped areas along the lake shoreline. The most popular dispersed camping areas in the LRNRA occur in the southern portion of the lake (Dashiell, pers. comm., 2008). Because of their remote locations, management of dispersed camping areas is an ongoing challenge. Trash and human waste are the biggest management issues associated with these areas. Camping along the shoreline outside of developed areas will continue to be allowed as long as it can be managed to keep resource impacts at acceptable levels. The LRNRA General

Management Plan (2000) acknowledged that a process to assess damage and manage dispersed sites along the shoreline may be required (NPS, 2000).

The results of the 1996 NPS visitor survey indicated visitors were concerned with crowding that happens on weekends at popular facilities such as Porcupine Bay and Keller Ferry. Their primary areas of concern were a lack of camping spaces and crowding of boat ramps.

3.11.1.3 Reservoir Drawdown

The lake is characterized by seasonal fluctuations in the lake level as described in the Programmatic EIS. This affects boat launches and other waterfront facilities because they must be designed to be operable under variable water level conditions. In response to low lake levels rendering certain boat ramps inoperable, the NPS extended some ramps in the year 2000 to be operable under current lake management. These included the Snag Cove, Jones Bay, and China Bend ramps. Following these extensions, and under normal non-drought conditions, the lake level is generally high enough to meet the needs of all ramps in the LRNRA. Under drought conditions when lake levels reach 1,278 feet, six of the 22 boat ramps within the LRNRA are inoperable during two of the highest use months on the reservoir. This is approximately one-third of the ramps. Ramps that continue to be susceptible to low lake levels in the high visitor use season include Hawk Creek, Marcus Island, Evans, Napoleon Bridge, and North Gorge. According to NPS, launching is reported to shift to other ramps when these become inoperable (Dashiell, pers. comm., 2008).

The STI closes their developed boat launch at Two Rivers when lake levels render it inoperable. During wet and average years, this generally occurs from January through mid-June and again for a few days in August during average years. During drought years, the launch is closed for approximately two weeks in August. In general, if lake levels are too low, visitors are allowed to use primitive launches at their own risk as no extensions are provided. Many visitors cross the bridge to use launches at Fort Spokane when the Two Rivers launch is closed (Kieffer, pers. comm., 2008).

The minimum operating elevations of the designated swimming areas vary by site topography. The NPS is able to move swimming markers to adjust to lower lake levels, but does not adjust swimming platforms. Two of the swimming areas (Marcus Island and Kettle Falls) may not have water when lake levels are low (NPS, 2008d). During spring drawdowns, the concessionaire must relocate houseboats to deeper water. Rental boat docks are not available at some locations for up to six weeks during this time.

3.11.2 Columbia River Downstream

As described in the Programmatic EIS (Ecology, 2007), the Columbia River downstream areas include a variety of recreation and scenic resources. Recreation areas include parks, monuments and historic areas, wildlife refuges, wilderness areas, forest, and range areas. Recreation activities in the downstream areas include fishing, hunting, bird watching, boating, swimming, and other water-oriented activities.

3.11.3 Odessa Subarea and Banks Lake

3.11.3.1 Odessa Subarea

The Odessa Subarea comprises a large area within Adams and Grant Counties with a small portion in Franklin County. The subarea mainly supports arid lands that have been converted to irrigated agricultural land. As described in the Programmatic EIS, many of the municipalities that could receive water through this Proposal own and operate local parks used for a variety of recreational purposes.

3.11.3.2 Banks Lake

Banks Lake is a popular recreational area due to its diverse recreational opportunities and scenic natural features. Activities on the reservoir include fishing, swimming, boating, water skiing, and wind surfing. The highest concentration of boating activity occurs in the Devil's Punch Bowl, Osborn Bay, Kruk's Bay/Airport Bay, and Jones Bay areas. Scenic natural features of the area include basalt outcroppings and coulee walls rising on the east and west sides of the reservoir.

There are 19 developed recreation areas on the lake. These include developed recreation sites and facilities, generally concentrated at the south and northeast ends of the reservoir. While much of the recreation use is concentrated at developed recreation sites, either managed directly by the state (e.g., Steamboat Rock State Park), under lease from the state (e.g., Sunbanks Resort, Coulee Playland), or under lease from Reclamation (e.g., Coulee City Community Park), a significant amount of dispersed use occurs in undeveloped areas along the lake's shoreline.

At full pool (1,570 feet), the reservoir covers 27,000 acres and inundates 91 miles of shoreline. Water withdrawal from the Columbia Basin Project causes the elevation of the lake to vary during the irrigation season between late March and late October, annually. These fluctuations overlap the high-use recreation season on the lake of mid-May through September. Under current operating conditions the reservoir is drawn down to a minimum elevation of 1,565 feet in August and refilled by late September. The lake is characterized by shallow, low-gradient shorelines; therefore, shore facilities can be affected by even small fluctuations in lake level.

WDFW is responsible for the operation and maintenance of six boat ramps. The Washington State Parks and Recreation Commission (WSPRC) is responsible for three boat ramps. Operation and maintenance for the other boat ramps located on the reservoir (Sunbanks Resort, Coulee Playland, and Coulee City Community Park) are the responsibly of the respective lessee or concessionaire. During drawdowns, certain boat ramps may be more difficult to use or may become inoperable: Dry Falls, Million Dollar Mile North and South, Barker Flat, and Osborn Bay Southeast boat ramps. Launching is reported to increase at the Steamboat Rock Rest Area and Boat Launch during low reservoir elevation periods.

Swimming is ranked as the second most common activity on Banks Lake. Periodically, low water elevations in the swimming areas are also a concern.

3.12 Socioeconomics

The Programmatic EIS (Ecology, 2007) identified the goods and services derived from the river and related resources, and the potential socioeconomic consequences of management decisions affecting those resources. The following text augments that discussion.

3.12.1 Lake Roosevelt

The Lake Roosevelt area is predominantly used for purposes of the Lake Roosevelt National Recreation Area (LRNRA) and the STI and CCT Reservations. The National Park Service manages the LRNRA primarily for boating, camping, and fishing activities. The two tribes partake in these activities and conduct business activities that rely on the associated recreational uses.

The local economy with direct links to Lake Roosevelt includes the STI and CCT Reservations, and the adjacent portions of Ferry, Stevens, Lincoln, Grant, Douglas, and Okanogan Counties. Table 3-4 shows that, in 2006, the six counties had a total population of 183,220 (U.S. Census Bureau 2008a,b,c). All counties but Grant County have been experiencing a slower population growth, have a higher concentration of persons 65 years and older, and have a higher concentration of American Indian and Alaska Native persons than the state as a whole.

The 2000 Census reported the CCT and STI Reservation populations as 7,587 and 2,004, respectively (U.S. Census Bureau 2008a, b). As described in the Programmatic EIS, the tribes generally manage areas near Lake Roosevelt for natural-resource oriented purposes.

3.12.2 Columbia River Downstream

The near downstream region of the Columbia River is contained by Okanogan County to the north and Douglas County to the south. Banks Lake is within Grant County. The city of Odessa and surrounding agricultural lands are within Lincoln County. These counties are demographically similar to the other counties surrounding Lake Roosevelt. Lincoln County and Douglas County have particularly high shares of land in agriculture relative to the other counties and the state of Washington as a whole (Table 3-4).

3.12.3 Odessa Subarea and Banks Lake

Banks Lake is within Grant County. The city of Odessa and surrounding agricultural lands are within Lincoln County. These counties are demographically similar to the other counties surrounding Lake Roosevelt. Lincoln County has a particularly high share of land in agriculture relative to the other counties, besides Douglas County, and the state of Washington as a whole (Table 3-4).

Table 3-4 Demographic Statistics for Counties and Reservations Surrounding Lake Roosevelt

	Ferry County	*Grant County*	*Lincoln County*	*Okanogan County*	*Stevens County*	*Douglas County*	*Colville Reservation*	*Spokane Reservation*	*Washington State*
Population, 2006 estimate	7,560	82,612	10,376	40,040	42,632	35,772	7,587[a]	2,004[a]	6,395,798
Population, change, April 1, 2000 to July 1, 2006	4.1%	10.6%	1.9%	1.2%	6.4%	9.7%	NA	NA	8.5%
White persons, 2006	78.5%	94.8%	94.9%	85.3%	90.9%	95.4%	32.6% [a]	18.5% [a]	84.8%
American Indian and Alaska Native persons, 2006	17.5%	1.4%	2.0%	11.0%	5.5%	1.4%	59.7% [a]	76.5% [a]	1.6%
Bachelor's degree or higher, persons age 25+, 2000	13.5%	13.7%	18.8%	15.9%	15.3%	16.2%	8.4% [a]	4.9% [a]	27.7%
Per capita money income, 1999	$15,019	$15,037	$17,888	$14,900	$15,895	$17,148	$12,185	$10,151	$22,973
Persons below poverty, 2004	17.80%	16.20%	11.80%	18.80%	15.10%	12.1%	26.8% [a]	28.7% [a]	11.60%
Persons per square mile, 2000	3.3	27.9	4.4	7.5	16.2	17.9	5.7	8.4	88.6
Land area, 2000 (sq. miles)	2,204	2,681	2,311	5,268	2,478	1,821	1032	238	66,544
Land area in farms (percent), 2002	56.7%	62.6%	83.4%	36.8%	33.3%	75.4%	NA	NA	36.0%

[a] Reservation population data only available to 2000.
Sources: U.S. Census Bureau 2008a,b,c; U.S. Department of Agriculture 2008.

3.13 Public Services and Utilities

Public services and utilities were described in the Programmatic EIS (Ecology, 2007). Additional information is provided here on hydroelectric power generation facilities.

3.13.1 Lake Roosevelt

There are 12 hydroelectric facilities on the mainstem of the Columbia River including Grand Coulee Dam and the Grand Coulee pump-storage facility. For the facilities downstream of Lake Roosevelt, the dams operate primarily as run-of-river hydroelectric facilities which generate power according to the flow in the Columbia River. There is limited regulating capacity in the reservoirs upstream of each of the dams. Table 3-5 lists each hydroelectric facility, its current installed capacity and the estimated annual production in kilowatt-hours.

Table 3-5 Hydroelectric Facilities on the Columbia River

Hydroelectric Facility	*Owner*	*Instantaneous Generating Capacity (Peak MW[1])*	*Estimated Annual Generation (aMW[2])*
Grand Coulee	Reclamation	6,326	2,500
Grand Coulee Pump-Storage	Reclamation	300	Included in Grand Coulee number
Chief Joseph	U.S. Army Corps of Engineers	2,535	1,300
Wells	Douglas PUD	774	470
Rocky Reach	Chelan PUD	866	700
Rock Island	Chelan PUD	624	290
Wanapum	Grant PUD	1,038	585
Priest Rapids	Grant PUD	855	550
McNary	U.S. Army Corps of Engineers	1,127	640
John Day	U.S. Army Corps of Engineers	2,484	1075
The Dalles	U.S. Army Corps of Engineers	2,074	800
Bonneville Dam	U.S. Army Corps of Engineers	1,047	580

Sources: Watson (2008), Chelan PUD (2008), Grant PUD (2008), Douglas PUD (2008), Department of Energy (2008a,b)
[1]MW = Megawatts
[2]aMW = annual megawatts. Calculated by dividing the total number of megawatt-hours generated by the number of hours in a year. 8,760 Megawatt-hours.

3.13.2 Columbia River Downstream

The Columbia River downstream hydroelectric facilities are described in Table 3-5.

3.13.3 Odessa Subarea and Banks Lake

In addition to the mainstem Columbia River dams, Banks Lake acts as a pump-storage facility. Water is pumped into Banks Lake and stored, and then released back to Lake Roosevelt to generate power from the elevation difference between the two lakes.

Two hydroelectric plants exist between Banks Lake and the Odessa Subarea. The plants are the Summer Falls and Main Canal Headworks hydroelectric facilities operated by the Grand Coulee Project Hydroelectric Authority. Those projects recover energy from water flowing from Banks Lake to the Main Canal. The Summer Falls project is 92 MW and generates 39aMW. The Main Canal project is 26 MW and generates 10.8aMW.

3.14 Transportation

The Programmatic EIS (Ecology, 2007) contains information on surface transportation modes serving the Columbia River Basin. Surface transportation modes described included highways, railroads, and waterborne transportation. The following section provides additional information on waterborne transportation on Lake Roosevelt to support the evaluation of impacts associated with releases from Lake Roosevelt in more detail.

3.14.1 Lake Roosevelt

The CCT operates the Inchelium-Gifford Ferry, a small capacity car ferry on the upper lake, connecting Inchelium on the west shore to State Route 25 on the east shore (see Figure 3-8). The Inchelium-Gifford Ferry becomes inoperable when Lake Roosevelt elevation falls below 1,228 feet, requiring passengers to drive approximately 30 miles north to the bridge at Kettle Falls or take a longer route to the south. This occurs during drought years only (4 percent of the time).

Washington State Ferries operates the Keller Ferry, a 12-car capacity ferry from Ferry County and the CCT Reservation on the north bank of Lake Roosevelt to Lincoln County on the south bank, near the lake's confluence with the Sanpoil River (see Figure 3-9). Approximately 60,000 vehicles travel on the ferry each year. During normal lake elevation of 1,290 feet above sea level to approximately 1,248 feet, ferry service is "on-demand" in order to avoid unnecessary empty runs. The ferry crew can observe both landings and remain at the north or south landing until a vehicle appears needing to cross in either direction. Occasionally, perhaps every two or three years, when lake elevations drop below 1,248 feet, the north landing is moved a short distance up the Sanpoil River, extending the normal 10-minute crossing to about 20 minutes. At this location, the ferry can operate normally with lake levels as low as 1,208 feet. With some special provisions in the ferry operations, it can be operated on a limited basis with levels as low as 1,180 feet (Washington State Ferries, 2008). The primary east-west land transportation route serving Lake Roosevelt is U.S. 2, which connects Spokane, Davenport, and Coulee City to points west. State Route 20, which

extends from U.S. 395 at Colville to U.S. 97 through Republic to Tonasket, is the primary east-west route for the northern portion of the National Recreation Area. Major south-north routes are U.S. 97, connecting Ellensburg, Wenatchee, Okanogan, and crossing the Canadian border north of Oroville; State Route 17, connecting Moses Lake to Okanogan; and U.S. 395, connecting Spokane to Colville and crossing into Canada.

3.14.2 Columbia River Downstream

Water transportation on the Columbia River downstream areas is described in Section 3.11.3 of the Programmatic EIS (Ecology, 2007).

3.14.3 Odessa Subarea and Banks Lake

As described in Section 3.11.4 of the Programmatic EIS, transportation in the areas that would receive additional water supplies is primarily land-based road and rail.

CHAPTER 4.0 IMPACTS AND MITIGATION MEASURES FOR INCREMENTAL STORAGE RELEASES

This chapter describes the potential impacts associated with the Lake Roosevelt Incremental Storage Releases Project. The chapter includes a general discussion of the impacts associated with the No Action Alternative. Impacts associated with the Proposal are described for areas that could be impacted—Lake Roosevelt, the Columbia River downstream from Grand Coulee Dam, and Banks Lake and the Odessa Subarea. Because of the nature of this Proposal, with a variety of actions that would take place in different years, most impacts associated with it are considered long-term or operational impacts. Short-term impacts are only discussed in terms of construction that would be required to implement the Proposal. The chapter includes appropriate mitigation measures for any significant adverse impacts that are identified.

4.1 No Action Alternative

Under the No Action Alternative, Lake Roosevelt would continue to be operated as it is currently, with no additional releases from storage. Impacts of the No Action Alternative for the Incremental Storage Releases Project were evaluated in Section 5.4 of the Programmatic EIS (Ecology, 2007). The Programmatic EIS concluded that the No Action Alternative would have no impacts on most elements of the environment. The following potential impacts were identified to ground water, water rights, fish, and socioeconomics.

- Ground water levels in the Odessa Subarea would continue to decrease at approximately the same rate that they do today.
- There would be less water available for pending municipal/industrial users, and no water would be available for interruptible water rights during drought years.
- No additional water would be available to supplement stream flows in the mainstem of the Columbia River.
- Farmers in the Odessa Subarea would continue to experience rising costs of pumping ground water, which would diminish the feasibility of irrigation. Some irrigators may shift to crops that require less water or cease operations. This could result in a loss of sales, jobs, and income in the area.

This Supplemental EIS evaluates the Lake Roosevelt Incremental Flow Releases in more detail and provided more background information on such subjects as climate change, landslide potential, recreational boat ramps, and legal considerations related to the operation of Lake Roosevelt. With the exception of legal considerations, no additional impacts were identified from the No Action Alternative. Under the No Action Alternative, opportunities to provide additional water to improve water management in the Columbia River Basin would be delayed or lost. The opportunity to provide water to municipal and industrial users, interruptible water rights holders, users of ground water in the Odessa Subarea, and increased stream flows for fish would be lost. Ecology has no

legal requirement to provide water to those users and other options may exist to provide water to those uses.

4.2 Proposal

4.2.1 Lake Roosevelt

4.2.1.1 Earth

Short-term impacts

No short-term impacts are anticipated.

Long-term/operational impacts

Landslides, changes in alluvial deposits and additional exposed lakebed sediment are potential long-term impacts associated with additional drawdown of Lake Roosevelt. These potential impacts are described below.

Landslides

Landslide potential would not change as a result of the Proposal. The additional drawdown during the period with highest landslide potential (April and May when the lake level is less than 1,240 feet msl) would be minimal (less than 1 inch), and no impact is predicted during this period. The maximum additional drawdown (1.8 feet or less) would occur at the end of August, during the period of lowest landslide risk (summer, which is when the lake level is greater than 1,254 feet msl) and is within the normal operating levels of the reservoir.

Alluvial Deposition

Alluvial deposition patterns, including at the mouth of small tributaries, would not change as a result of the Proposal. This is because the additional drawdown period would primarily occur during the summer when there is little deposition occurring, and negligible (less than 1 inch) change in lake level during periods of higher deposition.

Exposed Sediment

Little additional lakebed area would be exposed as a result of the additional drawdown. The maximum additional drawdown (1.8 feet or less) would occur during the summer when lake level is greater than 1,254 feet msl. These lakebed areas would become exposed without the incremental storage releases as a result of normal reservoir operations. Impacts, if any, would be related to the duration of exposure. With additional drawdown, lakebed sediments may be exposed for a longer duration, even though the total area of exposure would be the same as under current conditions.

The bathymetry of 14 selected embayments of Lake Roosevelt was used to estimate how much exposed sediment corresponds to 1 foot of drawdown. Table 4-1 shows the amount of lakebed area exposed across 5-foot increments of pool heights. These data were used to determine a relationship between additional area exposed and drawdown on a continuous basis (i.e., per foot). In general, between 35 and 45 acres of lakebed is exposed for every 1 foot of drawdown when the lake elevation is between 1,290 and 1,255 feet msl. When the lake is below 1,255 feet msl, a larger area (up to 120 acres) is exposed per foot of drawdown.

Table 4-1 Total Exposed Lake Roosevelt Lakebed Area per Foot of Drawdown for the 14 Selected Embayment Areas

Contour Interval (feet msl)	*Additional Area (acres) Exposed per 1 ft Drawdown*
1,285 to 1,290	37.3
1,280 to 1,285	45.2
1,275 to 1,280	34.0
1,270 to 1,275	46.2
1,265 to 1,270	38.2
1,260 to 1,265	40.4
1,255 to 1,260	40.8
1,250 to 1,255	57.1
1,245 to 1,250	86.8
1,240 to 1,245	120.1

See Section 4.1.1.9, Environmental Health for additional discussion of the potential exposure of contaminated sediments.

Mitigation

Reclamation conducts annual inspections of the Lake Roosevelt shoreline, to observe and, if necessary, mitigate the effects of landslides along the shoreline. These inspections and other existing operational management guidelines are sufficient to address the potential for slope failure and erosion. No significant change in the extent of exposed lakebed sediments is anticipated. Therefore, no additional mitigation is required.

4.2.1.2 Climate

A program such as the Lake Roosevelt Incremental Storage Releases Project could both affect, and be affected by, climate change. Projects can affect climate change by increasing carbon emissions that contribute to global warming. As noted in Section 3.3, climate change could affect precipitation, snowmelt and runoff to Lake Roosevelt, which could affect the water available for the incremental storage releases. For the purposes of this Supplemental EIS, the effect of the Proposal on climate change is discussed as a short-term impact, and the effect of climate change on the Proposal is discussed as a long-term impact.

Short-term impacts

The Proposal is not expected to increase emissions that would affect climate change since there would be no construction involved and there would be no increase in transportation emissions. The storage releases are expected to slightly reduce hydropower production,

which could increase the need to shift to another form of power generation, possibly with increased carbon emissions.

Long-term/operational impacts

The potential, general impacts of climate change on water resource management are described in Section 3.2. The impacts of climate change could affect water management at Lake Roosevelt by altering the amount and timing of water available in the reservoir. Because of the uncertainty of predictions of runoff and precipitation in the Pacific Northwest, it is not possible to discuss those impacts quantitatively. If less water is available in Lake Roosevelt or if the runoff occurs earlier in the year, water availability for the Incremental Storage Releases Project could be affected. Impacts related to reduced water availability include more interruptible water rights, reduced water available to meet target flows, and additional unusable recreational facilities.

Mitigation

Changes in water availability in the Columbia River Basin will require the managing agencies to adaptively manage the river to respond to changing conditions. If conditions change, Ecology will coordinate with Reclamation and other Columbia River managing agencies to adapt to climate changes. Possible mitigation actions include changes to Reclamation service contracts and an adaptive management plan for recreation impacts.

4.2.1.3 Surface Water

Water Quantity

Short-term impacts

No short-term impacts will occur. All facilities needed to release additional water from Lake Roosevelt exist and no construction would be required.

Long-term/operational impacts

The long-term impacts of modifying the release schedule for Lake Roosevelt will be a slight change in the water levels in Lake Roosevelt during the April-October time period. Tables 4-2 through 4-8 summarize the predicted difference in water levels for the alternative and flow options. On all the tables, the bottom row summarizes the cumulative drawdown of Lake Roosevelt at the end of each month. The predicted drawdown of Lake Roosevelt varies slightly between the alternatives for the Odessa Subarea demands because of the varying lake elevation-water storage relationship as the lake level changes. As lake levels drop, there is less water storage per foot of drop. The drawdowns shown in Tables 4-2 through 4-8 are best estimates using recorded lake elevations that occurred in years representing average (2002), dry (2003) and drought (2001) conditions. Figures 4-1 through 4-4 illustrate those predicted differences using recorded daily lake elevations for each representative year.

Table 4-2. Alternative 1A—Average Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0	0	0	1.76	1.76	0	0
Fish	27,500	0	0	0	2.18	2.18	0	0
Municipal/ Industrial	25,000	0	0	0	1.98	1.98	0	0
Cumulative Total	82,500	0	0	0	5.92	11.84	0	0

Table 4-3. Alternative 1B(a)—Average Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0.32	0.63	0.95	1.26	0.94	0.48	0.17
Fish	27,500	1.11	0.55	0.32	0.31	1.03	1.03	0
Municipal/ Industrial	25,000	0.43	0.60	0.75	0.71	0.75	0.70	0
Cumulative Total	82,500	1.86	3.64	5.66	7.94	10.66	0[1]	0[1]

[1]Cumulative total in September and October is zero because the lake will be refilled to previous levels by September 30.

Table 4-4. Alternative 1B(b)—Dry Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0.33	0.65	0.98	1.31	0.97	0.50	0.17
Fish	27,500	1.51	1.50	1.50	0	0	0	0
Municipal/ Industrial	25,000	0.45	0.62	0.78	0.73	0.77	0.73	0
Cumulative Total	82,500	2.29	5.06	8.32	10.36	12.10	0[1]	0[1]

[1]Cumulative total in September and October is zero because the lake will be refilled to previous levels by September 30.

Table 4-5. Preferred Alternative 1C(a)—Worst Case Scenario in Average Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0.32	0.63	0.95	1.26	0.94	0.48	0.17
Fish	27,500							0
Municipal/ Industrial	25,000							0
Cumulative Total	82,500	1	1	1	1	12.41[2]	0[2]	0

-Period of time flow releases can occur.

[1]Not calculated as distribution of flow releases can vary yearly.

[2]Cumulative total in September and October is zero as lake will be refilled to previous levels by September 30.

Table 4-6. Preferred Alternative 1C(b)—Worst Case Scenario in Dry Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0.33	0.65	0.98	1.31	0.97	0[1]	0.65[1]
Fish	27,500				0	0	0	0
Municipal/ Industrial	25,000				0	0	0	0
Cumulative Total	82,500	[2]	[2]	10.55	11.86	12.83[3]	0[3]	0[3]

-Period of time flow releases can occur.

[1]Odessa demand is supplied by Banks Lake in September and Lake Roosevelt in October. October demand on Lake Roosevelt includes September demands to refill Banks Lake.

[2]Not calculated as distribution of flow releases can vary yearly.

[3]Cumulative total in September and October is zero as lake will be refilled to previous levels by September 30.

Table 4-7. Alternative 1D—Demand Option in Drought Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0.33	0.65	0.98	1.31	0.98	0.50	0.17
Fish	44,500	2.43	2.44	2.43	0	0	0	0
Municipal/ Industrial	25,000	0.45	0.62	0.78	0.73	0.77	0.73	0
Interruptible Water Rights	33,000	1.08	1.09	1.08	1.09	1.09	0	0
Cumulative Total	132,500	4.29	9.09	14.36	17.49	20.33	0[1]	0[1]

[1]Cumulative total in September and October is zero as lake will be refilled to previous levels by September 30.

Table 4-8. Preferred Alternative 1E—Worst Case Scenario in Drought Year

Purpose of Flow Releases	***Total Released (acre-feet)***	***Difference in Lake Roosevelt Water Levels (inches)***						
		April	May	June	July	August	September	October
Odessa	30,000	0.33	0.65	0.98	1.31	0.98	0.50	0.17
Fish	44,500				0	0	0	0
Municipal/ Industrial	25,000	0	0	0				0
Interruptible Water Rights	33,000	0	0	0				0
Cumulative Total	132,500	[1]	[1]	9.26	[1]	21.05[2]	0[3]	0[3]

-Period of time flow releases can occur.

[1]Not calculated as distribution of flow releases can vary yearly.

[2]Assumes complete Municipal/Industrial, Fish, and Interruptible Water Rights flow released by August 31 and refilled by September 30.

[3]Cumulative total in September and October is zero as lake will be refilled to previous levels by September 30.

The maximum change in Lake Roosevelt elevations is approximately a 1-foot drawdown from existing operations. The maximum change occurs at the end of August, and decreases to zero at the end of September as the reservoir refills. For alternatives with releases to the Columbia River in September (Alternatives 1B(a), 1B(b), 1D), reservoir refill will occur in October as long as an elevation of 1,283 feet msl is reached by October 1 for kokanee spawning access.

The Preferred Alternative, Alternative 1C, has a maximum drawdown of 1.0 feet at the end of August in an average year and a maximum drawdown of 1.1 feet at the end of August in a dry year. The actual flow releases and resulting lake drawdown for the Preferred Alternatives will be determined by a panel of fisheries and water managers described in Section 2.3.1.

During drought years with additional release for downstream interruptible water rights and stream flow enhancement, the maximum change is estimated to be 1.7 feet at the end of August for Alternative 1D. The Preferred Alternative in a drought year, Alternative 1E, has a maximum drawdown of 1.8 feet at the end of August. This conservatively assumes the maximum flow releases from this proposal (44,500 acre-feet for fish, 25,000 acre-feet for municipal and industrial, and 33,000 acre-feet for interruptible water rights) will occur prior to the end of August. The actual flow releases and resulting drawdown will depend on the flow release schedule developed by the panel of fisheries and water managers.

Figures 4-1 to 4-4 illustrate the small difference in Lake Roosevelt water levels compared to the entire range of existing operations. Figure 4-5 provides a close-up view of the drawdown during the period of maximum drawdown and refill (June-September) for Preferred Alternative 1E.

Mitigation

No mitigation measures are proposed for surface water impacts because the drawdowns would be within the normal operating levels of Lake Roosevelt.

Water Quality

Water temperatures within and downstream of Lake Roosevelt are affected by the balance of inflows and outflows and the total surface area of the lake. Total dissolved gas (TDG) levels below Lake Roosevelt are affected by the volume of water released from Grand Coulee Dam.

Short-term impacts

No short-term impacts are anticipated because no new construction would be required.

Long-term/operational impacts

Lower Lake Roosevelt water levels are not expected to change the lake's overall thermal characteristics, including stratification. Additional drawdown would reduce the total depth or thickness of the water column. However, since maximum additional drawdown (1.8 feet or less) will occur during the summer when lake level is highest, the total range of water column thickness will remain virtually the same as under current conditions. Impacts, if any, would be related to a slight shift in the timing and duration of a given water column thickness. These impacts are not considered significant.

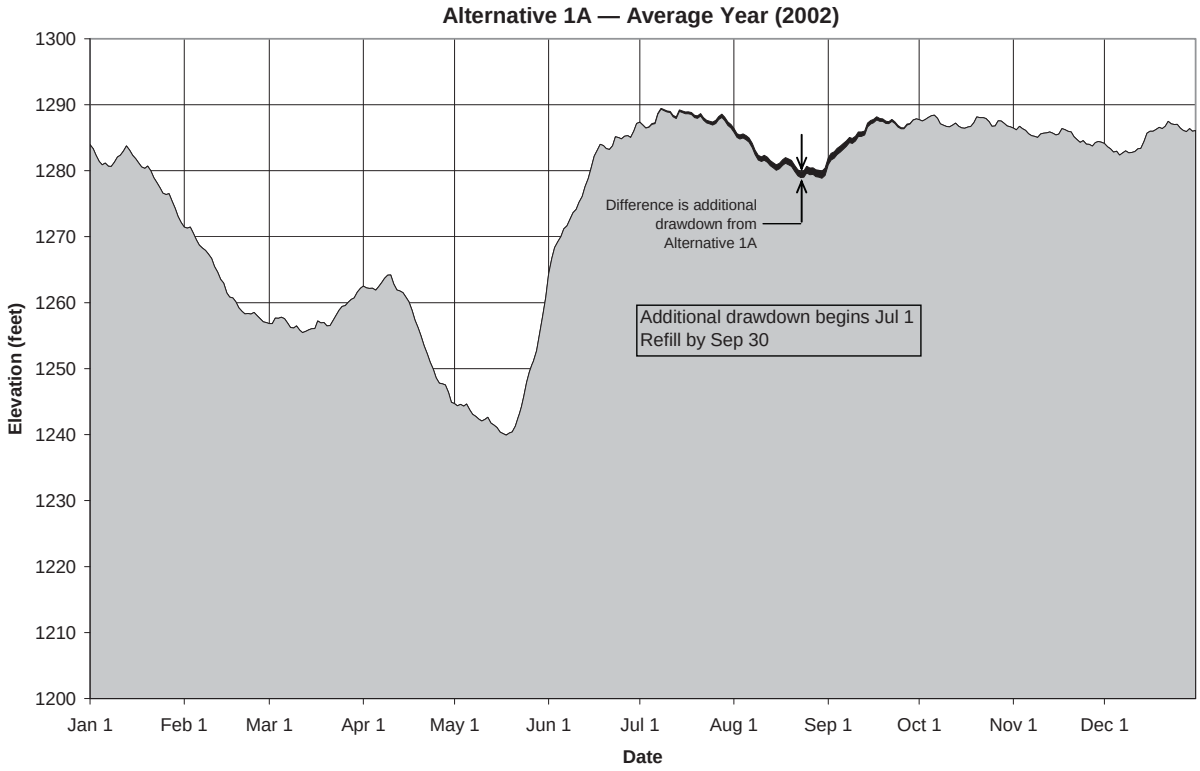
Mitigation

No mitigation measures are necessary because no impacts are anticipated.

4.2.1.4 Ground Water

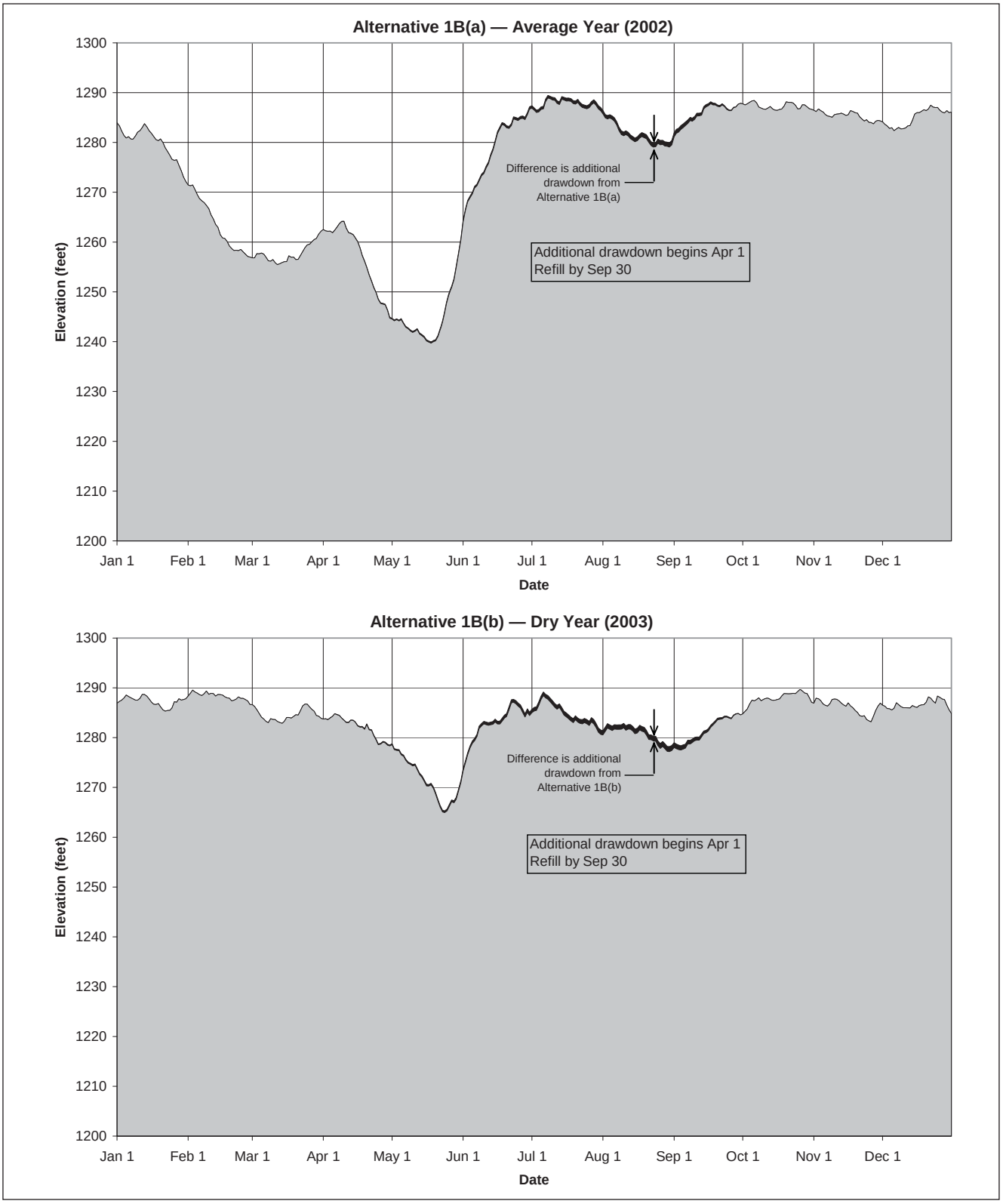
Water Quantity

Aquifers for wells located within 1 mile of Lake Roosevelt are generally in hydraulic connection with Lake Roosevelt. Ground water level elevations follow the same increases and decreases as observed in surface water level elevations of Lake Roosevelt.



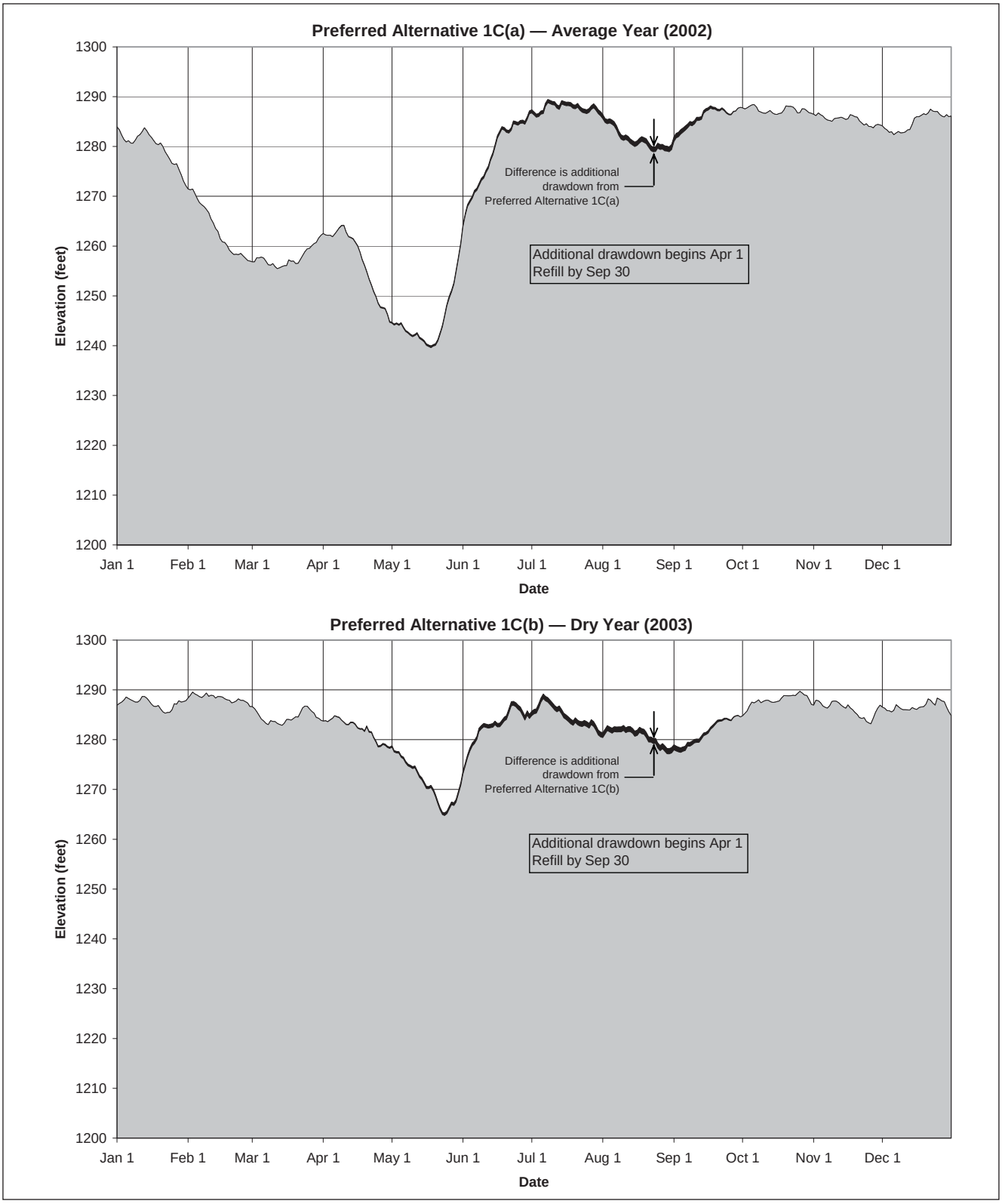
FILE NAME: Fig04-1_1A-2002.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 4-1
Lake Roosevelt Water Elevations — Alternative 1A



FILE NAME: Fig04-2_1B-2002-2003.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

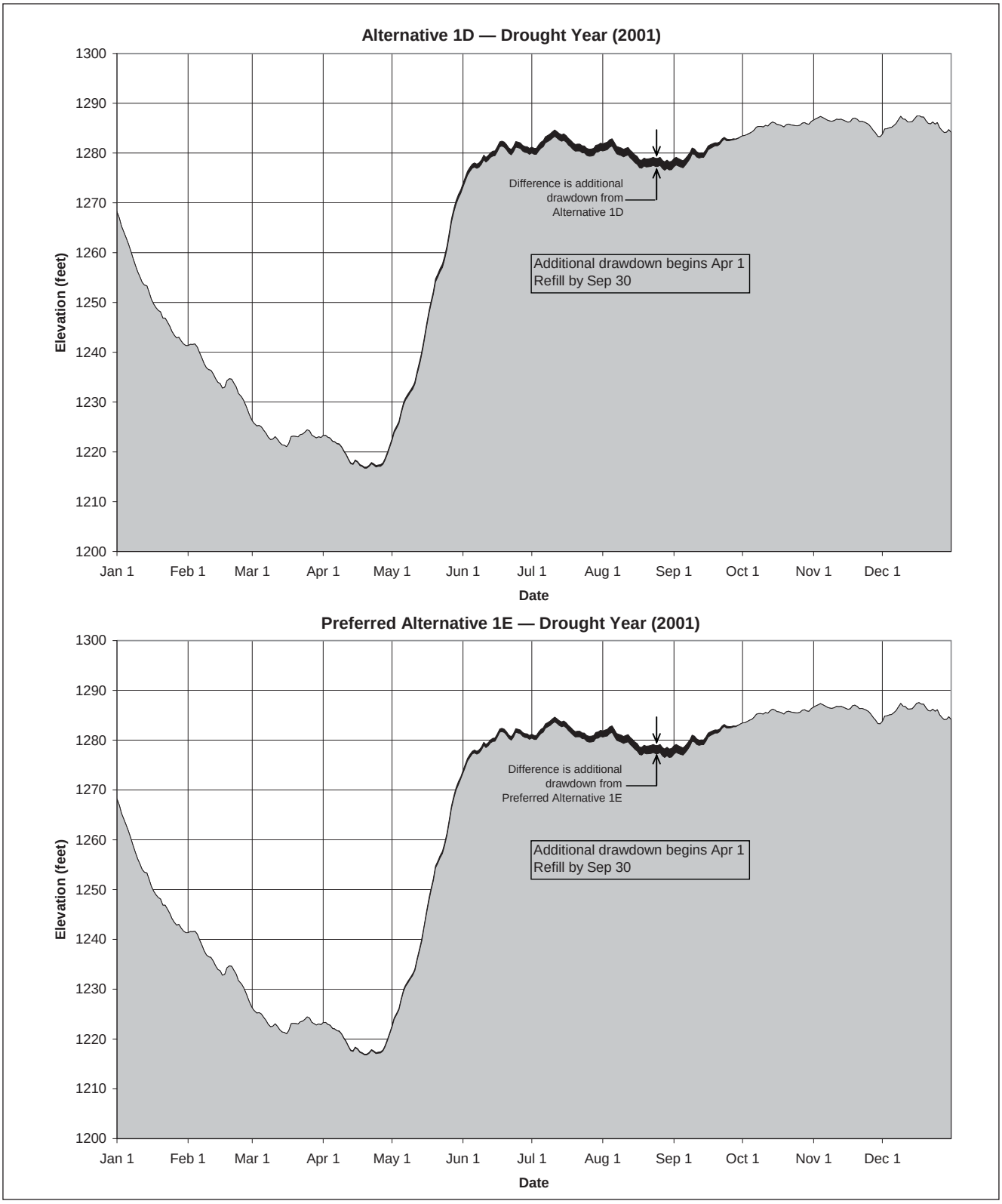
Figure 4-2
Lake Roosevelt Water Elevations — Alternative 1B



FILE NAME: Fig04-3_1C-2002-2003.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 4-3

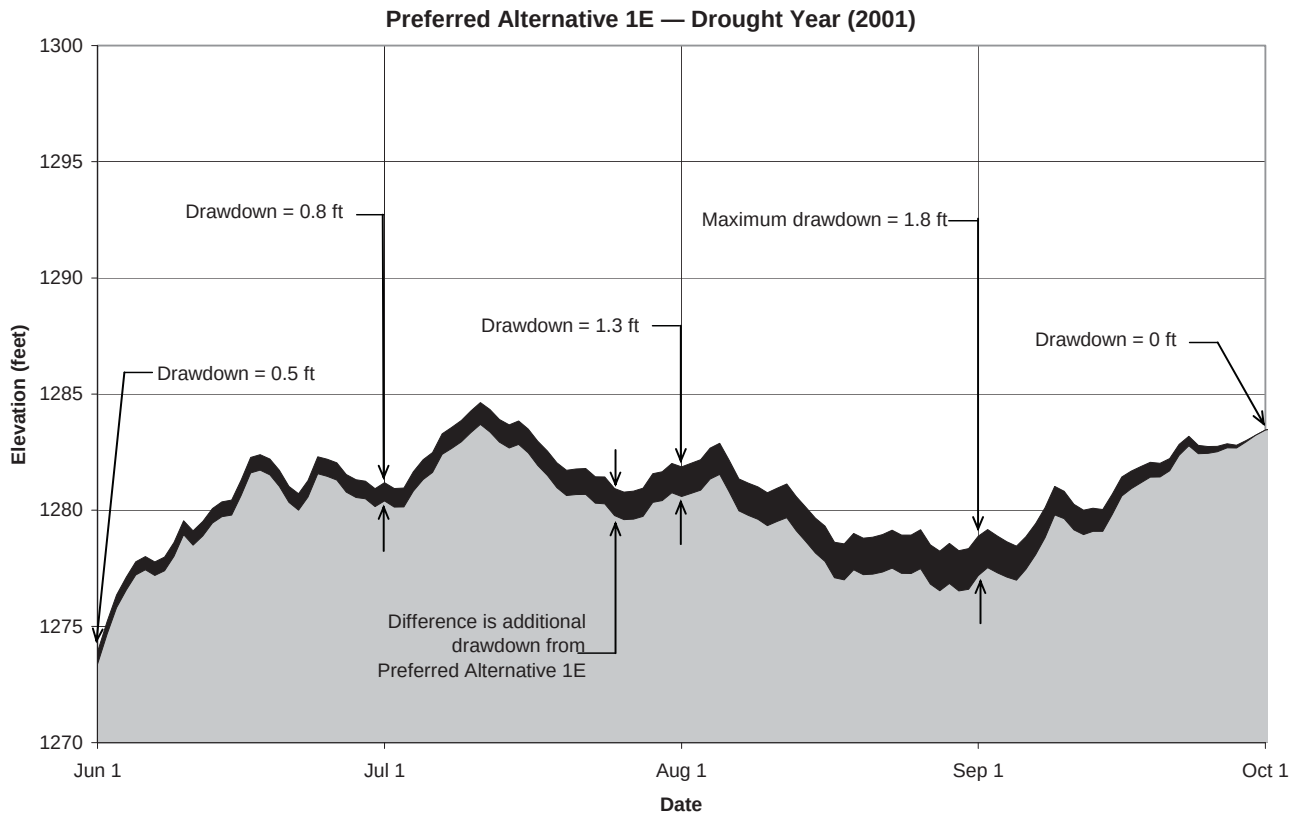
Lake Roosevelt Water Elevations — Alternative 1C



FILE NAME: Fig04-4_1D_1E.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 4-4

Lake Roosevelt Water Elevations — Alternatives 1D, 1E



FILE NAME: Fig04-5_1E_expanded.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 4-5

Lake Roosevelt Water Elevations — Alternative 1E (Expanded Scale)

Short-term impacts

No short-term impacts are anticipated because no new construction would be required.

Long-term/operational impacts

The Proposal includes a maximum 1.0 to 1.8 foot decrease in the water level of Lake Roosevelt for a short period at the end of August. A smaller decrease will occur from April up to August as additional water is withdrawn from Lake Roosevelt. Those decreases are shown in Tables 4-2 through 4-8. Wells that are hydraulically connected to Lake Roosevelt may see a smaller, but similar decrease in their static water level during the period of additional drawdown. The magnitude of these decreases is dependent on individual characteristics of the wells and nearby geology. The maximum additional drawdown will occur in late August, well after the period that Lake Roosevelt is lowest (prior to spring melt). The change in water levels in August is within the normal operating range of Lake Roosevelt. Existing wells that can operate over the current range of Lake Roosevelt water levels will not be affected by the additional drawdown. A slight increase in pumping head may result. The increase will be proportional to the decrease in static water level divided by the depth from the ground surface to the static water level. For example, a 1 foot decline in static water levels for a well with a 200 foot depth to static water level would cause a 0.5 percent increase in pumping head.

Mitigation

No mitigation measures are necessary because no impacts to ground water are anticipated.

Water Quality

Short-term impacts

No short-term impacts are anticipated because no construction would be required.

Long-term/operational impacts

Ground water quality is not significantly influenced by Lake Roosevelt since the ground water gradient appears to be toward the lake, not away from it. Therefore, operation of the lake, while it may influence ground water levels, should not significantly affect ground water quality over the long term.

Mitigation

No mitigation measures are necessary because no impacts are anticipated.

4.2.1.5 Legal Considerations

Water Rights

Short-term impacts

No short-term impacts to water rights are anticipated since there would be no construction.

Long-term/operational impacts

Reclamation has water rights for 6.4 million acre-feet of live storage in the reservoir and water rights to release approximately 3 million acre-feet for downstream consumptive

beneficial use.[1,2] Any additional releases from the reservoir will be authorized under secondary use permits issued by Ecology. One potential for impacts on other water rights is in drought years when Reclamation has agreed to release additional water for interruptible water right holders and to augment instream flow. However, Ecology may not grant the permits if additional releases would impair or adversely affect existing water rights from the reservoir. Therefore, no impacts to existing water rights are anticipated.

Mitigation

Mitigation would be required if the additional releases would adversely affect water right holders who divert from Lake Roosevelt. Any required mitigation would be determined by Ecology as the water right applications are processed.

Biological Opinion

Short-term impacts

No short-term impacts are anticipated.

Long-term/operational impacts

RPA Action 4 in the 2008 Biological Opinion addresses Storage Project Operations, including Grand Coulee operations. Operations include releasing flows from the reservoir to support salmon flow objectives during July and August, with a variable draft limit of 1,278 msl in dry years and to 1,280 feet msl in other years. The drawdown expected with the incremental releases from Lake Roosevelt ranges from 1,277.34 in dry years (2003) to 1,279.36 feet msl in average years (2002). With these releases, the reservoir would be drafted below the target in the Biological Opinion. However, the Biological Opinion recognizes the need for flexibility in the operations of Lake Roosevelt that may affect reservoir draft limits. RPA Action 14 calls upon the Action Agencies to coordinate use of this flexibility, including the need during dry years to distribute water across the expected migration season (NOAA Fisheries, 2008).

The Draft MOA between the CCT and the Action Agencies (CCT and Action Agencies, 2008) also calls for a study to evaluate lowering Lake Roosevelt to 1,278 feet msl only in the lowest 20 percent of water years and to 1,280 feet msl in all other water years. The Draft MOA calls for an investigation of Dry Water Year Operations other than summer drafting.

Section A.1.e(ii)(4) of the Draft MOA acknowledges the stream flow enhancement component of the Lake Roosevelt Incremental Storage Releases Project and calls for an investigation to evaluate the proposed release of water in April through June (rather than

---

[1] The water rights held by Reclamation were issued pursuant to the agency's withdrawal of the water from appropriation under RCW 90.40.030. The reservation need not be renewed because any withdrawal of water "associated with the Columbia Basin Project shall continue as withdrawn from appropriation, without need for periodic renewal, until the project is declared completed or abandoned by the United States acting by and through the secretary of the interior or such other duly authorized officer of the United States" (RCW 90.40.100).

[2] Reclamation has additional water rights for non-consumptive hydropower generation.

July and August) in the driest 20 percent of years to benefit Upper Columbia River out-migrants.

Mitigation

There will need to be on-going discussions and communication between the State of Washington, the Action Agencies, and the Tribes so that actions under all agreements and plans that relate to the operation of Lake Roosevelt are coordinated.

Canadian Treaty

Short-term impacts

The additional releases from the reservoir will have no short-term impacts on the Canadian Treaty because the releases are within the normal operations of Lake Roosevelt.

Long-term/operational impacts

The additional releases will have no long-term impacts on the Canadian Treaty because it is within the normal operation levels of the reservoir. The renegotiation of the Treaty may, however, have impacts on the water supply to Lake Roosevelt and the flexibility in how the reservoir is operated.

Mitigation

No impacts are anticipated and no mitigation is necessary. Any changes to reservoir operations as a result of future Treaty negotiations could require adaptive management which would be resolved in the Treaty negotiations.

4.2.1.6 Fish

Short-term impacts

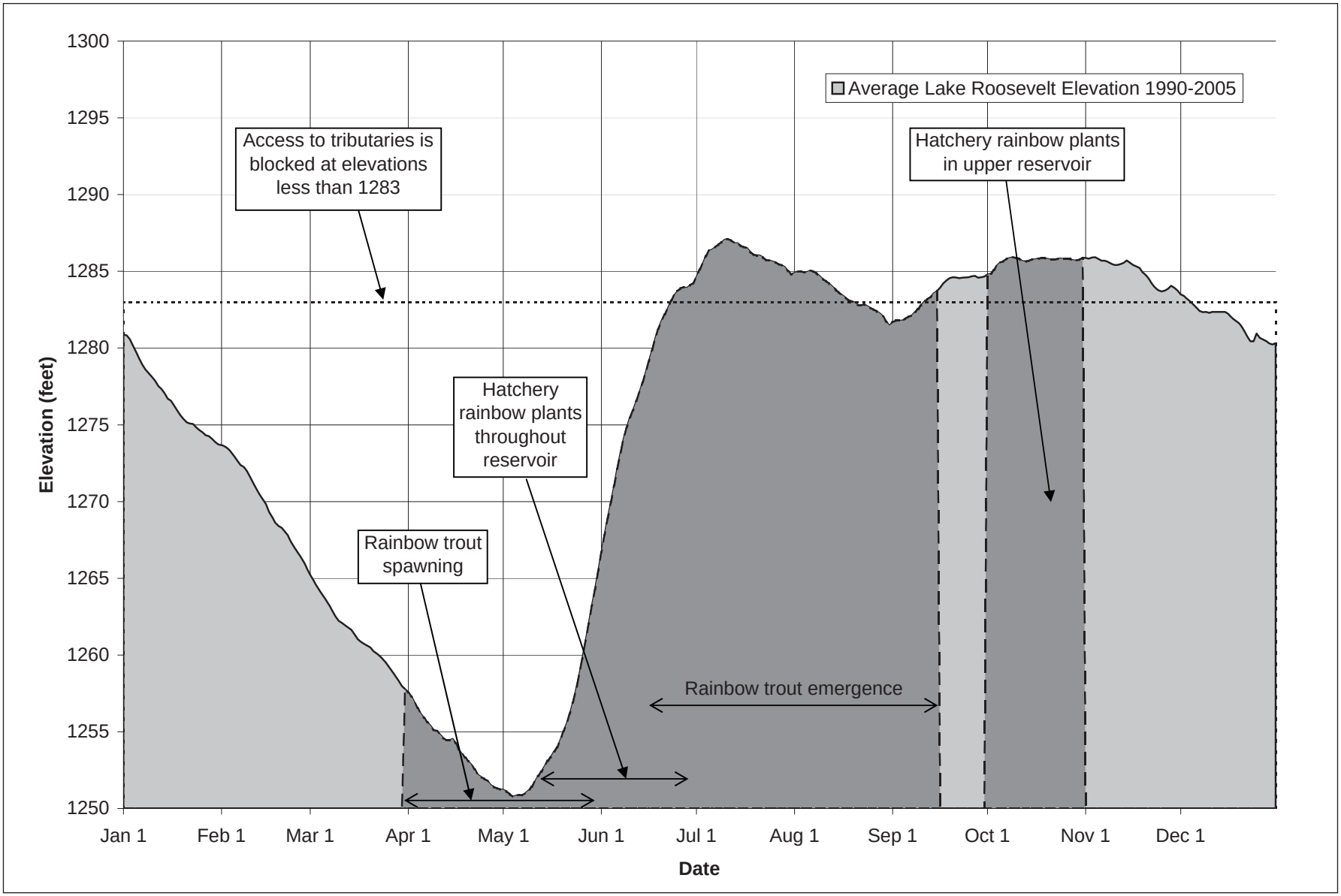
Infrastructure exists to implement the flow releases from Lake Roosevelt. Thus, short-term effects of construction activities are not anticipated.

Long-term/operational impacts

Drawdown

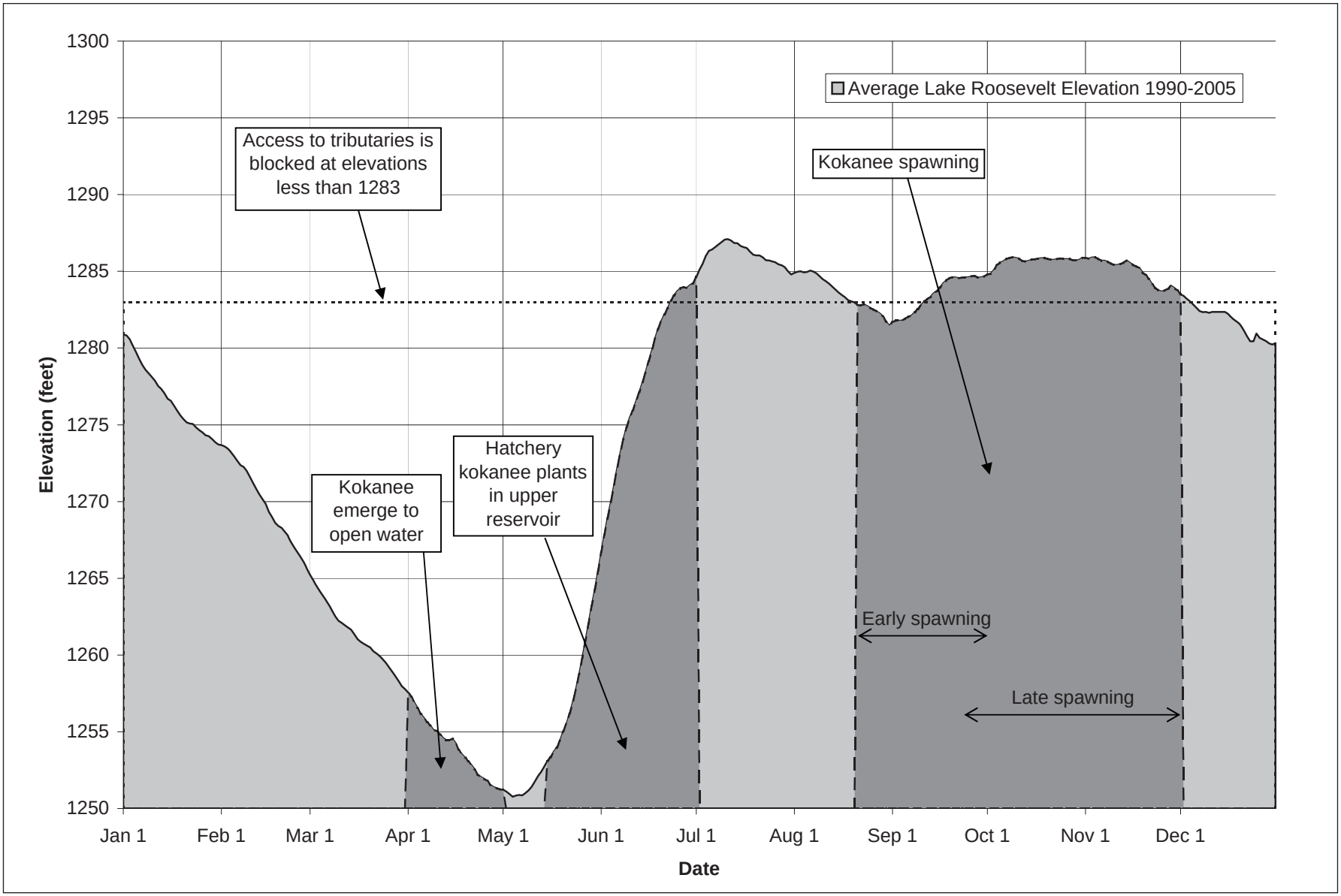
The magnitude, seasonal timing and duration of drawdown under the various release alternatives and options are summarized in Tables 4-2 through 4-8 and graphically shown in Figures 4-1 to 4-5. The annual volume of water released under each of the scenarios is fixed. Spreading the timing of the releases across a number of months under the alternatives decreases the relative level of drawdown, but extends the period of exposure. The worst-case drawdown of 1.0 and 1.1 feet under average and dry year conditions (96 percent of the time) are anticipated to occur annually at the end of August under Alternative 1A, 1B, and 1C. Drawdowns during the balance of the months for non-drought years range between 0.0 and 0.9 feet depending upon the alternative. The worst-case drawdown under drought conditions (Preferred Alternative 1E) is 1.8 feet during the end of August (Table 4-8, Figure 4-4). The seasonal timing of various life history stages of rainbow trout and kokanee salmon in the reservoir are shown in comparison to the annual average drawdown of Lake Roosevelt in Figures 4-6 and 4-7.

This section of the Supplemental EIS evaluates the influence of the anticipated drawdown on: (1) exposure of shallow lakeshore (littoral) habitats; (2) access of adfluvial stocks of fish to tributary waters of the lake; (3) hatchery enhancement programs in the lake via changes in reservoir residence time and fish entrainment; and (4) aquatic habitats in the Spokane River/Chamokane Creek area of the lake.



FILE NAME: Fig04-6_waterlevels_TROUT.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/13/08

Figure 4-6
Lake Roosevelt Water Elevations for Rainbow Trout



FILE NAME: Fig04-7_waterlevels_SALMON.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/13/08

Figure 4-7
Lake Roosevelt Water Elevations for Kokanee Salmon

Littoral Habitats

Lakeshore

As noted in Section 3.4.1.1, Lake Roosevelt water elevations during the late winter - spring drawdown period routinely vary between 25 and 80 feet and average 50 feet from full pool. The normal operating drawdown exposes a large area of lakebed along the shore, limiting vegetative growth and aquatic productivity in this zone (Stober et al., 1977; WDG, 1986; Sholtz et al., 1986; Voeller, 1993). The lack of stable littoral habitats in the lake has resulted in little macrophyte community growth and limited benthic macroinvertebrate assemblages (Voeller, 1993). Ultimately, the lack of aquatic productivity in littoral areas limits fish communities that rely on such habitats (Stober et al., 1977).

Kokanee Salmon

In their annual contract report to Ecology for the Columbia River Basin Water Management Program, WDFW suggested direct effects to kokanee salmon at the shoreline from the additional 1.0- to 1.8-foot drawdown would not be measurable in relation to the wide range of impacts from existing reservoir operations (WDFW, 2007). WDFW formed this conclusion because kokanee in Lake Roosevelt primarily utilize open water habitat. Indirect effects of the drawdown on kokanee salmon may occur with a loss of zooplankton and fish through entrainment. These effects are discussed in subsections below. Influences of reservoir operations on tributary access and hatchery programs for kokanee salmon are also addressed below.

RainbowTrout/White Sturgeon

Wild production of rainbow trout and white sturgeon is not dependent upon lakeshore spawning habitats that would be influenced by drawdown. Wild adfluvial populations of rainbow trout spawn in Lake Roosevelt tributaries, while white sturgeon use deep water portions of the riverine section of the upper reservoir for spawning generally upstream of the confluence of the Colville River. Additional drawdown would slightly increase the proportion of riverine habitats in the reservoir, but not likely to the extent of improving juvenile recruitment to the reservoir population. White sturgeon utilize benthic food sources and all life stages have been documented to use shallow water habitats at times. Thus, any change in benthic production in the reservoir could alter white sturgeon growth and rearing. The influences of reservoir operations on riverine spawning, tributary access, and hatchery programs for rainbow trout and white sturgeon are addressed below.

Embayments

Embayments throughout the reservoir provide the greatest surface area of shallow, warm water littoral habitats. These habitats support spawning and rearing of many spiny-ray game, non-game, and prey base species. The amount of surface area and seasonal frequency when the reservoir elevations fall between 10-foot increments of pool heights for 14 example embayments are shown in Table 4-9. The bathymetry of these selected embayments offers a sub-sample of the many similar embayments along the reservoir. The estimated potential amount of embayment surface area exposure under the worst-

case maximum monthly reservoir drawdown under Preferred Alternative 1C is shown in Table 4-9.

Table 4-9. Approximate Area Exposed in Select Shallow Water Embayments

Location		Area (acres)				
Region	Embayment	1280 – 1290[1]	1270 – 1280[1]	1260 – 1270[1]	1250 – 1260[1]	1240 – 1250[1]
Riverine	Kettle Falls River	1.8	5.7	8.2	15.6	48.1
	Colville River	4.2	3.4	3.7	5.9	6.1
	Marcus Flats	Contours to 1,275'		2.6	2.7	18.1
Transitional	Hall Creek Bay	1.5	0.8	0.8	0.8	1.4
	Nez Pierce Creek	1.9	1.6	1.0	1.0	1.0
	Wilmont Creek	3.1	3.9	1.8	1.8	2.7
	Nine Mile Bay	0.2	0.2	0.2	0.2	0.2
Impounded	Spokane River	1.4	1.4	1.5	1.7	3.0
	Hawk Creek Arm	3.6	2.7	2.2	1.7	2.6
	Swawilla Bay	5.3	5.7	5.2	6.9	7.1
	Welch Creek	0.2	0.2	0.2	0.2	0.5
	San Poil Arm	16.0	10.5	9.9	8.6	10.9
	Crescent Bay	0.4	0.4	0.4	0.4	0.4
	Porcupine Bay	1.5	1.9	1.7	1.5	1.4
Annual Duration (%)		60%	6%	10%	15%	8%
Season		Summer/ Winter	Winter/ Spring	Winter/ Spring	Winter/ Spring	Spring

[1]feet msl

The maximum drawdown of approximately 1 foot under Alternative 1A during non-drought years would occur at the end of August, a period when the reservoir level is typically between 1,280 and 1,290 feet msl. As a consequence, approximately 41 acres of shallow embayment habitat would be exposed with a 1-foot drawdown under average flow release conditions for the 13 embayments with bathymetric data at this elevation, or on average, approximately 3.2 acres per embayment.

The period of maximum exposure would be brief since refilling the reservoir commences within a week of maximum drawdown. The lakebed area exposed with the incremental flow releases is routinely exposed under normal lake level drawdowns. Thus, the existing habitat quality of this shallow littoral zone to support aquatic production is already severely compromised (see Drawdown section above). The effect of the additional drawdown associated with the incremental flow releases is incidental to the normal operation of Lake Roosevelt.

Access to Tributaries for Adfluvial Stocks (San Poil River Access)

The upper San Poil Arm near full pool consists of a large shallow flat. The longitudinal gradient of the channel where the river enters the embayment is approximately 0.2 percent slope (see Figure 6 in the Map Folio, most northern of the four San Poil Embayments figures). The shallowest portion of the Arm lies between elevation 1,280 and 1,285 feet msl. Operation of the lake under the reservoir rule curve strives to achieve a pool elevation of 1,283 feet msl during the fall months to provide sufficient water depth for the upstream migration of the local adfluvial stock of kokanee salmon. The release of fish-flows under normal operating conditions during July and August currently draws the reservoir down to near 1,280 feet msl in late August. Achieving an elevation of 1,283 feet msl upon refilling the lake in September generally occurs early in September under average reservoir conditions (Figures 4-1 to 4-5). However, this timeframe naturally varies between the first week and the last week of September depending upon hydrological conditions of the water year as shown in Table 4-10.

Table 4-10. Time to Refill the Reservoir to Elevation 1,283 feet msl in Fall with and without the Incremental Storage Releases Project

Water Year Condition	*Approximate Time to Elevation 1,283 feet msl*	*Change in Time to Elevation 1,283 feet msl with Releases*
Average	1st Week September	2 days
Dry	3rd Week September	1 day
Drought	4th Week September	0 days

The change in time to reach the desired lake elevation under the incremental flow releases would be minor. The anticipated worst-case delay of two days would represent less than 10 percent of the normal range in annual variation to achieve the target lake elevation. The influence of a one- to two-day delay on the upstream migration and spawning success of adult kokanee salmon would also be minimal. River entry of the fish is influenced not only by lake elevation, but by river water temperature, river flow and occurrence of a rainfall event in the San Poil subbasin to initiate migratory behavior in the fish. In addition, the influence on the spawning population is a factor of the proportion of fish in the population returning for entry into the river during the early part of September. River entry for the spawning migration of kokanee can occur anytime between late August and mid-November (LeCaire, 1999; McLellen and Sholz, 2003). As a worst-case assumption for this assessment, lack of achieving pool elevation of 1,283 feet msl is regarded as a complete barrier to upstream movement. As a worst-case

assumption for this assessment, lack of achieving pool elevation of 1,283 feet msl is regarded as a complete barrier to upstream movement.

An extra expenditure of energy for fish waiting to spawn is a general concern for all fisheries and especially for one defined as a critically low population like the wild San Poil kokanee salmon (LeCaire, 1999). Nevertheless, a one- to two-day delay in early September is normal for fish staging in the San Poil Arm waiting for river entry. It is unlikely the time to refill Lake Roosevelt under the proposed incremental flow releases would have a significant adverse effect on the spawning success of adfluvial kokanee salmon returning to spawn in the San Poil River.

Artificial Propagation (Kokanee, Rainbow Trout, White Sturgeon)

The influence of the drawdown on existing hatchery programs and recreational fisheries in the lake would be related to (1) the changes in standing stock of prey items (e.g., zooplankton biomass) as measured by differences in reservoir residence time in days; and (2) potential changes in entrainment of released hatchery fish past Grand Coulee dam. Both of these relationships are addressed for the various hatchery fish released in the reservoir in the subsequent paragraphs.

Reservoir Residence Time

As water particle residence time increases, primary productivity levels and zooplankton populations have an opportunity to expand. Correspondingly, Underwood and Shields (1996) showed zooplankton density generally decreased as water retention time decreased below 30 days. Zooplankton are the primary food source for kokanee, rainbow trout, suckers, whitefish, and fry life history stages of all species (Cichosz et al., 1999). Thus, it is possible that withdrawals that reduce water retention time can result in reduced food availability for fish and the overall fish carrying capacity of the lake. However, most researchers have noted the existing zooplankton biomass is not limiting fish production (Beckman et al., 1985; Sholtz et al., 1986; Peone et al., 1990; Voeller, 1993; Baldwin and Polacek, 2002).

A slight reduction in planktonic biomass of less than 1 to 2 percent during non-drought and drought conditions, respectively, as a result of reduced reservoir residence times is anticipated under the various flow release alternatives (Table 4-11). The minimal reduction should not adversely influence the capacity of the lake to support growth or rearing of either kokanee salmon or rainbow trout. Similarly, since white sturgeon primarily feed on benthic food sources, growth and rearing should not be negatively influenced by a slight change in reservoir residence time.

Table 4-11. Estimated Change in Reservoir Retention Time (days) Compared to Current Conditions

Alternative				*Water Particle Retention Time*		
Maximum Monthly Outflow				*Baseline*	*With Proposal*	*Difference*
Alternative	*Outflow (cfs)*	*Month*	*Drawdown (feet)*	*Days*	*Days*	*Days (%)*
Example at 1,280 feet msl - **Average Year** - 1-foot elevation change						
1A	428	August	1,279	46.0	45.8	0.2 (0.4%)
1B(a)	183	August	1,279	46.0	45.9	0.1
1C(a)	0-855	August	1,279	46.0	45.6-46.0	0-0.4 (0-0.8%)
Example at 1,280 feet msl - **Dry Year** - 1-foot elevation change						
1B(b)	234	June	1,279	41.4	41.3	0.1 (0.2%)
1C(b)	0-844	June	1,279	41.4	41.1-41.4	0-0.3 (0-0.7%)
1C(c)	271	July	1,279	83	82	1.2 (1.5%)
Example at 1,280 feet msl - **Drought Year** - 2-foot elevation change						
1D	441	June	1,278	64.7	64.3	0.4 (0.6%)
1E	0-945	July	1,278	100.3	98.5-100.3	0-1.7 (0-1.7%)

Fish Entrainment

Kokanee Salmon/Rainbow Trout

A strong relationship exists between the volume of reservoir drawdown and the entrainment of fish in water passing Grand Coulee Dam for both kokanee and rainbow trout (see Section 3.7.1). For this assessment, it is assumed fish lost to the lake via entrainment are a detriment to the artificial propagation programs designed to increase recreational fisheries in Lake Roosevelt. It is conceivable that entrained hatchery fish contribute to fisheries downstream in the mainstem Columbia River reservoirs of Lake Rufus Woods and Lake Pateros; the reservoirs of Rock Island, Rocky Reach, Wanapum, and Priest Rapids dams; and the Hanford Reach.

The highest potential monthly outflow for all of the flow release alternatives remains less than 2 percent of the normal outflow at Grand Coulee Dam (Table 4-12). This small increase in outflow volume would have a very minor influence on the current level of fish entrainment past the dam.

Hatchery management programs responded to reports of increased entrainment associated with steep levels of reservoir drawdown by focusing release strategies on larger (post-smolt) size fish, and releasing fish later in late-May and early June when the reservoir begins its refilling phase. Additional emphasis on the use of local sources for broodstock to overcome a prevalence for juveniles to move downstream in the spring (simulated outmigration patterns) has the potential to improve the retention of hatchery-released fish in the lake for increased return to the fishery.

Table 4-12. Maximum Monthly Outflow under Various Flow Release Alternatives Compared to Existing Conditions

Alternative	*Maximum Monthly Outflow (CFS)[1/]*	*Peak Month*	*Existing mean monthly discharge at GCD (CFS)[2/]*	*Increase in outflow (%)*
Average Year				
1A	428	August	110,400	0.39
1B(a)	183	August	110,400	0.17
1C(a)	0-855	August	110,400	0-0.77
Dry Year				
1B(b)	234	June	122,400	0.19
1C(b)	0-884	June	122,400	0-0.72
Drought Year				
1D	441	June	78,400	0.56
1E	0-945	July	50,600	0-1.87

[1]Flow volumes include both withdrawals and flow releases past Grand Coulee Dam.

[2] Source: USGS Gauge# 12436500 Columbia River at Grand Coulee, Washington.

White Sturgeon

White sturgeon annually released into the lake during the month of May would not be adversely influenced by entrainment under the flow releases project. Preferred habitats of white sturgeon occur in the riverine portion of the reservoir, upstream of the confluence of the Colville River. With the use of radio telemetry, sturgeon have been tracked downstream to near the confluence of the Spokane Arm. Nevertheless, these fish are not

known to be subject to entrainment differences with changes in drawdown patterns (LeCaire, 1999; Simmons et al., 2002).

Summary of Effects on Lake Roosevelt Hatchery Programs and Recreational Fisheries

A review of the factors related to reservoir drawdown with a potential to influence artificial production programs in the lake indicates the flow release alternative scenarios would not materially change the existing lake conditions or influence the hatchery production programs. It is unlikely that anglers would be able to detect a difference related to slight changes in populations of game fish resulting from alterations in lake residence time or entrainment.

Spokane River/Chamokane Creek

Drawdown of Lake Roosevelt under any of the flow release alternatives is not anticipated to measurably influence ground water levels in the Spokane basin (Section 4.1.1.4). As a consequence, surface water conditions in the Spokane River subbasin and in Chamokane Creek upstream of full pool reservoir elevation 1,290 feet msl will not be modified. Corresponding changes to aquatic habitats or species are not anticipated under any of the alternatives.

Mitigation

Releases of fish flows to benefit off-site fisheries, described in the Programmatic EIS (Ecology, 2007), are designed to offset the minor effects that may occur to Lake Roosevelt fisheries. Per the recommendation of WDFW, a slight reduction in zooplankton with reduced reservoir residence time and an increase in fish entrainment due to the additional drawdown associated with the incremental flow releases may be mitigated with changes to the current artificial production supplementation program (WDFW, 2007).

4.2.1.7 Wildlife and Plants

Changes to emergent and riparian vegetation, nesting waterfowl and breeding amphibians are the potential impacts associated with the additional drawdown of Lake Roosevelt. The magnitude and extent of these impacts is dependent on the time of year, the number of days the reservoir is drawn down, and the extent of area exposed. Impacts to federal and state-listed plant and wildlife species were previously discussed in the Programmatic EIS (Ecology, 2007).

Short-term impacts

No short-term impacts to wildlife habitats or plants are anticipated from the Proposal for the drawdown of Lake Roosevelt because no new infrastructure is required to implement the flow releases.

Long-term/operational impacts

Vegetation

The distribution and abundance of emergent and riparian vegetation along the Lake Roosevelt shoreline would not measurably change as a result of the Proposal. As discussed in the Programmatic EIS and in Section 3.8.1, the normal operating drawdown of Lake Roosevelt currently negatively affects littoral habitats and vegetation. Due to

reservoir fluctuations, there is limited production of emergent and aquatic bed vegetation near the shoreline (Voeller, 1993). Under the Proposal, the additional drawdown of 1 foot during non-drought years is within the normal operation levels of the reservoir. The maximum additional drawdown would occur when the lake level is currently between 1,280 and 1,290 feet msl (at the end of August). The vegetation communities below this level would have developed under the fluctuating conditions and have been previously exposed as a result of normal reservoir operations.

Changes to littoral habitats within 14 example embayments along the impounded, transitional and riverine sections of the reservoir are shown in Table 4-10. Within these selected embayments, between 35 and 45 acres of littoral zone habitat would be exposed after the additional 1-foot drawdown. These areas would have also been previously exposed during normal reservoir operations earlier in the summer, prohibiting the growth of emergent and aquatic bed vegetation as well as stranding aquatic nuisance species (i.e., Eurasian watermilfoil). In addition, the period of maximum exposure would be less than a week, as normal operations include refilling the reservoir beginning in early September to meet target lake levels for kokanee salmon. Thus, the additional drawdown will not have a measurable effect on vegetation distribution and abundance within the selected embayments. The one week of additional exposure is not likely to result in a significant increase in aquatic nuisance weed species. Thus, the extent of vegetation in these areas will likely continue in a similar manner as it is currently.

The additional 0.5 feet of drawdown under drought conditions would not have a discernable effect on the establishment of aquatic plants and riparian vegetation. The additional drawdown during drought years would result in a slight increase in the distribution and abundance of aquatic nuisance weeds such as Eurasian watermilfoil in shallow water areas or embayments. However, this increase is considered to be minimal because the period of maximum exposure would be less than one week and non-drought years do not occur every year. The low frequency of both drought events and days of exposure attributable to the storage releases of the Proposal are not anticipated to create a significant increase in the growth of Eurasian watermilfoil.

Nesting Waterfowl and Breeding Amphibians

As discussed in the Programmatic EIS and in Section 3.8.1, the lack of stable littoral habitats along the shoreline of Lake Roosevelt prevents the formation of extensive emergent and riparian vegetation suitable for wildlife breeding and roosting. Nesting waterfowl and breeding amphibians that do find suitable habitat are currently impacted by the rapid drawdown in spring, resulting in losses each year. The additional drawdown of the lake is not anticipated to increase the current level of impact substantially, but will expose slightly more surface area in shallow waters (Table 4-10). Between 35 and 45 acres of shallow embayment habitat within the 13 selected embayments would be exposed under the additional drawdown. However, the worst-case scenario under drought conditions would occur at the end of August and after the height of the spring breeding season for many amphibians and waterfowl.

In summary, given the large volume of water held by the lake and the extreme fluctuation of water levels under normal operating conditions, the additional changes that would occur to wildlife as a result of the additional drawdown under both non-drought and drought conditions are generally within the range of fluctuations that currently exist.

Mitigation

No mitigation is proposed for impacts to wildlife and plants.

4.2.1.8 Cultural Resources

Short-term impacts

No new short-term impacts to cultural resources are anticipated as a result of the Proposal as there is no construction associated with this alternative.

Long-term/operational impacts

Potential impacts to cultural resources were described in Section 5.1.1.9 of the Programmatic EIS. No new long-term/operational impacts to cultural resources are anticipated as a result of incremental storage releases. Under the various alternatives, additional drawdowns will occur at different times of the year than under current operations. However, under all alternatives, the drawdowns during peak recreation season are anticipated to be small and within normal operational range. The NPS has identified sites on its managed lands that would be exposed by the Proposal during the peak recreation season.

Mitigation

The State of Washington has entered into Water Resource Management Agreements with the CCT and the STI to mitigate effects of the storage releases including effects to cultural resources (Washington State and CCT, 2007; Washington State and STI, 2008). These agreements provide for full mitigation of potential effects to cultural resources within each tribe's Lake Roosevelt management area therefore no additional mitigation measures are proposed. Ecology will coordinate with NPS to develop appropriate mitigation for potential impacts to cultural resources on NPS managed lands.

4.2.1.9 Environmental Health

Short-term impacts

As described in the Programmatic EIS, drawdowns from Lake Roosevelt occur on a daily and seasonal basis, and no construction or short-term activities would be necessary to accomplish the additional drawdowns for this project.

Long-term/operational impacts

Alternative 1A

Alternative 1A proposes releases during July and August only and a maximum drawdown of 1 foot. While the additional drawdown of 1 foot is within the normal operation levels of the reservoir, some increased environmental health risks might be present due to the timing of drawdown during summer months when recreational lake use increases.

Contaminated Sediments

Drawdowns at Lake Roosevelt increase the potential for contaminated sediment exposure. Lower lake levels during summer months could leave contaminated sediments exposed and prone to drying. Concern has been raised that dry sediments could then become airborne, carrying toxic metals and organic compounds (Office of Governor Christine Gregoire, 2005). Increased recreational use of Lake Roosevelt during summer months could therefore increase chances of the public coming into contact with exposed or wind-blown contaminated sediments. Exposure and movement of contaminated sediments and pore-water chemistry could also increase fisheries contact with contamination, providing another exposure pathway to the public, especially anglers. The area of sediment that will be exposed by the incremental storage releases is within the area exposed by current operations; however, the drawdown would occur at a period when recreation use of the lake is highest.

Teck Cominco and the EPA are currently conducting a Remedial Investigation and Feasibility Study (RI/FS), which will include human health and environmental risk assessments of contaminated sediments in Lake Roosevelt. Results of the RI/FS will not be available for this Supplemental EIS, but will be considered by Ecology upon completion.

Swimming and Boating Hazards

Lower lake levels during summer months at periods of high recreational use may result in increased swimming and boating hazards. Elevation increases of docks above the water surface present falling hazards for both boaters and swimmers. Lower lake levels may also present diving hazards in shallow areas and draw swimmers away from designated swimming areas in search of more ideal swimming conditions. Drawdowns also increase the risk of boaters coming into contact with bottom hazards and shallow waters, presenting navigational hazards.

Sanitation

Minimal decreases in lake elevation that do not affect recreational use of campgrounds and swimming areas could lead to an increase in total beach area, therefore increasing the amount of area susceptible to improper sanitation practices (e.g., human waste deposition). However, additional human waste deposition would not necessarily be expected with increased beach area as the number of recreational users is not expected to increase significantly.

As described in the Programmatic EIS, Grand Coulee Dam currently regulates Lake Roosevelt water levels between 1,208 feet msl and 1,290 feet msl, with lake levels varying throughout the year. Fluctuations in water levels (e.g., reservoir drawdowns) have been noted as an effective method of control for mosquito populations (Snow, 1956 and Hess and Kiker, 1943 in Reclamation, 2004). Drawdowns during summer months will help control mosquito populations at Lake Roosevelt by limiting mosquito habitat near vegetated shores.

Other Alternatives

The impact of Alternatives 1B and 1C are generally similar to Alternative 1A. Exposure of slightly more surface area in shallow waters at the end of August could mean more risk of exposure to contaminated sediments and an increase in swimming and boating hazards; however, the slight increase in the current level of impact is not considered to be significant. The drought year alternatives 1D and 1E would increase the maximum drawdown to 1.8 feet and slightly increase the risk of exposure to contaminated sediments and swimming and boating hazards. These impacts are not expected to be significant.

Mitigation

Contaminated Sediments

Teck Cominco and the EPA are conducting a human health and ecological RI/FS to determine future hazardous substances remediation and mitigation needs. That process has just begun, and the results of that body of study will not be available for this Supplemental EIS. These documents are expected to guide mitigation of impacts from contaminated sediments upon their approval by EPA. If it is determined that the Proposal negatively impacts the environment by re-entraining pollutants into the air or water, the State will establish a working group with the CCT to develop mitigation measures and pursue funding for those measures (Washington State and the CCT, 2007).

Swimming and Boating Hazards

The State of Washington has signed Water Resource Management Agreements with the CCT and STI to mitigate potential effects of the drawdown. The state will finance improved lake access facilities. These improvements are expected to include extending boat ramps, modifying boat docks and swimming areas, and other retrofitting of facilities to accommodate lower lake levels.

Sanitation

The NPS is developing a Shoreline Management Plan that will address sanitation issues along Lake Roosevelt. The NPS is also increasing educational outreach and has printed brochures for distribution concerning sanitation requirements. Further outreach efforts and additional sanitary services are being considered.

Mosquitoes

Drawdowns occurring in late summer would likely reduce mosquito breeding habitat; therefore, no mitigation is proposed.

4.2.1.10 Recreation and Scenic Resources

Short-term impacts

As described in the Programmatic EIS, storage releases from Lake Roosevelt occur on a daily and seasonal basis, and no construction or short-term activities would be necessary to accomplish the additional storage releases for the Proposal.

Long-term/operational impacts

An engineering analysis to assess the impacts of the alternative release scenarios on NPS recreational facilities was completed following the issuance of the Draft Supplemental EIS. The results of this analysis are incorporated into the discussion below (KPFF, 2008; Appendix G, *Lake Roosevelt Shoreline Management Waterfront Facilities Drawdown Impact Study*).

Drawdown

The drawdown was evaluated according to magnitude, seasonal timing, and duration under the various operational scenarios to assess the potential impacts to recreation facilities. Impacts can occur if the Proposal were to affect the predictability of lake levels and facility availability, require retrofitting or additional maintenance of facilities, or result in the loss of recreational use.

The primary facilities that could be affected by additional drawdowns on the lake would be boat ramps, mooring docks, swimming beaches, and camping areas. Fluctuation in pool elevations is a normal aspect of reservoir operations, and facilities have been designed and operated to accommodate these fluctuations. While the proposed drawdowns would not produce lake levels outside the range of historical seasonal fluctuations, the project likely would cause the lake's surface to fall to levels that interfere with shore facilities earlier in the summer than currently occurs, and, for some years, expand the number of days in which some water-related recreational activities are restricted. These changes could result in changes in operation costs and temporary closures at some facilities.

The maximum drawdown of approximately 1 foot under non-drought conditions in Alternatives 1A, 1B, and 1C (96 percent of the time) and 1.8 feet under drought conditions in Alternatives 1D and 1E (4 percent of the time) is anticipated to occur annually with the greatest potential for impacts for a few days or weeks at the end of August.

Boat Ramps and Moorage Facilities

Comments received on the Draft Programmatic EIS suggested that even small lowering of lake level during the month of August could result in impacts to water-dependent facilities. At lower lake levels, some boat ramps and mooring docks that are currently operable in August may be limited by water depth, boat draft, and siltation. While most facilities are designed to accommodate the wide fluctuations that already occur, some facilities would need to be retrofitted, relocated, or temporarily closed. The NPS extended many boat ramps after the year 2000 to be operable during lower lake levels and further opportunities to extend launch ramps lower are limited (Dashiell pers. comm., 2008).

Of the four marinas on the lake, three have boat ramps that are accessible at low lake levels. The only marina that does not have low-level access is also the only marina on the Spokane Arm of the lake. This suggests potentially greater vulnerability of the Spokane Arm region of the lake than the main body of the lake to boat access impacts. NPS boat ramps that are not currently designed to function at lower lake elevations

(below 1,280 feet) and the expected impact to these facilities under the release alternatives are shown in Table 4-13.

Table 4-13. NPS Boat Launches with Minimum Boat Launch Operating Elevations of 1,280 Feet msl or Lower

Facility	Minimum Launch Elevation	Impacts
Hawks Creek, Lincoln Co.	1,281	No new impact
Marcus Island, Stevens Co.	1,281	No new impact
Evans, Stevens Co.	1,280	Slight impact in average or wet year only
North Gorge, Stevens Co.	1,280	Slight impact in average or wet year only
Napoleon Bridge, Ferry Co.	1,280	Slight impact in average or wet year only
China Bend, Stevens Co.	1,280	Slight impact in average or wet year only
Kettle Falls	-	No new impact to swim area
Kamloops	-	No new impact. Courtesy dock on dry land above 1,280 feet
Kettle River	-	No new impact. Courtesy dock on dry land above 1,280 feet

Source: KPFF, 2008

In average years (Preferred Alternative 1Ca and Alternatives 1A and 1Ba), the additional flow releases would lower the lake level to approximately 1,279 feet at the end of August (1 foot lower that current lake elevations at this time of the year during average or wet years). This drawdown elevation remains within the current normal range of summer elevations during dry or drought years. Although the influence of the additional 1-foot drawdown at the end of August is expected to be minor relative to existing reservoir operational impacts on recreational facilities, certain boat ramps and moorage facilities that are currently not affected during average or wet years could be affected. Hawks Creek and Marcus Island boat ramps currently experience lake level drops below their recommended launch elevation each year during the summer season. Because they are already not recommended for use at that time of year, the additional drawdown is not expected to affect those facilities. Evans, North Gorge, China Bend, and Napoleon Bridge boat ramps experience lake elevations below minimum launch elevations at the end of August during dry and drought years. The boat ramps are not typically closed at the listed elevations. Site inspections revealed that all but very large boats and trailers could

continue to use the ramps with the new drawdown elevation of 1,279 feet (KPFF, 2008). In dry years (Preferred Alternative 1Cb and Alternative 1Bb), the additional storage releases would lower the lake level to approximately 1,277 feet at the end of August (1.1 foot less than the current operating elevation at the same time of the year in dry years). Impacts would be similar to those described below for drought years.

Under drought conditions , the additional flow releases would lower the lake level to approximately 1,276 feet at the end of August under Preferred Alternative 1E and the end of September under Alternative 1D(1.8 feet lower that current lake elevations at this time of the year during a drought year). This would occur approximately 4 percent of the time. The primary impact would be less usable dock area for courtesy docks (floating dock sections next to boat ramps). In addition to the boat ramps impacted during an average or wet year, one additional ramp, Snag Cove, would be impacted under the Preferred Alternative 1E and Alternative 1D. The Snag Cove boat launch is listed as having a recommended minimum lake elevation of 1,277 feet. The proposed drought drawdown elevation is 9.5 inches lower than this recommended elevation. The recommended minimum lake boat launch elevations are typically conservative and are expected to impact only very large boats. It is estimated that few, if any people, will be unable to launch at this ramp during the proposed drought year drawdown (KPFF, 2008).

Of the three regions on the lake (Kettle Falls, Fort Spokane, and Spring Canyon), each region has at least two boat ramps that will be operable at a level down to 1,275 feet during drought conditions. It is expected that some slip areas would not be operable within the Seven-Bays Marina. The marina would remain accessible, but boat moorage would decrease if docks could not be retrofitted to allow for temporary relocation.

Based on boat ramp use data from the most recent drought year (2001), if ramps become inoperable, use is expected to shift to other boat ramps, as currently occurs when lake levels reach this elevation. While the additional use at the operable boat ramps could cause increased congestion and a decrease in the overall quality of the recreation experience, evidence suggests that overall boat ramp visitation would not decline during July and August. Thus, the increase in the current level of impact on boat ramps is not considered to be significant. See Section 4.1.1.11, Socioeconomics, for additional information. If lower lake levels were to impact the availability of moorage slips, significant adverse effects to boating could occur. This would be most likely to occur under drought conditions (Preferred Alternative 1E and Alternative 1D).

Swimming and Boating

At lower water levels, some developed swimming areas that are currently operable in August may be affected by the additional drawdown. The main impact would be less surface area and depth of water in enclosed swimming areas. This would be more likely to occur under drought conditions (Preferred Alternative 1E and Alternative 1D). At lower lake levels, sandy beach areas may be far from the water's edge with unattractive and unappealing mud flats being exposed. This would discourage swimming and other beach activities. Swimming floats could be beached or water levels could become too shallow for use. Depending on the extent of exposure, changes may have adverse effects and lead to decreased visitor use at those recreation areas. Preliminary information

indicates the drawdown may cause the swimming hole at AA Campground to become inoperable at the end of August.

Lower lake levels during summer months at periods of high recreational use may also result in increased swimming hazards. Lower lake levels may present diving hazards in shallow areas and draw swimmers away from designated swimming areas in search of better swimming conditions.

Channels used to navigate from the water access sites could be affected if water levels are too low to allow the safe passage of watercraft. Boats with greater draft requirements, such as sailboats, would be particularly affected by shallower channel depths. Navigation hazards and shallow waters require boaters to take detours around inaccessible areas. Additionally, as reservoir elevations lower and surface area decreases, congestion may become more noticeable in popular areas that receive high-use or where narrow channel corridors exist.

Camping

Lower lake levels under the additional drawdown may also reduce the attractiveness of certain campgrounds and cause recreational users to recreate in more remote locations or go elsewhere. This would be more likely to occur under drought conditions (Alternatives 1D and 1E). Because of their remote locations, management of dispersed camping areas is an ongoing challenge and an increase in dispersed camping would add to the management burden. Lower lake levels could also make patrol of dispersed camping areas by boat more difficult. The NPS is developing a plan to assess damage and manage dispersed sites along the shoreline.

Scenic Resources

Lower lake levels would create a change in the viewscape, as more of the shoreline would be exposed. This would be most noticeable for a few days under drought conditions (Preferred Alternative 1E and Alternative 1D). Once the drawdown is over, lake levels would increase. The proposed drawdown would have no long-term adverse impacts to scenic resources in the area.

Mitigation

In addition to the mitigation described in the Programmatic EIS, the state of Washington and the Spokane and Colville tribes have signed agreements to mitigate effects of the drawdown by providing financial compensation for impacts on the tribes.

The Washington State Department of Ecology provided funding to the NPS to conduct an engineering analysis to assess the impacts of the alternative release scenarios on their recreational facilities. The results of this analysis were incorporated into the Final SEIS and are included in the *Lake Roosevelt Shoreline Management Waterfront Facilities Drawdown Impact Study* (KPFF, 2008; Appendix G).

The *Lake Roosevelt Shoreline Management Waterfront Facilities Drawdown Impact Study* (2008) recommends specific retrofit measures to address drought year impacts on NPS boat launch and swimming facilities. Mitigation measures for courtesy docks typically involve adding an additional dock section to the end of the existing dock system to maintain the same useable length of dock for the end of August water levels. Shifting

docks to slightly deeper water where possible is recommended for maintaining usability at marina docks during August. Mitigation measures for swimming beaches typically involve lengthening log boom systems and extending the booms into deeper water. Recommended mitigation measures for specific facilities are included in Appendix G.

In addition, Ecology is funding a portion of the NPS shoreline management program to more specifically assess the impacts of the alternative release scenarios on NPS facilities and to address needed management actions for current and future conditions. The results of these studies will be incorporated into an adaptive management plan. The adaptive management plan will prioritize and implement specific mitigation measures recommended in the studies to address the impacts.

4.2.1.11 Socioeconomics

The following information suggests that the Proposal will not have socioeconomic impacts on the local economy different from those arising from the current management of Lake Roosevelt. Instead, additional drawdowns resulting from the Proposal likely would add incrementally to the existing impacts. There may be new impacts at other areas.

Short-term impacts

There would be no short-term impacts to socioeconomics because no construction is required to implement the incremental flow releases project.

Long-term/operational impacts

Research suggests that reservoirs have more recreational use value at high levels than at low levels. A study conducted in 2005 of Lake McConaughy in Nebraska found that, recreationists were willing to pay $14.43 per visitor-day of recreation at the lake, but would be willing to pay an additional $1.42 per visitor-day if the reservoir were maintained at a slightly higher level. When the reservoir is at 20 percent of capacity, adding 100,000 acre-feet would increase total recreation value by $1.4 million per year (Supalla, 2005). Lower water levels in reservoirs correlate with fewer visits by anglers and other recreationists. With low water levels in 2000, in southwestern Nebraska's Swanson and Enders Reservoirs, for example, visitation dropped by 12 to 14 percent and expenditures by anglers, many of whom come from Colorado, dropped by more than $150,000 (Nebraska Game and Parks).

Data from other reservoirs indicate that property adjacent to reservoirs, all else being equal, is more valuable than property that is not, and property values are greater at high lake levels than low levels. Knetsch (1964) found that reservoir-front property demanded a premium in the Tennessee River Valley. A study of level fluctuations in six Alabama reservoirs revealed changes in the value of nearby residential property, expenditures on reservoir-related recreation, and reservoir-related non-use values (Hanson et al., 2002). They found that a permanent 1-foot reduction in summer reservoir levels reduced the value of lakefront property 4 to 15 percent and recreational expenditures 4 to 30 percent. Respondents to a survey who indicated they currently do not use the reservoirs nonetheless indicated a willingness to pay $47 per household, on average, to maintain the status quo.

Similarly, research on Lake Travis, a reservoir in Texas, found a premium of $79,000 to $102,000 (1990 dollars) for reservoir-front property. Houses within 2,000 feet of the reservoir reflected significant premiums while this premium faded at 4,000 feet. Recreation and amenity values dropped even more rapidly at 150 feet from the reservoir (Lansford and Jones 1995). Numerous additional studies use travel costs and real estate premiums to estimate the value of lakes and reservoirs at "full" water levels (e.g., Cordell and Bergstrom, 1993; Burt and Brewer, 1971; Cameron et al., 1996).

The impacts of the Proposal on recreational facilities are discussed in Section 4.2.1.10. The analysis indicates that for some alternatives, decreased lake levels at the end of August could temporarily make some boat ramps inoperable. Restrictions on boating activities might lower the value recreationists derive from Lake Roosevelt, the economic activity derived from recreationists' expenditures, or both. However, any restrictions on boating-related recreation resulting from the Proposal would not be unlike those that would occur without it. Past experience indicates that, if the Proposal were to cause a boat ramp or other facility to become inoperable, recreationists would have access to substitute facilities and, thus, still have the ability to avail themselves of the lake's recreational opportunities, although the substitutes might be less convenient or more costly.

As the lake fills from April through July, a broad range of lake levels occurs. In 2007, lake level ranged from 1,257 to 1,287 feet msl during this time. During 2001, a drought year, the lake levels ranged from 1,219 to 1,282 feet msl during this period. Recreational users of the lake are therefore accustomed to changing accessibility of boat ramps as the lake level vary

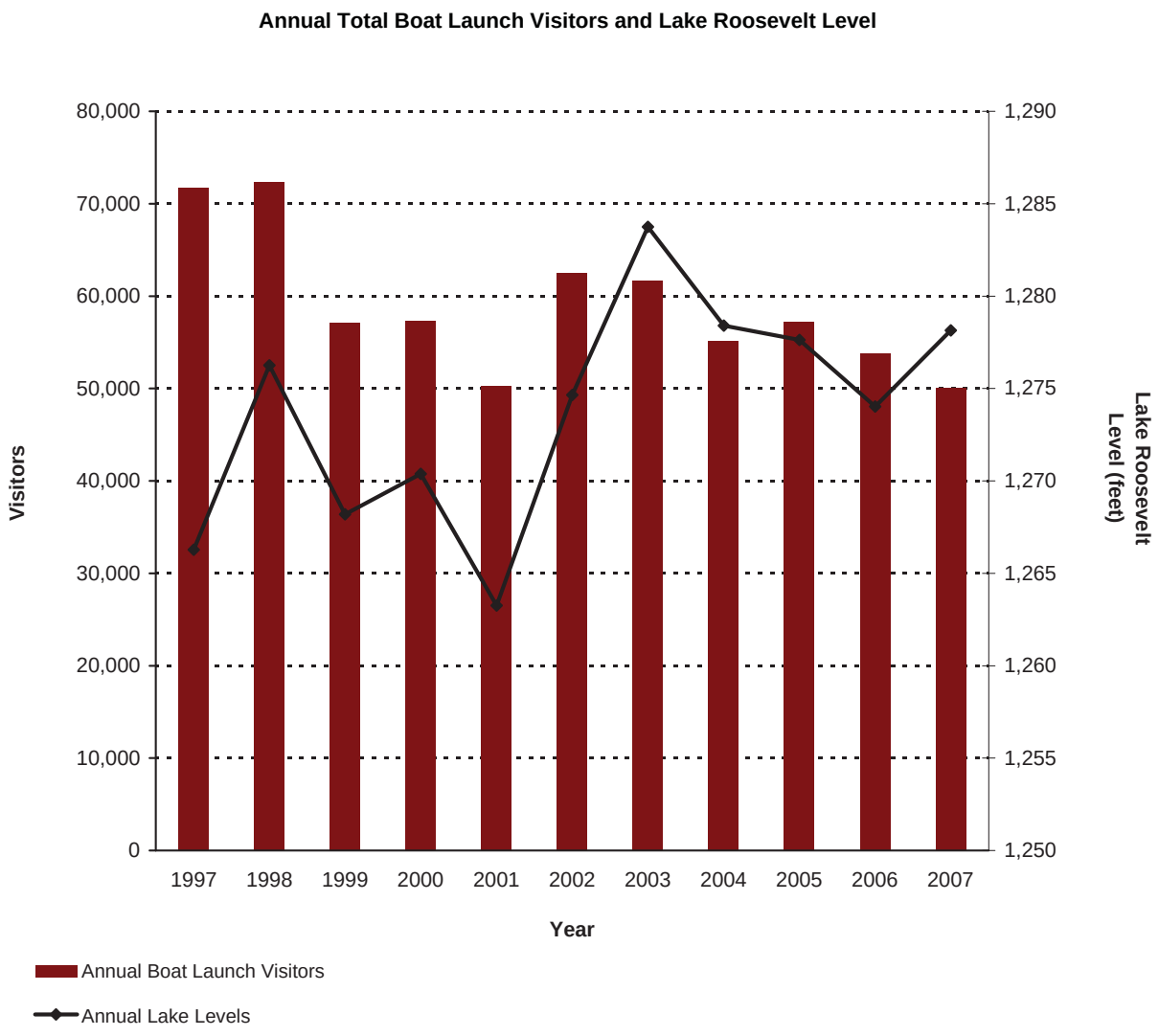
Figure 4-8 shows that, over the past 10 years, average lake levels and annual total boat launch visitors have both fluctuated. The average lake level fluctuated from 1,264 to 1,284 feet msl. Annual visitation fluctuated from roughly 50,000 to more than 70,000. While the data show some tendency for lake levels and visitor numbers to correlate positively, the relationship is not sufficient to conclude that changes in average lake level necessarily would be accompanied by corresponding changes in visitation. Further research might, however, reveal a tighter relationship between the two variables, controlling for the influence of other factors.

Figure 4-9 shows that monthly fluctuations in lake level and visitors to boat launches also do not demonstrate a strong correlation. July and August have the most visitors, substantially more than in other months that experience similar lake levels. The number of visitors to boat launches was low in April and May of 2001 and 2007, although the lower levels in 2001 also correspond to lower visitor numbers than 2007. Figure 4-6 shows that these patterns hold for 2001 as well, a drought year. Lake levels during July and August were 5 feet and 2 feet lower respectively during 2001 than 2007. The 2001 lake level was substantially lower than the maximum drawdown expected with the Proposal. However, there were more total visitors to boat launches in 2001 than 2007. Evidence does not suggest that the drawdowns will uniformly decrease boat launch visitation.

While lower lake levels during the summer of 2001 did not correspond to fewer total visitors than higher levels in 2007 (Figure 4-9), fewer visitors in 2001 used the ramps that

require high lake levels for access (Figure 4-10). These data suggest that total visits do not decrease with the differences of a few feet, but that visitors relocate to boat ramps that are operable. A 5-foot drop in lake level in 2007 from July to August also corresponded to an increase in visitor days for these ramps with the highest minimum launch levels.

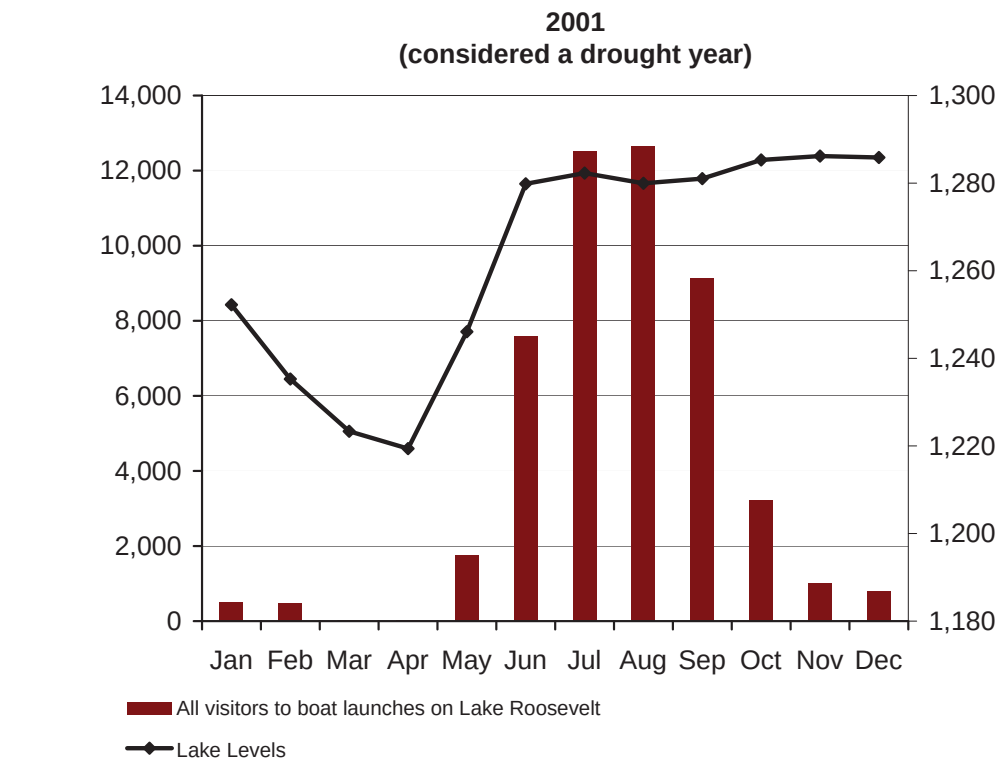
While literature suggests that the quality of the recreational experience might be reduced with lower lake levels, there is no evidence that decreases in lake level at the scale of the drawdowns associated with the Proposal would reduce the overall number of visitors for boating purposes. Instead, lower levels likely would reduce the usage of ramps that can be accessed only at high lake levels. Based on past responses to fluctuations in lake level, it appears that the overall impact of the Proposal on visitation would not be substantial. Localized impacts on activities associated with individual boating facilities seem likely to occur only when the Proposal causes the maximum drawdown for a few days at the end of August, especially in drought years.

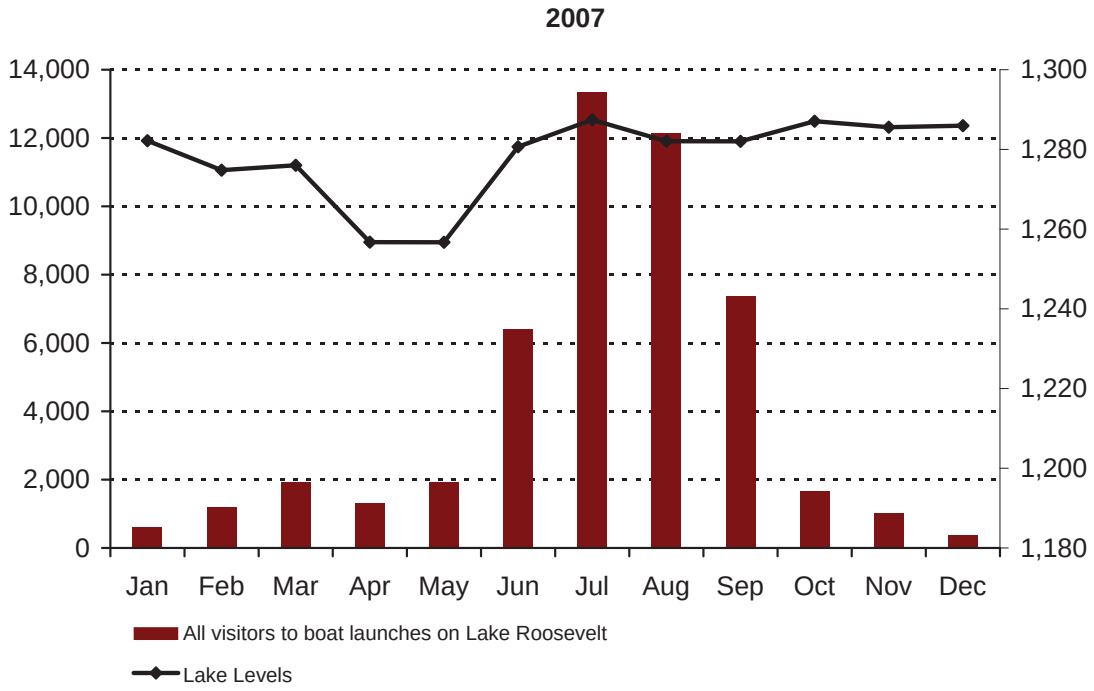


FILE NAME: Fig04-8_AnnualVisitors-LkLevel.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/13/08

Figure 4-8

Annual Total Boat Launch Visitors and Lake Roosevelt Level

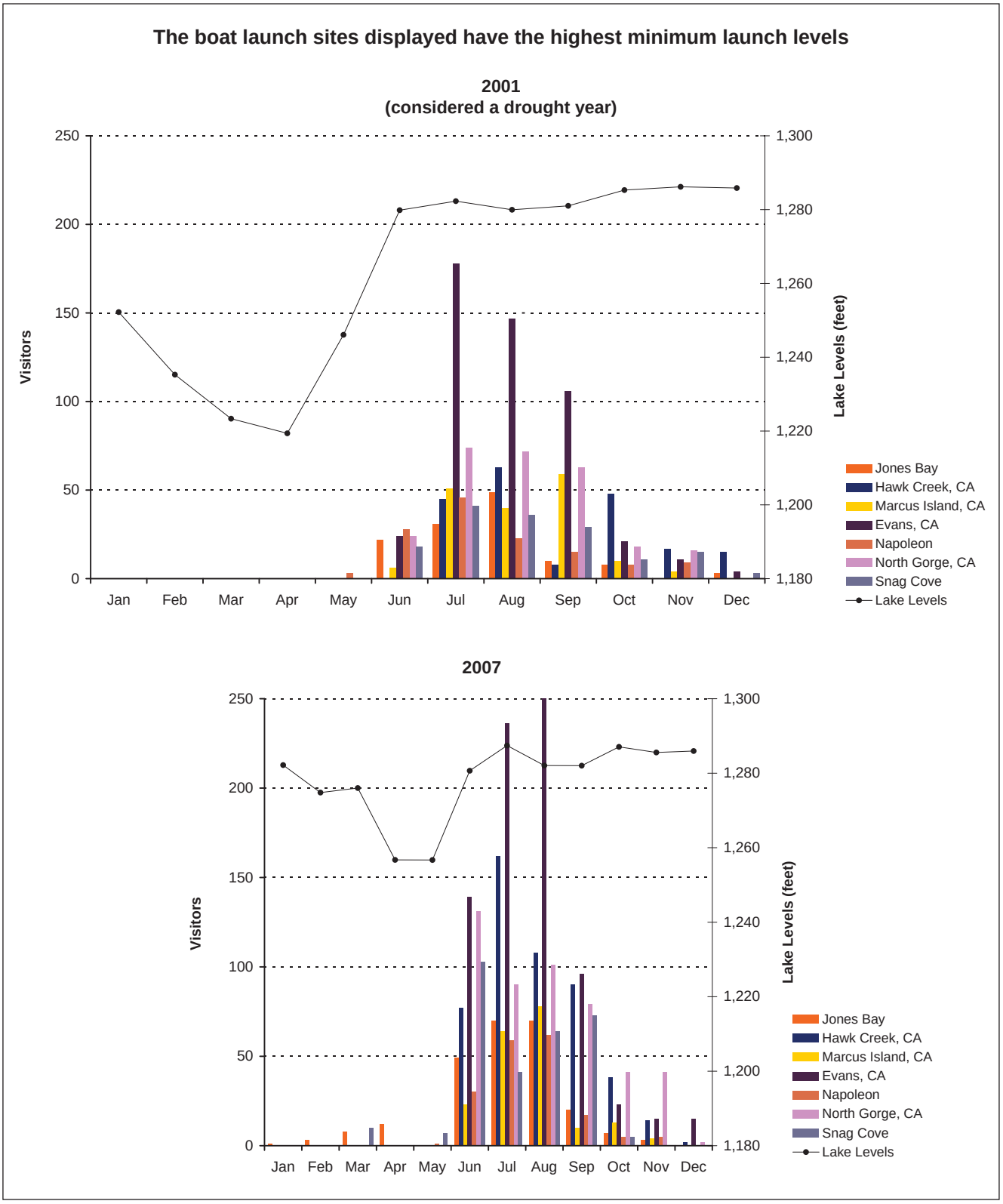




FILE NAME: Fig04-9_2001-2007Visitors-LkLevel.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/13/08

Figure 4-9

Total Visitors to Boat Launches and Lake Roosevelt Level



FILE NAME: Fig04-10_LaunchSites-LkLevel.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/13/08

Figure 4-10

Boat Launches at High Minimum Launch Sites and Lake Roosevelt Level

Fishing Recreation Effects

Annual angler trips on Lake Roosevelt from 1990 to 1998 ranged from 146,000 (1997) to 595,000 (1993) (Underwood, 2000). Walleye and rainbow trout are the most commonly caught and harvested species, followed by kokanee salmon (Underwood, 2000). A survey of anglers on Lake Roosevelt conducted from 1994 to 1995 revealed consumption preference for rainbow trout and walleye over kokanee and bass, with little consumption of other species (Washington State Department of Health, 1997).

The Proposal may alter the value of anglers' fishing experience on Lake Roosevelt. If it results in boat ramps and other facilities becoming unusable earlier, anglers may find it more inconvenient to reach targeted fishing areas, and some areas may become too shallow to fish. The value anglers place on their fishing experience tends to correlate with their success in catching fish, especially larger fish. As described in Section 4.1.1.6, analyses of fishery impacts within Lake Roosevelt suggest no likely reduction in fishery populations due to the Proposal. Insofar as population density drives impacts for recreational fishing, this reduction will correspond to no loss of value.

Mitigation

The State of Washington and the STI and CCT have signed Water Resource Management Agreements to mitigate effects of the storage releases by financing improved spawning habitat and lake access facilities. No additional mitigation is proposed.

4.2.1.12 Public Services and Utilities

Impacts to public services and utilities were described in the Programmatic EIS (Ecology, 2007). Additional information is provided here on impacts to hydropower production.

Short-term impacts

There would be no short-term impacts to hydropower production because there would be no construction associated with the Proposal.

Long-term/operational impacts

The Proposal is not expected to affect hydropower generation at Grand Coulee Dam. Potential impacts to downstream hydroelectric facilities are discussed in Section 4.2.2.12.

Mitigation

Because no impacts are anticipated, no mitigation is proposed.

4.2.1.13 Transportation

Short-term impacts

As described in the Programmatic EIS, drawdowns from Lake Roosevelt occur on a daily and seasonal basis and no construction or short-term activities would be necessary to accomplish the additional drawdowns for the Proposal. Therefore, no short-term impacts to transportation systems are expected from the drawdowns.

Long-term/operational impacts

Since the drawdown is within the normal range of operations, the Keller Ferry on State Route 21 would not be affected. The ferry can operate normally with lake levels as low

as 1,208 feet. With some special provisions in the ferry operations, it can be operated on a limited basis with levels as low as 1,180 feet (WSF, 2008).

The Inchelium-Gifford Ferry becomes inoperable when Lake Roosevelt elevation falls below 1,228 feet, requiring additional driving of approximately 30 miles to the Keller Ferry. The probability that the ferry would become inoperable is greatest in April when lake levels are drawn down for flood control under existing conditions. Under the Proposal, water would be released from Lake Roosevelt during April of drought years, but the drawdown is not expected to extend the length of time that the ferry would be inoperable. Therefore, no impacts to the operation of the Inchelium-Gifford are anticipated from the Proposal.

According to comments from the STI, low lake levels increases the need for removal of debris (e.g., logs) from the ferry ramps. The problems are worse when lake levels are lowest (drought years) and only at certain times of the year (April). The Proposal is not expected to extend the length of the April low lake level period; therefore, no increase in debris at the ramps is anticipated.

Mitigation

In addition to the mitigation described in the Programmatic EIS, the State of Washington, the CCT, and the STI have signed agreements to mitigate effects of the drawdown. Included in the Water Resources Management Agreement with the CCT is the State's support for a federal appropriation for on-going maintenance of the ferry and of a study of locating a bridge at the ferry site.

4.2.2 Columbia River Downstream

4.2.2.1 Earth

Short-term impacts

No short-term impacts are anticipated because there would be no construction.

Long-term/operational impacts

The additional drawdown would increase flow releases up to 428 cfs during the summer. The increase in flow would be less than 1 percent of the current release and is therefore unlikely to cause an increase in landslide potential.

Mitigation

Reclamation currently monitors known landslide areas downstream of the Grand Coulee Dam, and will continue to do so. Erosion and landslide hazards are addressed as part of the normal operating procedures for Lake Roosevelt operations. No additional mitigation is warranted to address landsliding impacts.

4.2.2.2 Climate

Short-term impacts

The short-term impacts of the Proposal on climate change were described in Section 4.1.1.

Long-term/operational impacts

The long-term impacts of the Proposal on climate change were described in Section 4.1.1.

Mitigation

As discussed in Section 4.1.1, Ecology and Reclamation would coordinate with other Columbia River managing agencies to adaptively manage the Columbia River under changing climate conditions.

4.2.2.3 Surface Water

Water Quantity

Short-term impacts

No short-term impacts will occur as all facilities needed to release or pump additional water from Lake Roosevelt to the Columbia River currently exist.

Long-term/operational impacts

The long-term impacts from changing the release schedule from Lake Roosevelt will be a change in flow in the Columbia River (Table 4-14). The timing of the increase in flow varies with the alternative; however, the maximum additional flow release is approximately 440 cfs in June of a drought year for Alternative 1D. The decrease in flow during September when Lake Roosevelt is filling to compensate for summer drawdowns is predicted to range from approximately 1,360 to 1,370 cfs during dry and average years and up to approximately 2,200 cfs during a drought year, depending on the alternatives.

Table 4-14. Estimated Difference in Columbia River Flow Downstream of Lake Roosevelt

Alternative	*Difference in Flow by Month (cfs)*						
	April	*May*	*June*	*July*	*August*	*September*	*October*
1A—Average Year	0	0	0	428	428	-1,258	0
1B(a)—Average Year	164	119	114	105	183	-1,371	-17
1B(b)—Dry Year	201	211	234	73	77	-1,371	-17
1C(a)—Average Year[1]	0 to 884 (173)[2]	0 to 855 (173)[2]	0 to 884 (173)[2]	0 to 855 (173)[2]	0 to 855 (173)[2]	-1,371[3]	-17
1C(b)—Dry Year[1]	0 to 884 (291)[2]	0 to 855 (291)[2]	0 to 884 (291)[2]	0	0	-1,320[3]	66
1D—Drought Year	407	411	441	180	185	-2,213	-17
1E—Drought Year[1]	0 to 749 (247)[2]	0 to 725 (247)[2]	0 to 749 (247)[2]	0 to 945 (472)[2]	0 to 945 (472)[2]	-2,162[3]	17

[1] Preferred alternative.

[2] Actual difference in flow is dependant on panel described in Section 2.3.1. This table presents a range of possible values and a value in parenthesis that assumes the releases are distributed in full equally throughout the allowable period.

[3] Actual difference in flow is dependant on panel described in Section 2.3.1. This value assumes the full allotments allowable within the alternative are released.

Table 4-15 summarizes the average monthly flows from Lake Roosevelt under current operations. Table 4-16 provides the percent difference between current operations and proposed releases with the alternatives described in Chapter 2. Figures 4-1 through 4-5 illustrate the changes in flow.

Table 4-15. Average Monthly Flow in Columbia River Downstream of Lake Roosevelt

Type of Flow Year	Average Flow for Month (cfs)						
	April	May	June	July	August	September	October
Average (2002)	110,903	118,226	178,193	163,081	110,371	71,600	76,984
Dry (2003)	100,690	118,577	122,443	101,397	94,158	64,523	73,190
Drought (2001)	60,463	47,903	78,403	50,590	68,703	62,277	55,955

Table 4-16. Difference in Average Monthly Flow in the Columbia River Downstream of Lake Roosevelt with Additional Flow Releases

Alternative	April	May	June	July	August	September	October
1A – Average Year	0.0%	0.0%	0.0%	0.3%	0.4%	-1.7%	0.0%
1B(a) – Average Year	0.2%	0.1%	0.1%	0.1%	0.2%	-1.9%	-0.0%
1B(b) – Dry Year	0.2%	0.2%	0.2%	0.1%	0.1%	-2.1%	-0.0%
1C(a) – Average Year[1]	0 to 0.8% (0.2%)[2]	0 to 0.8% (0.2%)[2]	0 to 0.5% (0.1%)[2]	0 to 0.5% (0.1%)[2]	0 to 0.8% (0.2%)[2]	-1.9%[3]	-0.0%
1C(b) – Dry Year[1]	0 to 0.9% (0.3%)[2]	0 to 0.7% (0.2%)[2]	0 to 0.7% (0.2%)[2]	0.0%	0.0%	-2.0%[3]	0.0%
1D – Drought Year	0.7%	0.9%	0.6%	0.4%	0.3%	-3.6%	-0.0%
1E – Drought Year[1]	0 to 1.2% (0.4%)[2]	0 to 1.5% (0.5%)[2]	0 to 1.0% (0.3%)[2]	0 to 1.9% (0.9%)[2]	0 to 1.4% (0.7%)[2]	-3.5%[3]	0.0%

[1] Preferred alternative.

[2] Actual difference in flow is dependant on panel described in Section 2.3.1. This table presents a range of possible values and a value in parenthesis that assumes the releases are distributed in full equally throughout the allowable period.

[3] Actual difference in flow is dependant on panel described in Section 2.3.1. This value assumes the full allotments allowable within the alternative are released.

The maximum increase in flow immediately downstream of Lake Roosevelt would be up to 1.8 percent during July for Alternative 1E during a drought year. This assumes the full allocation of releases to municipal and industrial and interruptible water rights occurs in July. If the flows are distributed equally through the April to August time period, the maximum increase is estimated to be 0.9 percent in July. The maximum estimated decrease in September would be 3.5 percent also for Alternative 1D during a drought year.

For the Preferred Alternatives, the increase in flow immediately downstream of Lake Roosevelt depends on releases determined by the panel of fisheries and water managers described in Section 2.3.1. The range would be 0 to 1.9 percent. The maximum decrease in September would be 3.5 percent for Preferred Alternative 1E. This assumes the full allocation of releases for fish, municipal and industrial, and interruptible water rights occurs.

The differences in flow are a very small percentage of flow in the Columbia River downstream of Lake Roosevelt. As tributaries enter the Columbia River, the percentages decrease. For example, the average monthly flow in the Columbia River at The Dalles Dam during August in a dry year (2003) is 131,300 cfs, compared to 94,160 cfs below Lake Roosevelt. During September, the average monthly flow at The Dalles Dam is 94,600 cfs compared to 73,200 cfs below Lake Roosevelt. That additional flow is 30 to 40 percent of the Columbia River flow below Lake Roosevelt.

No impacts to surface water are anticipated. Flows in the Columbia River will increase during most months. The increases and decreases in flow are small relative to overall flows in the river and are not expected to significantly affect water levels in the river or downstream reservoirs. Specific impacts to water rights, Biological Opinion flows, fish, and hydropower are discussed in following sections.

Mitigation

No mitigation is proposed because no impacts to surface water are anticipated.

Water Quality

Short-term impacts

No short-term impacts are anticipated because no construction is required to release water to the Columbia River.

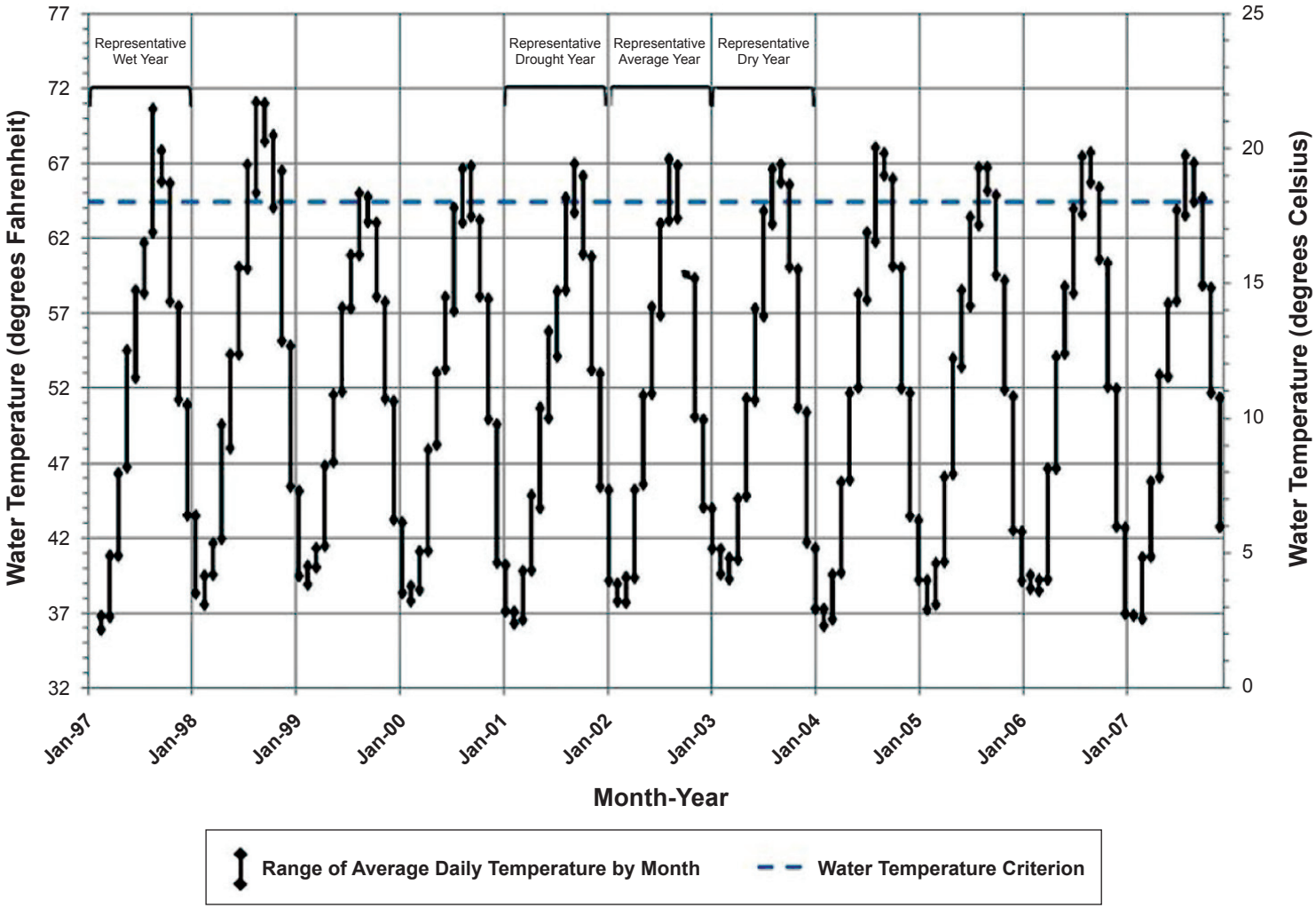
Long-term/operational impacts

The temperature of the water in Lake Roosevelt is influenced by a number of factors including pool elevation, inflow water temperatures, weather conditions (e.g., air temperature, wind and solar radiation), and water releases (Reclamation, 2000). The different intake depths for the power plant flows (see discussion in Section 3.4.2.2) suggest that using preferential power plant operations could influence water temperatures downstream from the dam. However, Reclamation (2000) reported that the limited volume of cool water in the reservoir could not provide significantly cooler summertime releases for prolonged periods. The volume of cool water in the reservoir is limited because flood control activities release a large amount of the cool water and the

remaining cooler water is removed in the spring and early summer due to the large volumes of water that are released each month (Reclamation, 2000).

There are no major inflows to the river in the 6-mile reach of the river between Grand Coulee Dam and the downstream gage. Water temperatures measured 6 miles downstream from the dam represent the temperature of the water released from Lake Roosevelt plus any heating or cooling that occurs within the first 6 miles downstream of the dam. Given the small change in release flows (see Table 4-16) that would result from changing Lake Roosevelt's release schedule and the lack of significant accretion (surface and ground water inflow) to this reach, any temperature change downstream of the dam is expected to be negligible. Therefore, the incremental water releases under each scenario would be expected to be very similar to the water temperature measured at the downstream gage under existing conditions.

The incremental storage releases would continue to maintain typical summertime release temperatures warmer than the 64.4 degrees F (18 degrees C) criterion, but cooler than 68 degrees F (20 degrees C)



Source: Reclamation (2008a)

Notes: Data are collected by the U.S. Army Corps of Engineers. The downstream gage (GCGW) is located 6 miles downstream from the dam. Daily average data were not available for all days in some months: January 1-February 4, 1997; July 16-21, 1998, July 30 - 31, 1998; November 8-12, 1998; July 6-10, 2001. In addition, erratic data were not used to develop the summary table: July 8- 30, 1997; August 1-3, 1997; August 20 - September 1, 1997; January 12-22, 1998; March 11-13, 1998; April 4-13, 1998; April 21, 1998; July 4 - 10, 1998; October 7-18, 1999; July 11, 2001; September 7-9, 2002; and September 30-October 30, 2002.

FILE NAME: Fig04-11_temperature_range.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 4-11

Ranges of Average Daily Water Temperature
Downstream of Grand Coulee Dam by Month, 1997-2007
Washington

Additional flow releases of up to 428 cfs are not expected to cause a measurable increase in TDG saturation below the dam. Total flow would increase by less than one percent in comparison to current releases and therefore is not expected to cause a measurable increase in TDG saturation levels below Grand Coulee Dam.

Mitigation

No mitigation measures are necessary because no construction is proposed and no significant long-term adverse effects are expected for water quality.

4.2.2.4 Ground Water

Water Quantity

Short-term impacts

No short-term impacts are anticipated because there would be no construction to disrupt ground water.

Long-term/operational impacts

Long-term impacts would be similar to those described for the Lake Roosevelt area (Section 4.1.1.4) and dependent on the water released from Lake Roosevelt.

Mitigation

No impacts are anticipated to ground water wells in downstream Columbia River area; therefore, no mitigation is necessary.

Water Quality

Short-term impacts

There would be no short-term impacts to Columbia River ground water quality because there would be no construction.

Long-term/operational impacts

Total flow would increase by less than 1 percent in comparison to current releases and therefore is not expected to cause significant changes in stage or water quality of the Columbia River downstream of Grand Coulee Dam. Incremental flow releases should not significantly affect the hydraulic continuity between surface and ground water and therefore should not significantly affect ground water quality.

Mitigation

Because no impacts to ground water quality are expected, no mitigation measures are proposed.

4.2.2.5 Legal Considerations

Water Rights

Short-term impacts

No short-term impacts to water rights are anticipated because no is construction required to implement the storage releases.

Long-term/operational impacts

Annual Releases

Positive impacts may occur with annual releases. In such years, 25,000 acre-feet of water would be released for the 128 pending applications for municipal and industrial water rights within 1 mile of the river; 27,500 acre-feet for flow augmentation downstream of Grand Coulee Dam; and 30,000 acre-feet for irrigation in the Odessa Subarea.

According to the MOU between the state, Reclamation, and the Columbia Basin Project irrigation districts, water for municipal and industrial purposes would be provided to Ecology under a Municipal and Industrial Contract (a water service delivery contract) with Reclamation. The water would be transferred to Ecology's Trust Water Rights Program as mitigation for some or all of the pending water right applications for municipal and industrial water rights. Although the water rights would be permanent, federal law prohibits Reclamation from entering into permanent water service delivery contracts. Ecology and Reclamation will negotiate the length of the service contract as part of a MOA covering the secondary use permits. There is a chance of adverse impact on permanent new municipal and industrial water rights if the water service delivery contract with Reclamation is not renewed when its term expires. However, by that time it is Ecology's intention to have provided alternative sources of water through new storage and conservation programs.

The MOU called for the first increment of water for the Municipal and Industrial Contract to be made available from January 2006 through December 2007. At the time of this writing, Reclamation and Ecology have yet to enter into the contract. Ecology will not conclude negotiation of the contracts until this Supplemental EIS is finalized.

Municipal and industrial water rights are issued for year-round use. Under Alternative 1A, water would be released only in July and August. Under Alternative 1B, water would be released to meet demand, including year-round for municipal and industrial water supply. Under Alternative 1C, water would be released as determined by the demand for fish. For the alternatives where water would be delivered year-round and releases would be less than year-round, an OCPI determination is required (WAC 173-563-080) (Section 2.3). The determination allows diversion of water from the Columbia River even if instream flows are not being met (WAC 173-563-080). This could result in an adverse impact to instream flows.

The additional water released from Lake Roosevelt for new municipal and industrial water rights is anticipated to provide new rights for applicants as far downstream as Camas, Klickitat County, Maryhill State Park, and Washougal (Ecology, 2008a). Instream flows set by rule are recognized water rights. The additional flows during all years (drought and non-drought) would assist in maintaining flows set by rule.

Drought Year Releases

During drought years there would be positive impacts associated with permanent standby-reserve permits issued to those holding one of the 379 interruptible water rights and both positive and potentially negative impacts on stream flows.

In drought years, 33,000 acre-feet would be released from Lake Roosevelt for interruptible water rights from the mainstem Columbia River and an additional 17,000 acre-feet would be released for flow augmentation downstream of Grand Coulee Dam. The water is to be made available through a Drought Relief Contract between Reclamation and Ecology. Those holding interruptible water rights will apply to Ecology for permanent standby-reserve permits to be used during drought years.

The standby-reserve permits will be issued for the entire irrigation season (April to October) even though the releases from the reservoir will be from April 1 to August 31. An OCPI determination will be required to authorize permits to divert water at times when there are no releases from the reservoir (WAC 173-563-080) (Section 2.3). This could result in negative impacts on stream flows.

Generally, the standby-reserve permits will have a positive impact for those holding interruptible water rights. However, those who obtain a standby-reserve permit will be required to call in to Ecology weekly to find out whether they can divert water in the coming week. When instream flows established under Chapter 173-563 WAC are met, those users with a standby-reserve permit will be authorized to divert. When instream flows will not be met, those holding standby-reserve permits may divert only if there is water in Ecology's "drought insurance" program available to mitigate the diversion. The drought insurance program includes the 33,000 acre-feet from Lake Roosevelt and water obtained by Ecology from dry-year leases, water conservation projects, and aquifer and surface storage.

Reclamation's authority to enter into Drought Relief Contracts with the state depends upon the continued reauthorization of the federal Drought Relief Act. The Drought Relief Act is currently authorized until September 30, 2010 by Title 2, Chapter 3, Sec. 2306 of Public Law 109-234, June 5, 2006 (Emergency Supplemental Appropriations Act for Defense, The War on Terror, and Hurricane Recovery, 2006).

Releases from Lake Roosevelt are intended to provide water for interruptible water rights that are diverted as far downstream as the Quad-Cities (Ecology, January 2008a). The water will be transferred to the state Trust Water Rights Program and tracked as trust water downstream to the point of diversion.

Mitigation

Ecology would determine appropriate mitigation when processing water right applications if it determines that the new water rights would impact existing water rights. Ecology will negotiate with Reclamation to develop long-term service contracts with options for renewal to meet the need for certainty for municipal and industrial water rights.

Biological Opinion

Short-term impacts

Positive short-term impacts on instream flow are expected during drought years, which would assist in supporting flows under the federal Biological Opinion.

Long-term/operational impacts

The availability of an additional 27,500 acre-feet of water for flow augmentation most years and a total of 44,500 acre-feet of water for flow augmentation in drought years would assist in supporting flows under the federal Biological Opinion. Under all alternatives there would be increased flows below Lake Roosevelt from April through August. Reduced flows would occur in September and/or October, outside of the "salmon flow objective period" (April to August) in the Biological Opinion.

Table 1 of the Biological Opinion states "if the Lake Roosevelt drawdown component of Washington's Columbia River Water Management Program (CRWMP) is implemented, it will not reduce flows during the salmon flow objective period (April to August)." Appendix B.2.1 of the 2007 Biological Assessment discusses the CRWMP and the fact that one-third of the water withdrawn from Lake Roosevelt would be available to supplement fish flows from April through August. This will result in the delivery of "water below Grand Coulee Dam that would not be available under current operations to benefit ESA-listed fish anytime from April through August."

Mitigation

The impacts on stream flows in the Biological Opinion would be generally positive and no mitigation would be required. However, where water rights for out-of-stream uses would be issued for times other than when water is being released from the reservoir, an OCPI determination would be required. If such a determination is made for out-of-stream diversions, there could potentially be a negative impact on stream flows, which would require mitigation.

Canadian Treaty

Short-term impacts

As discussed in Section 4.1.1.5, there would be no short-term impacts on the Canadian Treaty.

Long-term/operational impacts

As discussed in Section 4.1.1.4, the additional releases will have no long-term impacts on the Canadian Treaty. The renegotiation of the Treaty may, however, have impacts on the water supply to Lake Roosevelt and the flexibility in how the reservoir is operated.

Mitigation

Since there would be no impacts on the Canadian Treaty, no mitigation would be required. Any changes to reservoir operations as a result of future Treaty negotiations could require adaptive management which would be resolved in the negotiations.

4.2.2.6 Fish

Short-term impacts

Infrastructure exists to implement the Lake Roosevelt Incremental Storage Releases Project. Thus, short-term related effects of construction activities on aquatic resources are not anticipated.

Long-term/operational impacts

The changes in monthly flows are summarized in Tables 4-14 to 4-16. The annual volume of water released under each of the incremental flow release scenarios is fixed. Spreading the timing of the releases across a number of months under the alternatives decreases the relative level of effect but extends the period of influence.

Lake Rufus Woods

As shown in Tables 4-14 to 4-16, flow releases for fish under the different alternatives would increase volumetric flow rates from the lake by 0.1 to 0.9 percent depending upon the alternative and time of year. The single greatest increase (338 cfs) over current river flows would occur under Preferred Alternative 1E drought conditions during the month of June. The smallest relative increase (173 cfs) over background river flows would occur during the month of June under average water year conditions with Preferred Alternative 1C(a). The amount of water released is minor and by itself is not expected to provide a positive or negative effect on fish in the Lake Rufus Woods under any of the alternatives. It is expected to help meet stream flow targets and provide cumulative benefits to fish. The releases fall within the range of current daily fluctuations and cannot be differentiated from background.

When Lake Roosevelt is refilled during the month of September, river flows below Grand Coulee Dam into Lake Rufus Woods will decrease compared to existing conditions. The decreases in flow rates are calculated to be approximately 2 percent during average and dry conditions and approximately 3.5 percent during drought conditions (Table 4-16). Similar to the benefits of flow increases during other months, the decrease in flows in September is minor and not expected to cause a positive or negative effect on the fish in Lake Rufus Woods under any of the alternatives. The changes in volumetric rates occur within the range of current daily fluctuations and cannot be differentiated from background conditions.

Mid-Columbia River

The influence of the flow releases for fish on habitat conditions would decrease in the downstream direction of the Columbia River as the mainstem discharge naturally increases. The increased flows, although minor, are expected to help meet stream flow targets and provide cumulative benefits to fish.

Hanford Reach

The largest amount of water contemplated for release to augment downstream fisheries under the incremental flow release alternatives occurs during drought conditions. The highest expected monthly flow discharged annually under Alternative 1E (472 cfs) compared to the lowest mean monthly flow on record at Priest Rapids Dam (56,700 cfs) represents a 0.8 percent increase in river discharge in the free-flowing Hanford Reach section of the Columbia River. Under average conditions, the 428 cfs discharged under Alternative 1A during normal August flow conditions (120,000 cfs below Priest Rapids Dam; USGS, 2006) represents 0.4 percent increase in flow. Should the flow release panel described in Section 2.3.1 elect to release all of the water allocation in one month, the increased flow in the Hanford Reach related to project would nearly double representing a 0.7 percent increase in average conditions and an 1.7 percent increase

under drought conditions. Such flow level increases are unlikely to have a measurable influence on habitat conditions or aquatic resources in the mainstem Columbia River. However, they are expected to help meet stream flow targets and provide cumulative benefits to fish. Under all alternatives, the salmon flow objectives in the Biological Opinion would be met (see Section 4.2.2.5)

Mitigation

Because no negative impacts to fish are anticipated in the Columbia River downstream of Grand Coulee Dam, no mitigation is proposed.

4.2.2.7 Wildlife and Plants

Changes to nesting waterfowl and breeding amphibians are the potential impacts associated with increased flow releases at Grand Coulee Dam. Impacts to federal and state-listed plant and wildlife species were previously discussed in the Programmatic EIS (Ecology, 2007).

Short-term impacts

No short-term impacts to wildlife and plants are anticipated because no construction is required to release water to the Columbia River.

Long-term/operational impacts

The additional water released at Grand Coulee Dam as part of the Proposal will not result in impacts to wildlife. The increase in flow would be less than 1 percent of the current release and is therefore unlikely to cause a measurable increase in the risk to nesting waterfowl or breeding amphibians in Lake Rufus Woods and downstream of Chief Joseph Dam. The increase in flow will be within the range of current daily fluctuations and cannot be differentiated from existing conditions. Further downstream, including the Hanford Reach, the influence of the additional flow on vegetation communities becomes further minimized as it represents only a 0.4 percent increase from existing conditions.

Mitigation

No mitigation is expected to be required for wildlife and plants because no impacts are anticipated.

4.2.2.8 Cultural Resources

Short-term impacts

No new short-term impacts to cultural resources are anticipated to the Columbia River downstream area because no construction would be required to implement the Proposal.

Long-term/operational impacts

No new long-term/operational impacts to cultural resources are anticipated to the Columbia River downstream area as a result of increased flows as the increase represents less than a 1 percent change from current operational flows.

Mitigation

Because no new impacts to cultural resources are anticipated, no mitigation measures are proposed for the Columbia River downstream area.

4.2.2.9 Environmental Health

Short-term impacts

As described in the Programmatic EIS (Ecology, 2007), withdrawals from Lake Roosevelt occur on a daily and seasonal basis, and no construction or short-term activities would be necessary to accomplish the additional withdrawals for the Proposal. Therefore no short-term impact to environmental health would occur.

Long-term/operational impacts

The Proposal would result in increased stream flows downstream in the Columbia River at times. While increased flows downstream have the potential to transport contaminants, impacts are not expected to significantly increase, as withdrawals from Lake Roosevelt already occur on a daily and seasonal basis.

Mitigation

No environmental health impacts are anticipated to the Columbia River downstream area; therefore, no mitigation is proposed.

4.2.2.10 Recreation and Scenic Resources

Short-term impacts

As described in the Programmatic EIS (Ecology, 2007), withdrawals from Lake Roosevelt occur on a daily and seasonal basis, and no construction or short-term activities would be necessary to accomplish the additional withdrawals for the Proposal.

Long-term/operational impacts

The project would result in increased stream flows downstream in the Columbia River at times. As described in Section 4.1.2.3, Surface Water, the change in flow downstream of Lake Roosevelt would be a small percentage of flow in the Columbia River. The maximum estimated increase in flow in July and August would be 428 cfs. For context, the average monthly flow in the Columbia River downstream of Grand Coulee Dam was 50,590 cfs during July 2001 and 68,700 cfs during August 2001, a severe drought year (USGS, 2006). This difference represents less than 1 percent of current flow. The maximum estimated decrease in September would be 3.43 percent. Tables 4-14 to 4-16 illustrate the change in flow. These changes in flow are not expected to be noticeable to the average recreational user.

As a consequence of the new water supplies, development in areas that would benefit from the new water supplies could increase. As described in the Programmatic EIS, this could affect scenic resources if the development occurs within scenic areas. Additional development and population growth would also increase the demand for recreation areas. However, most of this development would be expected to occur in already developed areas and areas where growth has been planned, thus additional development would not likely have significant adverse impacts. Recreation facilities, such as playfields and parks, could benefit from more reliable municipal water supplies.

Mitigation

No additional mitigation measures are proposed because no impacts were identified.

4.2.2.11 Socioeconomics

Short-term impacts

No short-term impacts are anticipated because there would be no construction required to release flows to the Columbia River.

Long-term/operational impacts

The Proposal will increase flows downstream of Lake Roosevelt during some periods, and decrease them in others. Because the changes in flows will be minor, no impacts to socioeconomic are expected.

Mitigation

No mitigation is proposed because no impacts are anticipated.

4.2.2.12 Public Services and Utilities

Impacts to public services and utilities in the Columbia River downstream area were described in the Programmatic EIS (Ecology, 2007). This section provides additional discussion of potential impacts to hydropower.

Short-term impacts

No short-term impacts would occur in the Columbia River downstream area because there would be no construction associated with the flow releases.

Long-term/operational impacts

Tables 4-14 through 4-16 provide an estimate of the differences in the amount and percentage of flow in the downstream Columbia River compared to existing operations. The change in flow is an increase in discharge from Lake Roosevelt from April through August and a larger decrease in September and October to help refill the storage used earlier in the season. Releases made for stream flow enhancement (27,500 acre-feet for non-drought years and 42,500 acre-feet for drought years) would remain instream and increase hydroelectric generation through the entire system of dams and hydroelectric generation facilities from Grand Coulee Dam downstream.

Releases made for municipal/industrial supply (25,000 acre-feet) and for interruptible water rights holders (an additional 33,000 acre-feet) in drought years would increase flows and hydroelectric generation down to their point of withdrawal. The potential withdrawal points for interruptible water rights have been mapped by Ecology (2008b) (Figure 4-12). The map only includes the interruptible water rights that are within one mile of the Columbia River and does not show the interruptible water rights located on the tributaries including the Methow, Okanogan, and Wenatchee Rivers. The potential withdrawal points extend from just downstream of Lake Roosevelt to the Dalles pool with a large concentration located in the McNary Dam pool. The actual point of withdrawal will depend on the allocation method Ecology uses as described in Section 2.3.2. The location of withdrawals for additional municipal and industrial use is not yet known but will likely occur near Wenatchee and the Quad-Cities as they are the largest population centers on the Columbia River. A large volume of the municipal and industrial supply and interruptible water supply would likely remain instream until the

McNary pool. Section 2.3.1 describes the potential allocation option for the municipal and industrial water supply.

The impact on hydroelectric generation is complex as it involves understanding the flow differences at a particular generation facility, the timing of hydroelectric generation at that facility, energy market conditions, required spills and other factors. Information contained in Watson (2008), BPA (2007a) and U.S. Department of Energy (2008a, b) was used to characterize the potential impact on hydroelectric generation.

The Watson report analyzed the effect of various operating scenarios of the Federal Columbia River Power System (FCRPS) on revenues derived by the CCT. The report focuses solely on federally-owned dams and did not include the mid-Columbia PUD owned dams. However, the impact on generation would likely be similar for the mid-Columbia PUD owned dams as they have the same flow regime and supply power to similar customers, and sell and buy power in the same energy market.

Hydroelectric revenue generated for Bonneville Power Administration (BPA) is a function of "firm" and "spot" power revenues. Firm power revenue is sales to preference customers by contracts, and spot power revenue is sales of surplus power on the spot market. If generation is not sufficient and power is needed to fulfill a firm contract (in a drought year) the spot power revenue may be reduced.

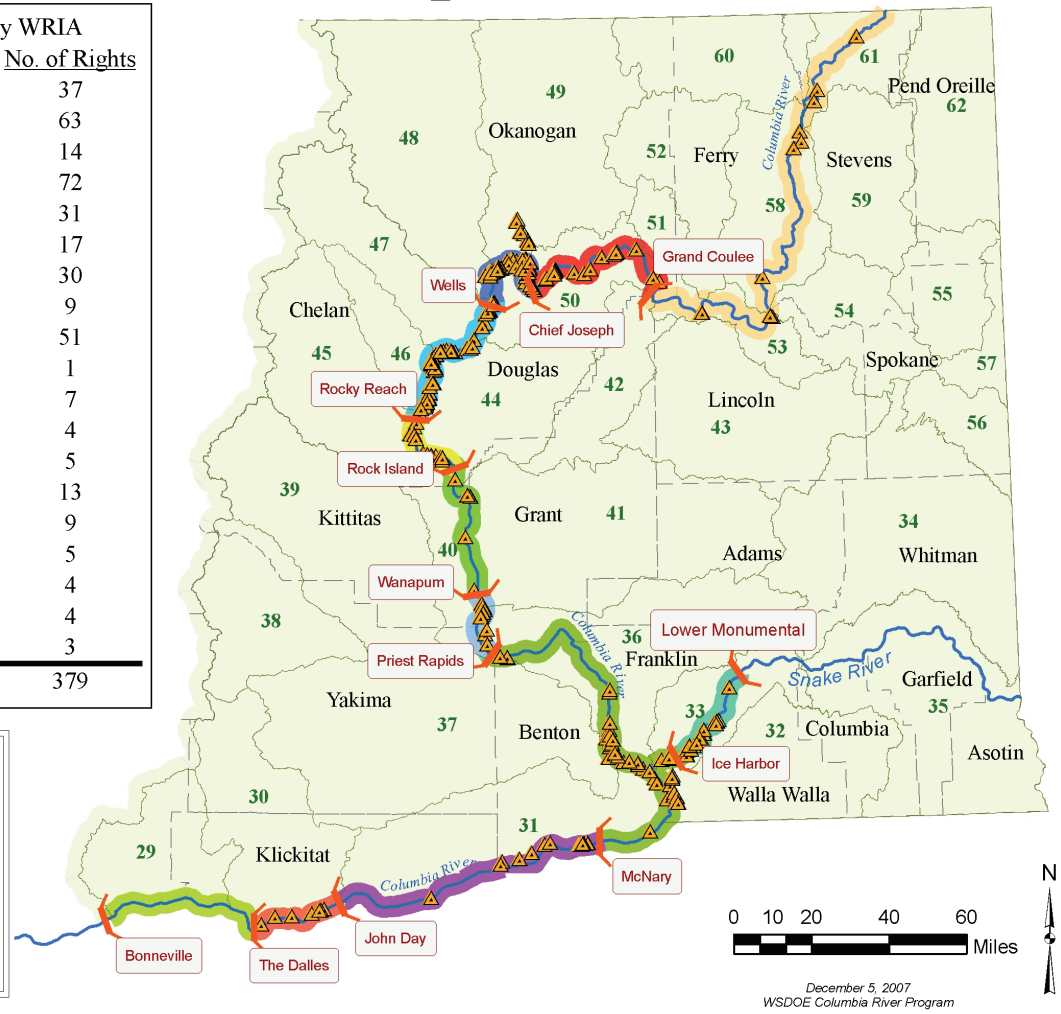
In the Pacific Northwest, the greatest demand for power is during the winter for heating purposes, and the firm power requirements are the greatest. The firm power requirements are the least during the April to August time period. During that period, spot power sales by BPA to external customers are the greatest. Spot power sales during September are much lower. The prices for spot power are variable depending on many factors, but are approximately double the prices for firm power contracts.

The effect on hydroelectric generation will be an increase in power production in the April to August period approximately equal to the increase in flow in the Columbia River, which will vary between zero and 1.9 percent for generation facilities between Grand Coulee Dam and McNary Dam. Downstream from McNary Dam, the increase will be less as only the fish enhancement flows will add to Columbia River flows. In September and October as outflow from Lake Roosevelt is decreased up to 3.5 percent, a corresponding decrease in hydroelectric generation will occur through all mainstem Columbia River dams. Although the decrease in generation appears to be larger than the April to August increase, the flow in September and October is also much less.

Interruptible Water Rights within the Columbia River Program

Interruptible Qa by WRIA

WRIA	Qa (afy)	No. of Rights
33	102,988	37
31	51,699	63
47	34,166	14
50	28,662	72
40	26,764	31
36	17,103	17
49	11,195	30
32	10,815	9
44	9,825	51
37	4,960	1
48	4,537	7
53	1,732	4
45	1,504	5
35	1,425	13
30	824	9
46	412	5
41	400	4
58	150	4
61	34	3
Total	309,159	379



FILE NAME: Fig04-12_Interruptibles.ai
CREATED BY: JAB / DATE LAST UPDATED: 08/11/08

Figure 4-12
Locations of Interruptible Water Rights
Washington

For example, the average monthly flow in September for an average water year is 71,600 cfs compared to the range of 110,400 to 178,200 cfs in April-August. Table 4-16 presents an estimate of the change in hydroelectric production assuming the Preferred Alternative 1C(a). Alternative 1C(a) was selected as being representative of the potential effects during an average year. It was assumed for the calculation that the flow releases for fish and municipal and industrial uses would be evenly distributed over the April to August time period. It was also assumed that the change in hydroelectric production is directly proportional to the change in flow. The values of production used in the table are for 2006 and were obtained from the Department of Energy (2008a, b) and include production at all mainstem Columbia River dams.

Table 4-16. Estimate of Change in Hydroelectric Production along the Columbia River for Alternative 1C(a)

	Production (MW-hrs)						
	April	***May***	***June***	***July***	***August***	***Sept.***	***Oct.***
Production in 2006	8,760,951	8,930,501	9,590,400	7,298,040	5,880,767	4,544,862	4,773,586
Estimated Percent Difference	0.10	0.08	0.07	0.11	0.14	-1.89	-0.02
Estimated Change in Production	8,600	7,200	7,100	8,300	8,400	-86,000	-1,100

Source of data: Department of Energy (2008a,b)

The estimated increase in production is approximately 439,600 MW-hours in April through August, while the decrease in September to October is approximately 87,100 MW-hours. The impact on generation revenue for mainstem Columbia River dams will be dependent on the value of spot power received (or not received). Spot prices are variable depending on the available supply of electricity and the demand. They are usually lowest in June when production is highest during the spring melt. As production declines through the summer and fall, spot prices increase.

Mitigation

No additional mitigation is proposed for hydropower impacts beyond the measures described in the Water Resources Management Agreement with the CCT (Washington and CCT, 2007).

4.2.2.13 Transportation

Short-term impacts

As described in the Programmatic EIS (Ecology, 2007), withdrawals from Lake Roosevelt occur on a daily and seasonal basis, and no construction or short-term activities would be necessary to accomplish the additional withdrawals for the Proposal. As a

result, there would be no short-term transportation impacts in the Columbia River downstream area.

Long-term/operational impacts

The total additional volume of water discharged to the downstream areas would be small relative to the normal flows and would not affect barge or other vessel transportation on the river. As a result, there would be no long-term transportation impacts in the Columbia River downstream area.

As described in the Programmatic EIS, development in areas served by municipal water supplies that would benefit from the Proposal could increase, which would increase demands on transportation systems. Any new development that occurs as a result of the new municipal water supplies is expected to be consistent with adopted land use plans and polices, which have incorporated transportation requirements to accompany growth projections.

Mitigation

No additional mitigation measures are identified since no impacts are anticipated in the downstream area.

4.2.3 Odessa Subarea and Banks Lake

4.2.3.1 Earth

Short-term impacts

Short-term impacts were previously discussed in the Programmatic EIS (Ecology, 2007). Since the Programmatic EIS was issued, Reclamation and the East Columbia Basin Irrigation District have identified the need for improvements to existing irrigation facilities in order to deliver the 30,000 acre-feet of water to the Odessa Subarea. These proposed improvements and general construction impacts are described in Section 2.3.3.

The Weber Branch Siphon would require approximately 32,000 cubic yards (cy) of excavation and 27,000 cy of fill around and over the siphon pipe. Approximately 3,000 cy of gravel fill may be imported from offsite to provide a suitable foundation for the siphon pipe. The Weber Coulee Siphon will require approximately 61,000 cy of excavation and 52,000 cy of fill around and over the pipeline. An additional 5,000 cy of gravel fill may be required to provide a suitable foundation. All fill materials would come from an approved source of material, either a WSDOT certified pit or another similarly permitted site. Both siphons will generate excess excavated materials—8,000 cy at the Weber Branch Siphon and 14,000 cy at the Weber Coulee Siphon. All excess material would be hauled off site and disposed of at an approved fill site.

Excavation would clear the ground and expose soils and increase the potential for soil erosion. The area is flat and receives little precipitation; therefore, the erosion potential would be limited. Best management practices such as silt fencing, would be implemented and the project would comply with state and local stormwater regulations. Excavation and hauling of materials would also increase fugitive dust in the area.

Long-term/operational impacts

Long-term/operational impacts were previously discussed in the Programmatic EIS (Ecology, 2007).

Mitigation

Mitigation measures for construction were described in the Programmatic EIS (Ecology, 2007). The implementation of BMPS to control runoff and dust and compliance with stormwater regulations are expected to mitigate increased erosion potential at the Weber Siphon project.

4.2.3.2 Climate

Short-term impacts

The short-term impacts of the Proposal on climate change were described in Section 4.1.1. The construction proposed for the Weber Siphon (Section 2.3.3) would cause temporary increases in emissions from construction vehicles. These increases are estimated to last approximately 6 months to one year. Most emissions would be generated during a shorter time period when materials are being hauled to or from the site. Potential greenhouse gas emissions were estimated using a worksheet developed by the City of Seattle. The calculation assumed 3,000 vehicle trips, a maximum distance traveled of 50 miles, consumption of 0.125 gallons of gas per mile, and 24.30 pounds of carbon emissions per gallon of gasoline. The gallons of gas per mile and pounds of carbon emissions per gallon of gasoline estimates are based on national averages. The estimated greenhouse gas emissions for the Weber Siphon construction would be 225 metric tons of carbon equivalents during the one-year construction period. The completed project would not generate additional greenhouse gas emissions.

Long-term/operational impacts

The long-term impacts of the Proposal on climate change were described in Section 4.2.1.2.

Mitigation

Emissions from construction vehicles could be reduced by following best management practices to minimize emissions, such as maintaining engines in good working order and minimizing trip distances. These are described in Section 4.2.1.2 of the Programmatic EIS (Ecology, 2007). As discussed in Section 4.2.1.2, Ecology and Reclamation would coordinate with other Columbia River managing agencies to adaptively manage the Columbia River under changing conditions.

4.2.3.3 Surface Water

Water Quantity

Short-term impacts

Potential short-term impacts to the surface water associated with irrigation infrastructure needed in the Odessa Subarea were described in Section 5.1.2.3 of the Programmatic EIS (Ecology, 2007). The proposed improvements to the East Low Canal (Section 2.3.3) would cause construction impacts similar to those described in the Programmatic EIS. Construction at the Weber Siphons would take place both during and outside the

irrigation season, but construction is not expected to impact the delivery of water since the existing barrel siphon could be used for the delivery. There would be no short-term impacts to Banks Lake because construction would not be required to pass the additional flows through Banks Lake.

Long-term/operational impacts

The additional 30,000 acre-feet pumped to Banks Lake will be used by irrigators in the Odessa Subarea in accordance with normal crop irrigation requirements during the irrigation season. Alternatives 1B, 1C and 1D assume that the pattern of additional water pumped to Banks Lake will match the normal crop irrigation requirement pattern. Therefore, additional water will not be stored in Banks Lake and the water levels in the lake will follow the existing pattern of drawdown and refill.

Alternative 1A differs in that it is assumed that the entire 30,000 acre-feet is pumped from Lake Roosevelt to Banks Lake in July and August. To meet irrigation demands in April to June from the portion of the Odessa Subarea to be served by the additional flow, Banks Lake will need to be drawn down slightly from its current operating condition. The April to June demands are estimated to be 12,000 acre-feet. That corresponds to a decrease in Banks Lake levels of approximately 0.45 feet using the volume of 133,600 acre-feet present between elevations 1,570 and 1,565 feet (Reclamation, 2004). Banks Lake would be refilled by the end of August to normal operating conditions. The decrease in Banks Lake levels is well within the operating levels currently experienced as the lake varies between 1,565 feet and 1,570 feet in late July and August.

Under the Preferred Alternatives, water would be withdrawn directly from Banks Lake in September with no flow releases from Lake Roosevelt. In most years Reclamation is able to release Lake Roosevelt water into Banks Lake over Labor Day weekend because power demand is reduced. In dry and drought years (Alternatives 1C(b) and 1E), not enough water is available for the Labor Day releases. Therefore, Banks Lake would be drawn down during September. The drawdown would be approximately 1.5 inches at the end of September and is not expected to be noticeable. The Lake would refill in October.

Mitigation

No additional mitigation is proposed for the Odessa Subarea or Banks Lake beyond the measures described in the Programmatic EIS (Ecology, 2007) because no additional impacts to surface water quantity have been identified.

Water Quality

Short-term impacts

Short-term impacts were previously discussed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated. Construction impacts associated with the improvements to the East Low Canal would be similar to impacts described in the Programmatic EIS. Eroded materials could runoff into the wasteway in Weber Coulee.

Long-term/operational impacts

Long-term/operational impacts were previously discussed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated.

Mitigation

Mitigation was previously discussed in the Programmatic EIS (Ecology, 2007). Construction best management practices would be implemented to minimize impacts to the stream in Weber Coulee. No additional mitigation is proposed.

4.2.3.4 Ground Water

Water Quantity

Short-term impacts were previously discussed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated. Construction of the Weber Siphons is not expected to impact ground water because excavation would be above the ground water table.

Long-term/operational impacts

Long-term/operational impacts were previously discussed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated.

Mitigation

Mitigation was previously discussed in the Programmatic EIS (Ecology, 2007). No additional mitigation is proposed.

Water Quality

Short-term impacts were previously discussed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated.

Long-term/operational impacts

Long-term/operational impacts were previously discussed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated.

Mitigation

Mitigation was previously discussed in the Programmatic EIS (Ecology, 2007). No additional mitigation is proposed.

4.2.3.5 Legal Considerations

Water Rights

Short-term impacts

No short-term impacts to water rights are expected. Construction of the Weber Siphons is not expected to impact the delivery of water to irrigators as the siphons would be built separate from the existing siphons and primarily outside of the irrigation season.

Long-term/operational impacts

Under Section 14 of the MOU, the parties agreed to pursue the delivery of 30,000 acre-feet of water from Lake Roosevelt to the Odessa Subarea (MOU, Section 14). Reclamation filed a water right application with Ecology in March 2005. The water right for irrigation water for the Odessa Subarea will be a permanent secondary use permit, which will authorize Reclamation to release water from Lake Roosevelt, which it stores under its storage certificate, C-11793, priority date May 16, 1938. The secondary use permit will contain language acknowledging the intent under the MOU that water will be

developed from new storage and conservation to replace the water being provided from Lake Roosevelt (Haller, pers. comm., 2008).

Reclamation has a contract with the East Columbia Basin Irrigation District (ECBID) to deliver water to ECBID who will, in turn, deliver the water to its members in the Odessa Subarea. Water users in the Odessa Subarea currently hold ground water permits and certificates, which authorize them to withdraw ground water to irrigate their crops. Per RCW 90.44.510, the members of ECBID who receive project water from Reclamation will be issued a superseding permit or certificate from Ecology for their ground water right. The superseding permit or certificate will identify their ground water right as a standby or reserve water right to be used in times when the project water is not available. The ground water right will thereby be exempt from relinquishment during the times it is not used because project water is provided (RCW 90.14.140(2)(b)).

Under all alternatives for the timing of releases from Lake Roosevelt, Odessa Subarea water users will receive irrigation water throughout the irrigation season. This will firm up their irrigation water supply and eliminate the need to drill ever-deeper wells to obtain ground water.

Ecology may only approve Reclamation's application for a secondary permit under its existing water right if there is water available, the water will be put to a beneficial use, it will not impair existing rights, and it will not be detrimental to the public interest (RCW 90.03.250). There is water available under Reclamation's storage right, and irrigation is a beneficial use. However, under Alternative 1A, water would be released from the reservoir only during July and August, but water will be delivered to ECBID and its members from April to October. In order to authorize diversion of water at times other than during the releases, the director of Ecology must deem it to be an overriding public interest requirement (WAC 173-563-080).

Under Alternatives 1B and 1C, water would be released from the reservoir throughout the irrigation season. If it is determined that it is in the public interest to continue irrigated agriculture in the Odessa Subarea, granting Reclamation a secondary permit should be in the public interest.

Mitigation

Ecology will determine appropriate mitigation for any impacts to water rights as necessary during the processing of the water right application.

Biological Opinion

Short-term impacts

There would be no short-term impacts to the Biological Opinion from the flow releases to Banks Lake and the Odessa Subarea.

Long-term/operational impacts

There would be no long-term impacts to the Biological Opinion from the flow releases to Banks Lake and the Odessa Subarea. The flow requirements of the Biological Opinion would be met if the Proposal were implemented.

Mitigation

Because there would be no impacts to Biological Opinion flow requirements, no mitigation would be required.

Canadian Treaty

Short-term impacts

There would be no short-term impacts to the Canadian Treaty from the flow releases to the Banks Lake and the Odessa Subarea.

Long-term/operational impacts

There would be no long-term impacts to the Canadian Treaty from the flow releases to the Banks Lake and the Odessa Subarea.

Mitigation

Because there would be no impacts to the Canadian Treaty, no mitigation would be required. The renegotiation of the Treaty may, however, have impacts on the water supply to Lake Roosevelt and the flexibility in how the reservoir is operated.

4.2.3.6 Fish

Short-term impacts

Habitat changes and potential effects on local fishery resources related to construction to supply Lake Roosevelt water to the Odessa Subarea were addressed in the Programmatic EIS (Ecology, 2007). No additional impacts are anticipated from improvements to the East Low Canal because no water bodies containing fish would be affected.

Long-term/operational impacts

Flows to the Odessa Subarea are fixed under the Incremental Storage Releases Project at 30,000 acre-feet regardless of water year conditions. Only two alternatives exist for the water delivery schedule under the flow release alternatives: a July and August delivery of 244 cfs as discussed in the Programmatic EIS (Ecology 2007), and an extended April through October delivery schedule as shown in Table 4-19.

Table 4-19. Magnitude and Timing of Lake Roosevelt Flow Releases (cfs) Delivered to the Odessa Subarea under Proposal Alternatives

Alternative	*April*	*May*	*June*	*July*	*August*	*September*	*October*
Average, Dry, and Drought Water Year Conditions							
1A				181	181		
1B(a,b), 1C(a,b,), 1D, 1E	34	65	101	130	97	51	17

An increase in the amount of water conveyed through Banks Lake, Billy Clapp Lake, the Main Canal, and the East Low Canal would result from providing a surface water supply to irrigators in the Odessa Subarea. As discussed in the Programmatic EIS (Ecology, 2007), aquatic habitats are only found in Banks and Billy Clapp Lakes, as summarized below.

Banks Lake

The water storage capacity of Banks Lake is a little over 1 million acre-feet. Distributing an additional 30,000 acre-feet under Alternative 1A during the months of July and August, when the lake is annually refilling and near full pool at 1,570 feet msl, represents 1.5 percent of the storage capacity. Allocating the Odessa Subarea water across all months of the irrigation season in accordance with all other distribution alternatives would represent between 0.1 to 0.8 percent of the reservoir storage capacity between April through October.

Water flowing into Banks Lake destined for the Odessa Subarea would be simultaneously withdrawn from the south end at Dry Falls Dam. Unless a lag time between inflow and outflow occurs, lake elevations would not change materially with the incremental flow release alternatives. The flow regime would increase through-lake water velocities between 0.1 and 1.5 percent depending upon the month and alternative under consideration. During the month of September when Lake Roosevelt is being refilled, water destined for the Odessa Subarea will come from existing storage in Banks Lake and lake elevations are anticipated to decrease approximately 1.5 inches. This level of change is too small to quantify shifts in hydrological or biological conditions in the lake.

Lewis et al. (2002) report lake residence times of 146 days during the irrigation season. Worst-case influence of Alternative 1A flow regimes in Banks Lake would reduce the residence time on the order of two days in July and August. The worst-case reduction in lake residence time under the other alternatives, including the Preferred Alternative 1C, would be approximately one day in July. These modifications are too small to adversely influence either phytoplankton or zooplankton production, fish feeding or breeding opportunities in the lake, or increase the potential for fish entrainment past Dry Falls Dam.

Billy Clapp Lake

The 1,000-acre Billy Clapp Lake is a Reclamation re-regulating reservoir for the Columbia Basin Project. Reservoir volume is 64,200 acre-feet and flows can be in the range of 10,000 cfs. Water particle residence times are very short. The reservoir is filled in the spring to accommodate irrigation deliveries and drawn down in the fall to accommodate winter runoff. Reclamation strives to maintain high, stable reservoir levels in the summer. Since Billy Clapp Lake is the headworks for the Main Canal, reservoir levels remain high and stable during the irrigation season.

Potential impacts related to routing additional water through Billy Clapp Lake to fish and fish habitat, and recreational fisheries for rainbow trout, kokanee salmon and walleye pike, were addressed in the Programmatic EIS (Ecology, 2007). The only change to address in this Supplemental EIS is the extended duration of water delivery throughout the irrigation season under Alternatives 1A, 1B, and 1D compared to the Preferred Alternatives 1C and 1E.

Assuming inflow and outflow of irrigation water destined for the Odessa Subarea are simultaneous in Billy Clapp Lake, the incremental flow release alternatives should not alter reservoir elevations compared to normal seasonal operations of the reservoir. Lake residence times would be reduced compared to existing conditions, but not in a manner that would adversely influence aquatic productivity, fish spawning or rearing opportunities.

Mitigation

No impacts would occur to fisheries in the Odessa Subarea or Banks Lake; therefore, no mitigation is proposed.

4.2.3.7 Wildlife and Plants

Short-term impacts

Few short-term impacts to wildlife or plants will occur as a result of the proposed water to be diverted to the Odessa Subarea. The 30,000 acre-feet of irrigation water would be delivered with existing infrastructure. Conveyance systems would need to be built to move water from existing canals to individual farms. The conveyance systems would be located in existing disturbed and agricultural areas and few impacts to plants and wildlife are anticipated. Potential impacts of this construction would be evaluated under separate SEPA or NEPA analysis, if required.

As discussed in Section 4.1.2.6, the proposed drawdown and flow increases would not result in significant changes to lake elevations within Banks Lake. Water flowing into the lake would be nearly simultaneously withdrawn to provide irrigation water to the Odessa Subarea. The worst-case reduction in lake residence time would be one to two days, which would not have measurable effects on vegetation communities or nesting waterfowl in Banks Lake.

Short-term effects of construction on wildlife species at the Weber Siphons are anticipated to be minimal because of the limited habitat in the project area. Construction would take place within the existing canal right-of-way in an area surrounded by agricultural land and is adjacent to I-90 (Figure 2-1). No native vegetation would be removed or disturbed by the project. Construction could cause temporary disturbance to those wildlife species occurring in the area that are noise intolerant. Impacts would be associated with noise disturbance will be short-term and are expected to be minimal as all construction would occur within the built environment. Temporary noise disturbance is estimated to last approximately 6 months to one year. Wildlife species that are noise intolerant would be expected to return to the area once construction is complete.

Long-term/operational impacts

No long-term impacts to wildlife or plants will occur as a result of the proposed delivery of 30,000 acre-feet of water to the Odessa Subarea. The water would be used to irrigate existing agricultural areas and no expansion is anticipated.

Mitigation

No mitigation is required for impacts to wildlife and plants because no impacts are anticipated.

4.2.3.8 Cultural Resources

Short-term impacts

Short term impacts to cultural resources under this alternative are anticipated to be limited to infrastructure improvements such as on-farm canals. Potential impacts would be similar to those described in Section 4.1.2.9 of the Programmatic EIS (Ecology, 2007). Construction at the Weber Siphons is not expected to disturb cultural resources since construction would be limited to previously disturbed areas within the canal right-of-way.

Long-term/operational impacts

No new long term/operational impacts to cultural resources are anticipated under this alternative as there will be no changes to land use.

Mitigation

Because no new impacts are anticipated, no mitigation measures are proposed. If any canal construction projects receive state or federal funding, those projects would be subject to further cultural review.

4.2.3.9 Environmental Health

Short-term impacts

No significant short-term impacts are expected. Construction associated with the Weber Siphons would generate dust during the construction period, but this would be temporary. Few people are located in the Weber Siphon area, so no health impacts are anticipated from the temporary increase in dust.

Long-term/operational impacts

No significant long-term or operational impacts are expected.

Mitigation

No mitigation would be required beyond BMPs to minimize creation of dust at the Weber Siphons.

4.2.3.10 Recreation and Scenic Resources

Short-term impacts

Short-term impacts related to construction could occur indirectly as a consequence of the new water supplies, and construction of new irrigation infrastructure for the Odessa Subarea, are described in Section 5.1.2.11 of the Programmatic EIS (Ecology, 2007). The temporary aesthetic impacts of construction would be minor, as most of the activities would occur in or near already developed areas, or on agricultural lands. Recreation resources could also be affected, depending on the location of construction. These temporary impacts are not expected to be significant.

No construction or short-term activities would be necessary to accomplish the additional releases to Banks Lake. Construction at the Weber Siphon area would not affect recreation or scenic resources.

Long-term/operational impacts

The flows released to the Odessa Subarea would result in an increase in the amount of water conveyed through Banks Lake. However, water will be released from the south end of Banks Lake simultaneously with the water supplied to the lake. Therefore, there will be no changes to lake levels and the increased flows would not be noticeable to the recreational user.

The Proposal would result in an increase in the amount of water conveyed through Banks Lake. The total additional volume of water to be pumped to Banks Lake is 30,000 acre-feet. The average annual volume of water diverted from Banks Lake by the Columbia Basin Project irrigation districts is approximately 2.4 million acre-feet. The effect on water levels is described in Section 4.1.3.3. For all alternatives except 1A, it is expected that no change in current water levels will occur. For Alternative 1A, the level of Banks Lake may be drawn down approximately 0.45 feet by the end of June to provide irrigation water to Odessa Subarea irrigators. Anecdotal evidence suggests that drawing the lake down lower than 1,575 feet msl would negatively affect some recreational facilities (Reclamation, 2004). The decrease in lake level is well within the operating levels currently experienced as the lake varies between 1,565 and 1,570 msl in July and August. The lake would be refilled to its normal operating level by the end of August. The decrease would not be noticeable to the recreational user.

Mitigation

There would be no impacts to recreation and scenic resources; therefore, no mitigation is proposed.

4.2.3.11 Socioeconomics

Short-term impacts

There could be minor short-term economic benefits associated with the construction of irrigation infrastructure required to deliver water to individual farms.

Long-term/operational impacts

The Proposal will provide a surface water supply for irrigation in the Odessa Subarea. This water is expected to offset some demand for ground water. The economic benefits and impacts of the supply of surface water were evaluated in Section 5.1.2.7 of the Programmatic EIS.

Mitigation

No adverse economic impacts are anticipated; therefore, no mitigation is proposed.

4.2.3.12 Public Services and Utilities

Impacts to public services and utilities in Banks Lake and the Odessa Subarea were described in Section 5.1.2.12 of the Programmatic EIS (Ecology, 2007). This section provides additional discussion of potential impacts to hydropower.

Short-term impacts

There would be no short-term impacts to hydropower production in the Odessa Subarea or Banks Lake area.

Long-term/operational impacts

No impact is anticipated to the power generation at Banks Lake because the pump-storage facility will be operated the same as under existing conditions. The operation of the pumps required to lift the additional 30,000 acre-feet of water from Lake Roosevelt to Banks Lake will require energy from the Grand Coulee Dam project, which will reduce energy that may be available to the regional power grid.

A slight increase in hydroelectric production would occur at the Summer Falls and Main Canal Headworks hydroelectric facilities operated by the Grand Coulee Project Hydroelectric Authority. Those projects recover energy from water flowing from Banks Lake to the Main Canal. The Main Canal project is 26 MW and generates 10aMW. The Summer Falls Project is 92 MW and generates 39aMW. Those two plants produce roughly one-half the energy used to lift water to Banks Lake from Lake Roosevelt.

The supply of water through the East Columbia Basin Irrigation District canal system to Odessa Subarea irrigators will reduce the groundwater pumping needs in the Odessa Subarea. Pumping heads in the Odessa Subarea aquifer generally range from 500 to over 1000 feet (Ecology 2007). A reduction in energy used for groundwater pumping will benefit the regional power grid.

Mitigation

No additional mitigation is proposed for hydropower impacts beyond the measures described in the Water Resources Management Agreement with the CCT (Washington and CCT, 2007).

4.2.3.13 Transportation

Short-term impacts

As described in the Programmatic EIS, no significant short-term impacts on transportation are expected, because construction in the receiving areas would be very limited and spread over a wide area. Construction associated with the Weber Coulee Siphon is not expected to affect traffic I-90 (Figure 2-2). The siphon barrel has already been installed under the roadway. Connecting the siphon barrel to the East Canal would take place outside the I-90 right of way. Construction of the Weber Siphon could cause temporary disruption of traffic when improvements are made under Road U Northeast.

Long-term/operational impacts

As described in the Programmatic EIS, no long term transportation impacts are expected, because no major infrastructure improvements are needed and no disruption to existing transportation systems would occur.

Mitigation

Detours or traffic rerouting would be used to maintain access to areas served by Road U Northeast. Additional mitigation is as described in Section 5.1.2.10 of the Programmatic EIS.

4.3 Cumulative Impacts

The potential cumulative impacts of the Lake Roosevelt Incremental Storage Releases Project were evaluated in Sections 4.3 and 5.5 of the Programmatic EIS (Ecology, 2007). The Programmatic EIS acknowledged that the development of additional water projects in the Columbia River Basin could cause cumulative impacts that would exacerbate the impacts of existing facilities. Potential cumulative impacts include additional impediments to fish passage and increased migration times, increased total dissolved gas problems, water quality degradation, further reductions in shrub-steppe habitat and resulting impacts to wildlife, and potential social opportunity costs. The cumulative impacts could cause species already in decline to experience more severe impacts than if a single project were constructed in a less disturbed environment.

This Supplemental EIS has determined that the additional maximum drawdown of 1.8 feet for a few days at the end of August during drought years could incrementally increase the impacts described in the Programmatic EIS; however, because of the short duration of increased drawdown, the incremental increase would not be expected to be significant.

The Proposal would provide increased stream flows to benefit fish in the Columbia River downstream of Grand Coulee. These increased stream flows are expected to provide cumulative benefits to fish in most months. The adaptive management strategy developed for the preferred alternatives will allow Ecology to maximize benefits of the flow releases for fish.

The Lake Roosevelt Incremental Storage Releases Project is one of several projects that Ecology is developing to improve water management in the Columbia River Basin (Section 1.6). All of the proposed projects will undergo separate environmental review under NEPA and/or SEPA when or if the projects are carried forward. The future environmental reviews will identify impacts of the individual projects and cumulative impacts to the Columbia River Basin. Ecology will work with other managing agencies in the Columbia River Basin to identify potential cumulative impacts and develop an adaptive management strategy to minimize impacts of any further water project development. Ecology is committed, through the Columbia River Water Management Act (RCW 90.90.010(3)(a)), to basin-wide management approaches that do not result in increased cumulative impacts.

Operation of Grand Coulee Dam and all the water supply projects in the Columbia River Basin could be impacted in the future by changes in climate and by renegotiation of the Columbia River Treaty with Canada. Climate change may reduce snowpack and alter the amount and timing of runoff to Lake Roosevelt. Any renegotiation of the Columbia River Treaty could require changes in the operation of Lake Roosevelt. Ecology will coordinate with other managing agencies in the Columbia River Basin to plan for and adapt to these changes as they occur.

CHAPTER 5.0 COMMENTS AND RESPONSES

The public comment period on the Draft Supplemental EIS was held from May 15 to June 30, 2006. All of the written comments are reproduced and included in this chapter of the Final EIS. To save space, the comments have been reduced to allow two pages to be reproduced on one page. Responses to each comment letter follow the reproduced letter.

LIST OF COMMENTERS

Comment Letter No. 1—Colville Confederated Tribes – Joe Peone

Comment Letter No. 2 – Spokane Tribe of Indians – Howard A. Funke

Comment Letter No. 3 – Yakama Nation – Phillip Rigdon

Comment Letter No. 4 – Confederated Tribes of the Umatilla Indian Reservation – Jay Minthorn

Comment Letter No. 5 – Bureau of Reclamation, Ephrata Field Office – William Gray

Comment Letter No. 6 – Washington Department of Fish and Wildlife – Teresa Scott

Comment Letter No. 7 – Klickitat County Natural Resources Department – Dave McClure

Comment Letter No. 8 – Okanogan County Office of Planning and Development – Nathan Wehmeyer

Comment Letter No. 9—Stevens County Farm Bureau – Wesley L. McCart

Comment Letter No. 10 – City of Bridgeport – Peter Fraley

Comment Letter No. 11 – City of Pasco, Department of Public Works – Bob Alberts

Comment Letter No. 12 – City of Richland, Public Works Department – Pete Rogalsky

Comment Letter No. 13 – City of Pasco – Gail A. Howe, Mayor

Comment Letter No. 14 – City of Kettle Falls – David M. Keeley, Project Manager

Comment Letter No. 15 – Columbia-Snake River Irrigators Association – Darryll Olsen

Comment Letter No. 16 – Columbia Basin Development League – Michael V. Schwisow

Comment Letter No. 17 – Kennewick Irrigation District – Scott Revell

Comment Letter No. 18 – American Rivers and Washington Environmental Council – Michael D. Garrity and Michael Mayer

Comment Letter No. 19 – Center for Environmental Law and Policy – Rachael P. Osborn

Comment Letter No. 20 – Center for Water Advocacy – Harold Shepherd

Comment Letter No. 21 – Teck Cominco – Marko Adzic

Comment Letter No. 22 – Seven Bays Marina – Laurel and Lyle Parker

Comment Letter No. 23 – Mary Lines

Comment Letter No. 24 – Jan Treecraft

Comment Letter No. 25 – Ken Weeks

Comment Letter No. 26 – Christopher and Patty Esvelt

Comment Letter No. 27 – Rene Grant

Comment Letter No. 28 – Reg Davenport

Comment Letter No. 29 – M. Hart

Comment Letter No. 30 – Susanne Waid

Comment Letter No. 31 – Don and June Hoecher

Comment Letter No. 32 – Lorna Johnson

Comment Letter No. 33 – Stephenson (indecipherable first name)

Comment Letter No. 34 – Unsigned comment form

Comment Letter No. 35 – Rene Holaday

Comment Letter No. 36 – National Park Service – Debbie Bird

Comment Letter No. 37 – East Columbia Basin Irrigation District – Craig Simpson

Colville Confederated Tribes
Fish & Wildlife Department
P.O. Box 150
Nespelem, WA. 99155
Phone: 509-634-2118
Fax: 509-634-2126

May 29, 2008

Teresa Scott
Washington State Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091

The Colville Confederated Tribes would like to thank the Washington Department of Ecology and the Washington Department of Fish and Wildlife for the opportunity to provide input into the development of the Department of Ecology's Supplemental Environmental Impact Statement (SEIS) for incremental releases of storage water from Lake Roosevelt for downstream agricultural, municipal, industrial, and domestic uses pursuant to RCW 90.90.

1-1 As a principal partner in the development of the Columbia River Water Management Plan and both on and off site mitigation associated with the impacts from implementation of the plan the Colville Confederated Tribes are in a unique position to provide comment on the SEIS. Our comments should be weighted appropriately since the Tribes are carrying the burden of much of the impacts associated with the planned drawdown.

1-2 The approved draw down will divert 82,500 acre-feet of stored water from Lake Roosevelt during most years and 132,500 acre-feet during the severe drought years. This would result in an additional drop of one-foot in lake elevation during most of the water years and an additional one-and-eight-tenths-feet decrease in lake elevation during the severe drought years. According to the newly released draft National Oceanic and Atmospheric Administration's (NOAA) Biological Opinion (BIOP) the Lake elevation level would be at 1280 during the 50% of the wettest years and 1278 at 50% of the driest water years. The additional withdraw, based on the SEIS, and would decrease water elevations in Lake Roosevelt to 1279-feet and 1276.2-feet

RECEIVED
JUN 0 2 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

1-2 depending on runoff conditions. Based on coordination with the State of Washington and as reflected in the FCRPS BIOP the water to be released for fisheries is to be released in the spring time for the benefit of endangered species in the lowest 20% of the water years. In the higher 80% of the water years the fish flows should be released for the benefit of summer migrants as reflected below.

1-3 There is concern however, that a larger draw down of water in the summer of the 20% of the drier years may jeopardize the refill of Lake Roosevelt to 1283-foot elevation required by September 30th for kokanee to access spawning habitat in the tributaries. This issue should be addressed in the SEIS to avoid adverse kokanee affects.

1-4 The agreement between the Colville Confederated Tribes and Washington State states "The State of Washington (State) is seeking to implement an agreement with the United States Bureau of Reclamation to make water available below Grand Coulee Dam during certain critical months (April through August) to improve stream flows for out-migrating juvenile anadromous fish and to provide water rights for new consumptive uses by drawing down Lake Roosevelt."

1-5 The tribe reviewed historical juvenile passage data using in season forecasting from Rocky Reach and Rock Island Dams to develop our recommendations for improving survival benefits to anadromous fish. The average date that 50% of the spring migration have passed Rocky Reach is May 11th and Rock Island by May 14th. Ninety percent of the Upper Columbia spring salmon migration has passed both Rocky Reach and Rock Island Dams by June 2nd. At the Rocky Reach facility 50% of the summer migrants have passed the facility by July 10th and 90% by August 2nd. The Rock Island facility showed similar data with 50% by July 11th and 90% by August 2nd.

Based on the first three alternatives listed in the SEIS, water releases should be timed according to wet and dry years and the needs of spring and summer migrants as shown above. During the 20% of the driest years flows would be more beneficial to spring migrants because a lower than average freshet would not be available for juvenile migration. During the 80% of the wetter water years, the spring freshet is more than adequate for spring migrant requirements therefore the additional flows would be best afforded to summer migrants. For example, alternative one would release 44,500 acre-feet of extra flow during 20% drier water years. Our recommendation would be to

1-5 release water during the third week of May producing up to an additional 22 cfs for spring smolt out migration benefiting not only Spring Chinook but sockeye and ESA listed steelhead as well. During the 80% of wetter water years the release of 27,500 acre-feet should be released about the second to third week of July to benefit Summer Chinook juvenile migrants.

1-6 UCR steelhead and Spring Chinook salmon are listed as endangered under the Endangered Species Act (ESA) and have the greatest survival and recovery gaps of any listed Columbia River stock. The Tribes and the State have a common interest in promoting the recovery of listed UCR anadromous fish. The timing of release may provide more opportunity to assist with the migration of anadromous stocks (especially ESA stocks) from the upper to the middle or lower Columbia River and should be considered.

1-7 We did have a question regarding option two and three and the release of 25,000 acre feet in the 80% of the wettest years and the 58,000 acre feet during the 20% of the driest years. How will the timing of the 25,000 acre feet or 58,000 acre feet be accomplished to make it available to assist anadromous fish?

1-8 Under the fourth alternative, The Colville Confederated Tribes would request that they and other state agencies be consulted if an overriding consideration of the public interest determination is required under WAC 173-563-080

Joe Peone

Joe Peone, Director Fish and Wildlife Department
Colville Confederated Tribes

cc: Derek I Sandison,
Central Regional Director
Washington Department of Ecology

Comment Letter No. 1—Colville Confederated Tribes – Joe Peone

1-1. Comment noted.
1-2. Your comment regarding the incremental flow releases and Biological Opinion is noted.
1-3. One of the purposes of the Lake Roosevelt Incremental Storages Releases Project is to provide enhanced flows to benefit fish in the mainstem Columbia River. During drought years under the Lake Roosevelt Incremental Storages Releases Project, additional downstream flows would be released as described in Tables 4-7 and 4-8 in the Supplemental EIS. Refill under this scenario would take longer to reach the 1,283 foot elevation goal as implied in your comment. The timeframe to achieve the elevation goal currently varies between the first week and the last week of September depending upon hydrological conditions of the water year. However, as shown in Supplemental EIS Table 4-10, the Proposal is not expected to increase the risk of non-compliance by September 30 during drought years.
1-4. Your comment regarding the agreement between the State of Washington and the CCT is noted.
1-5. Ecology has selected a Preferred Alternative that includes an adaptive management approach to releasing flows from Lake Roosevelt. An advisory panel of fisheries and water managers would determine specific flow releases each year based on runoff predictions at The Dalles Dam. The flow releases would be selected to maximize benefits to fish within the limitations of the water budget. See Section 2.3.1 in the Final Supplemental EIS.
1-6. Your comment regarding steelhead and spring Chinook is noted.
1-7. See the response to your Comment Number 1-5 regarding the Preferred Alternative. Ecology is no longer considering the specific alternatives that you mention.
1-8. Consistent with the provisions of WAC 173-563-020 and 080, Ecology will consult with appropriate federal, state, and local agencies and Indian tribes when considering OCPI determinations.

Spokane Tribe of Indians

P.O. Box 100 • Wellpinit, WA 99040 • (509) 258-4581 • Fax 258-9243

CENTURY OF SURVIVAL **1881-1981**

Comments of the Spokane Tribe of Indians
On the
Draft Supplemental Environmental Impact Statement for the Lake Roosevelt Incremental Storage Releases Program

Submitted in Response to the Request for Comments on the Draft Supplemental Environmental Impact Statement for the Lake Roosevelt Incremental Storage Releases Program, issued by the Washington Department of Ecology, dated May 15, 2008.

June 30, 2008

Derek I. Sandison, Regional Director
Central Regional Office
Washington State Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902
dsan461@ecy.wa.gov

Dear Mr. Sandison:

Thank you for the opportunity to submit these comments on behalf of the Spokane Tribe of Indians ("Tribe").

2-1 The Tribe has submitted comments on the Draft Programmatic EIS for the CRWMP,[1] the scope of the Supplemental EIS for the Lake Roosevelt Incremental Storage Releases Program,[2] and now these comments on the Draft Supplemental EIS for the Lake Roosevelt Incremental Storage Releases Program ("DEIS"). The Tribe's comments express concerns for environmental and human health as well as other areas of probable impact, including cultural and economic effects. During this process, the Tribe and the State of Washington ("State") negotiated a cooperative agreement[3] ("Agreement") by which the Tribe will *"concur in and support"* the proposed

[1] Spokane Tribe of Indians' Comments on the Draft Programmatic EIS for the Columbia River Water Management Program (November 22, 2006).
[2] Comments of the Spokane Tribe of Indians on the Scope of Supplemental Environmental Impact Statement for the Lake Roosevelt Storage Releases Project (February 4, 2008).
[3] Water Resources Management Agreement for Lake Roosevelt Between the Spokane Tribe of Indians and the State of Washington, § A.1-3 (February 4, 2008)

2-1 incremental storage releases program in exchange for the State's *"full consideration and mitigation for all impacts and effects."*[4] The DEIS does not provide "full consideration for all impacts and effects," nor does the Agreement provide for full "mitigation for any potential impacts" as implied in the DEIS. The Agreement is intended to benefit the people of the State, the Columbia River Basin and the Tribe, and it was approved by the 2008 State Legislature in Engrossed Second Substitute Senate Bill 6874, and codified in RCW 90.90.[5]

In this context, the Tribe remains concerned that the incremental storage releases may cause significant cumulative long-term negative impacts to the environment, human health, cultural resources, current mitigation efforts, and recreation and economic enterprises, and that such potential impacts have not been adequately studied or analyzed. Specifically, the Tribe is concerned that the negative impacts may exceed Ecology's projections despite its conclusion that:

2-2 *"No additional environmental review is required for the Lake Roosevelt Incremental Storage Releases Program. Reclamation will determine the necessary steps for NEPA compliance when it issues service contracts. As noted above, construction may be required for some infrastructure in the Odessa Subarea. Appropriate environmental review will be conducted on those projects prior to construction. Appropriate review will also be conducted on new municipal and industrial water rights and supplemental drought permit issuance as applicable."*[6]

Finally, the Tribe does not share Ecology's opinion that cumulative impacts of the incremental storage releases will not be significant because they are *"incidental to the normal operation of Lake Roosevelt"*[7] and within *"normal reservoir operations."*[8] This is the heart of the matter: The measurable impacts, both specific and cumulative, caused by more drawdowns during high and low use periods in a changing global climate, with tons of toxins and contaminates continuing to pour into the Upper Columbia River,[9] without consideration or analysis of the additional

2-3

[4] ID. at Page 1, Para. A.1-2
[5] DEIS at § 1.3.1.2, Para. 2
[6] DEIS at § FS-3, Para. 3
[7] DEIS § 4.2.1.6, Fish, at Page 4-33.
[8] This and similar language is replete in the DEIS.
[9] See: Bloomberg.com's underwhelming story about corporate profits in the wake of Teck Cominco spilling approximately 100 gallons of hydrofluoric acid containing 2,094 pounds of lead into the Upper Columbia River on May 28, 2008:

"Teck Cominco Says Output Unaffected by Lead Spill (Update2). By Rob Delaney.
May 30 (Bloomberg) -- Teck Cominco Ltd., the world's second- largest zinc producer, said lead output at a refinery in British Columbia won't be affected by a spill that temporarily halted operations at the site yesterday.
The refinery in Trail, British Columbia, resumed production about an hour after Teck detected a malfunction that caused an acidic liquid containing 950 kilograms (2,094 pounds) of lead to spill into the Columbia River, spokesman Greg Waller said today in a telephone interview.
Vancouver-based Teck is working with government agencies to manage the spill and test the quality of the water downstream, the company said yesterday in a statement.
Teck produced 76,400 metric tons of lead at Trail last year, down from 90,300 tons in 2006, according to the company's annual report.
Teck rose C$1.76, or 3.7 percent, to C$49.17 at 4:24 p.m. in Toronto Stock Exchange trading, after falling 4.4 percent yesterday. The shares have increased 39 percent this year.
To contact the reporter: Rob Delaney in Toronto - robdelaney@bloomberg.net.

2-3 drawdowns of Lake Roosevelt likely from the proposed Montana modifications to the Libby and Hungry Horse project operations,[10] while defaulting to future coordination to address impacts, forthcoming studies to assess impacts and other forums and environmental review processes is not sufficient to assess and/or determine the impacts of the Lake Roosevelt incremental drawdown.

Potential Impacts Require Additional Study.

DEIS at § FS-1 states: "*Since the Programmatic EIS was released in 2007, additional information has become available, allowing a more detailed evaluation of the incremental flow release options in this Supplemental EIS.*" The additional information does not include specific new best science studies to quantify important impacts in Lake Roosevelt waters and the surrounding area. Similarly, the much anticipated Colville Tribe consultant studies discussed below contain some new data on fish habitat loss and water levels, but primarily focus on quantifying economic and cultural impacts rather than the potential impacts to water quality, resident fish, and environmental and human health as the Tribe understood would be included.

2-4 The CRWMP provides mitigation for consequent negative impacts and Ecology committed itself to studying and analyzing a wide range of such potential impacts; yet, the nature and extent of the impacts remain to be studied, analyzed and quantified because the DEIS:

- Does not contain new studies, data or analysis to support Ecology's determinations of no significant impacts;
- Is based upon the assumption that a drawdown within the range of current operational water levels will not exacerbate current impacts over the short and long-terms;
- Does not identify and quantify negative impacts; and
- Does not identify how and by what standard a negative impact will be determined significant.

The thrust of the DEIS is that:

1. No significant short-term impacts are expected to result from the incremental storage releases:

2-5 "*S.3.2.1 Short-term Impacts - In general, the Proposal would not require construction of additional facilities; therefore, there would be no short-term impacts. The exceptions would be the construction of irrigation infrastructure to deliver surface water to individual farms in the Odessa Subarea and possible infrastructure for the municipal industrial uses. Impacts associated with this type of individual construction projects were described in Section 5.1 of the Programmatic EIS (Ecology, 2007).*"

Last Updated: May 30, 2008 16:46 EDT."

[10] The State of Montana proposes to modify releases from Libby Dam and Hungry Horse Dam in the State of Montana, which are operations anticipated in dry years to cause additional loss or drawdown of 18" in Lake Roosevelt.

2-5 This conclusion is not supported by new studies or analysis, and it is contrary to a Colville Tribes' consultant study finding that increased exposure of soil will concurrently expose archeological artifacts and human remains.[11]

2. Long-term negative impacts, such as increased exposure of contaminated soil, impacts on fish and wildlife, changes in air and water quality, and additional exposure of cultural artifacts and human remains are not significant because they fall within the range of impacts associated with normal operating levels:

"S.3.2.2 Long-term Impacts - This Supplemental EIS compared the potential impacts of the alternatives and options for flow releases under the Proposal to the No Action Alternative. This Supplemental EIS evaluates the impact of the incremental increases in flow releases to the Columbia River and drawdowns of Lake Roosevelt. These impacts are summarized below for each element of the environment.

Earth -No increased impacts to landslides or alluvial deposition were identified. Little additional lakebed area would be exposed as a result of the Proposal.

2-6 *Climate - The Proposal will not increase emissions that could affect climate change. The effects of climate change could alter runoff to the Columbia River Basin and affect water management of Lake Roosevelt. Ecology will coordinate with other management agencies in the Columbia River Basin to respond to changing conditions as they occur.*

Surface Water - The Proposal would result in additional drawdowns of Lake Roosevelt. It is expected that the maximum drawdown for non-drought years would be approximately 1 foot on August 31. For drought years, the maximum drawdown would be approximately 1.5 feet on August 31. In both cases, the maximum drawdown is expected to last for a few days to a few weeks with refill of Lake Roosevelt beginning in early September. The timing and amount of flow changes in the Columbia River vary for the different alternatives and flow options. Average monthly flows in the Columbia River will increase in most months to provide increased benefits to fish. For some alternatives and flow release options, flows will decrease during September. These decreases are most notable in drought years.

Ground Water - The Proposal is not expected to affect ground water levels.

Legal Considerations -The Proposal is not expected to negatively affect water rights, the Biological Opinion, or the Canadian Treaty. Ecology would determine appropriate mitigation measures when processing water rights. The Proposal will not reduce flows during the Biological Opinion "salmon flow objective period." If the Canadian Treaty is renegotiated in the future, the changes may affect water supply to Lake Roosevelt and could require Ecology to adapt the Proposal to changing conditions.

[11] See: FN14 at Page 13: *"Drawdown creates increased erosion during peak recreation period. This increases the number exposed and visibility of archaeological sites and human remains. More erosion, more exposure, more people means at least a threefold increase for the potential of burial and archaeological site looting and both intentional and naïve destruction and desecration."*

Fish - The Proposal is not expected to have significant negative impacts to fish in Lake Roosevelt. No additional shoreline would be exposed beyond what is routinely exposed during current operations. Those areas have severely compromised habitats as a result of normal operations. The capacity of the lake to support growth or rearing of kokanee, rainbow trout, or white sturgeon should not be negatively impacted. The incremental storage releases would increase flows in the Columbia River by a minor amount. Although the flow increases will be small, they are expected to help meet stream flow targets in the Columbia River and provide benefits to fish. No negative impacts to fish are expected in Banks Lake. The agreements between the State of Washington and the Confederated Tribes of the Colville Reservation (CCT) and the Spokane Tribe of Indians (STI) provide mitigation for any potential impacts to fish and aquatic resources in Lake Roosevelt.

Wildlife and Plants - No significant impacts to wildlife and plants are anticipated. The additional drawdown during drought years may slightly increase the distribution and abundance of Eurasian watermilfoil. No mitigation is proposed for impacts to fish and wildlife.

Cultural Resources - Impacts to cultural resources were identified in the Programmatic EIS (Ecology, 2007). No new impacts were identified in the Supplemental EIS. Under the various alternatives, additional drawdowns would occur at different times of the year than under current operations. However, under all alternatives, the drawdowns during peak recreation season are anticipated to be small and within the normal operational range. The agreements between the State of Washington and the CCT and STI provide mitigation for any potential impacts to cultural resources.

2-6

Environmental Health - The Proposal would slightly increase the exposure of contaminated sediments during peak recreation periods. This could increase public exposure to the contamination. The contaminated sediments problem is being studied separately by the Environmental Protection Agency and Teck Cominco. Ecology will consider the results when they are available to determine if mitigation is required.

Recreation and Scenic Resources - The additional drawdown of Lake Roosevelt during peak summer recreation periods may cause some water-dependent facilities, primarily boat ramps, to be inoperable for a few days from mid-August through early September. During the worst-case drought years, a total of eight boat ramps would potentially be inoperable at times during July and August. When some boat ramps are inoperable, it is expected that boating use will shift to other ramps that are operable, similar to existing conditions. This may slightly increase congestion at these areas for a few additional days. Some developed swimming areas, mooring docks, and camping areas may be affected during worst-case drought years. Lower lake levels would also create a change in the lake viewscape for a few days under worst-case drought conditions. The agreements between the State of Washington and the CCT and STI provide mitigation for any potential impacts to recreation resources. Ecology is working with the National Park Service to identify potential impacts to recreation facilities and will develop an adaptive

management plan to mitigate significant impacts that are identified.

Socioeconomics - The Proposal is not expected to have significant socioeconomic impacts. Although some additional boat ramps may be inoperable for slightly longer periods than under existing conditions, it is expected that visitor use will shift to other areas. Although there could be some decrease in total recreation visits to Lake Roosevelt with resulting economic impacts, data from the 2001 drought indicates that total visitor use did not decline, but shifted to operable ramps.

Public Services and Utilities - The proposal would slightly increase hydropower production in spring and slightly reduce hydropower production in September and October. The reduction is not expected to significantly affect regional power production. The agreement between the State of Washington and the CCT provides for compensation to mitigate the potential impact to CCT hydropower revenues.

2-6

Transportation - The Proposal would have no impact on transportation during non-drought years. During drought years, the Inchelium-Gifford ferry could become inoperable and the need for removal of debris from the ferry ramps could increase. The agreement between the State of Washington and the CCT provides for compensation to mitigate for these potential impacts."

"4.3 Cumulative Impact. The Programmatic EIS concluded that the Proposal could compound the effect of existing drawdowns of Lake Roosevelt on fish and wildlife, cultural, recreation, or other resources. This Supplemental EIS has determined that the additional maximum drawdown of 1.5 feet for a few days or weeks at the end of August could incrementally increase the impacts described in the programmatic EIS, however, because of the short duration of increased drawdown, the incremental increase would not be expected to be significant."

The forgoing conclusions are not based upon new science or analysis. This highlights the need to quantify what happens in the environment when the volume of water stored in and released from Lake Roosevelt is increased to accommodate accelerated operations within the same range of lake levels. Accelerated operations must impact the environment in both the short and long-terms, but the nature and extent of these impacts remain to be quantified.

Areas of controversy and uncertainty remain.

Ecology acknowledges that several important areas of controversy and uncertainty remain unresolved and carry the potential to cause significant negative impacts to the environment and everyone living, working and recreating in the Columbia River Basin: (all emphasis added):

2-7

DEIS § 3.3, Climate: *"[M]ajor uncertainty of precipitation projections is how changes in large-scale weather patterns may interact with local features."; " uncertainty of the precipitation projections complicates projecting runoff for the Columbia River Basin since runoff is dependent on both temperature and precipitation."; and " Therefore, the discussion in this Supplemental EIS of potential climate change impacts on Columbia*

River Basin water resources is qualitative rather than quantitative."

DEIS § 4.2.1.9, Environmental Health: *"Concern has been raised that dry sediments could then become airborne, carrying toxic metals and organic compounds (Office of Governor Christine Gregoire, 2005). Increased recreational use of Lake Roosevelt during summer months could therefore increase chances of the public coming into contact with exposed or wind-blown contaminated sediments. Exposure and movement of contaminated sediments and pore-water chemistry could also increase fisheries contact with contamination, providing another exposure pathway to the public, especially anglers. The area of sediment that will be exposed by the incremental storage releases is within the area exposed by current operations; however, the drawdown would occur at a period when recreation use of the lake is highest.*

Teck Cominco and the EPA are currently conducting a Remedial Investigation and Feasibility Study (RI/FS), which will include human health and environmental risk assessments of contaminated sediments in Lake Roosevelt. Results of the RI/FS will not be available for this Supplemental EIS, but will be considered by Ecology upon completion."

2-7

DEIS § S.4, Areas of Significant Controversy and Uncertainty: *"Potential impacts associated with the Teck Cominco contamination of Lake Roosevelt is an area of uncertainty. The extent and location of the contamination is not fully understood and is the subject of on-going studies by the Environmental Protection Agency and Teck Cominco. Results of those studies will not be available for this Supplemental EIS, but Ecology will consider the results when they become available in the future. It is not expected that the Proposal will add significantly to the exposure of the contaminants. The Proposal will not expose areas that are not already exposed during normal reservoir operations. Under the Proposal, additional drawdowns will occur during different times than under normal operations, but are expected to last for only a few days to a few weeks."*

Specifically referring to Lake Roosevelt, there are new tables and charts in DEIS §§ 4.1 and 4.2 indicating that the incremental storage releases will lower Lake Roosevelt's water level within the current range of operations; further, that the storage releases will be timed to meet water temperature and minimum flow targets. This is not new information, however, as the Final Programmatic EIS reached the same sweeping conclusions.

2-8

Ecology states that new information will be considered when received (*e.g.*, EPA/Teck Cominco study), but there is no reference to the procedure for these evaluations and what the standards will be for determining and acting upon a significant impact. Of further concern is that many of the Tribe's past comments and requests for information and best science data on the cumulative impacts of the proposed incremental storage releases remain open questions.

2-9

Colville Tribes' consultant studies.

The Tribe previously commented on the need for "*completion of studies*[3] *utilizing best science to*

determine the nature and extent of such impacts and effects as well as effective measures to minimize and mitigate them." [12] As stated in the footnote to that comment:

2-9

"[3] Note: The Spokane Tribe has made repeated requests to the Washington State Department of Ecology for studies conducted in 2007 bearing directly on the potential impacts of this proposed drawdown on water quality, resident fish and hydropower generation in Lake Roosevelt and any other relevant studies or study results generated to date. The studies and study results have not yet been received." [13]

The *"studies conducted in 2007"* refers to studies then being performed for the Colville Tribes. On April 10, 2008, the Tribe received two such study reports.[14-15] With a few exceptions, the reports focus on the potential impacts of the proposed drawdown on economic and cultural impacts, but not on water quality, resident fish, and environmental and human health.

2-10

The first of these exceptions is in the Columbia River Water Management Plan - Analysis of Impacts on Confederated Tribes of the Colville Tribes in which impacts to fish habitat are discussed in terms of how many acres of shallow area land will be exposed for mitigation purposes. The report's introduction states that several potential environmental and human health impacts should be revisited (emphasis and bracketed language added):

"In addition to these impacts [i.e., Fish Habitat; Irrigation Pumping Costs; Ferry Operations; Recreational; and Cultural Resources], there are several other impacts that may be considered in the future that were beyond the scope of this report or that could not be adequately analyzed given current information. These impacts may include:

- ▶ *Sloughing/erosion resulting from additional drawdown.*
- ▶ *Exposure of contaminated soil and associated health impacts from direct exposure to tribal members (i.e., skin impact) or exposure to airborne contaminants.*
- ▶ *Impacts on conventional water quality criteria (e.g., temperature and total dissolved gas).*
- ▶ *Impacts associated with the re-suspension of hazardous materials.*
- ▶ *Impacts on groundwater flow and community wells.*
- ▶ *Cumulative impacts.*

These topics should be revisited as additional information becomes available that could shed light on the nature and extent of these impacts." [16]

2-11

The remaining exceptions are in the Columbia River Water Management Plan - Analysis of Impacts on Confederated Tribes of the Colville Tribes, Appendix E - Impact of the Columbia River Management Program on Lake Roosevelt Water Levels (prepared by Watson Engineering,

[12] See: FN2 at Page 2, Para. 1.
[13] ID. at Page 2, bottom.
[14] Columbia River Water Management Plan - Analysis of Impacts on Confederated Tribes of the Colville Tribes.
[15] Analysis of Alternative Operating Scenarios for Hydropower and Impact Upon Agreement Between the Confederated Tribes of the Colville Reservation and Bonneville Power Administration (January 8, 2008).
[16] See: FN8 at Page 2, below Table 3.

Helena, MT; dated December 26, 2007):

2-11 1. Potential impacts to environmental and human resources are mentioned, but not fully discussed in this report: *"Changes in water levels caused by the CRWMP proposal for Lake Roosevelt were evaluated to assist in the determination of causal impacts between lake levels and environmental, cultural and human resources."* [17]

Again, this is the heart of the matter and it remains to be studied and analyzed so that a model is developed to reflect the causal relationship that is acknowledged in the DEIS, but not quantified or given adequate weight because new data was not sought to be included.

2-12 2. Assuming a *"median elevation in May of 1260 feet with 2000 Biological Opinion operating conditions,"* [18] this report presents worst case drawdown scenarios in Table 1 to *"assist in bracketing the worst conditions for analysis of environmental, cultural and human resource impacts. As BPA model runs are refined to address the Biological Opinion now under construction and the CRWMP proposal, changes to water levels should be reexamined. However, significant differences in the results of Table 1 are not expected."* [19]

This study indicates that the water level may fall as much as 3.93' during May in a worst case drought year scenario. The DEIS does not appear to incorporate this study and its findings.

2-13 3. An increased frequency of drought years due to climate change is demonstrated in Figure 1 and explained as follows: *"Assuming future NWS forecasts are reasonably accurate and climate change, if any, is more accurately reflected in the last 50 years than in earlier periods of record, DOE drought definitions might be met on average once in every 5 years in the future as contrasted with once in every 26 years."* [20]

The DEIS does not appear to incorporate this idea or the study's related findings. How will more frequent drought years exacerbate potential impacts associated with drawdowns, and will these impacts become significant?

2-14 4. As stated above, the DEIS also fails to consider or analyze the Montana proposal for Libby Dam and Hungry Horse Dam project operations, which are expected to result in an additional 18" elevation drawdown of Lake Roosevelt in dry years.

2-15 **Conservation:**

The Tribe is also concerned about water conservation which should be at the forefront of all actions and management practices involving downstream use of increased volumes of water stored in Lake

[17] See: FN9 at Page 5, Para. 6.
[18] ID. at Page 6, Para. 3.
[19] ID. at Page 7, Para. 2.
[20] ID. at Page 8, Para. 3.

Roosevelt. Wasteful practices are contrary to the long-term best interests of the Tribe and the State; yet, conservation receives conflicting treatment in the DEIS. Specifically, Ecology responded to two scoping comments[21] as follows:

Alternatives: add an aggressive water conservation alternative.	See Section 2.5.2 of the Supplemental EIS.

Ecology should not support projects that reward wasteful practices such as the Tri Cities and Odessa.	Ecology and Reclamation's conservation programs are discussed in Section 2.5.

2-15 The Tribe agrees with the comments that aggressive conservation and prevention of wasteful practices must be pursued, although not necessarily to the absolute exclusion of new permits. The relationship between use and conservation must be addressed. Ecology's responses appear to indicate that aggressive conservation and prevention of waste is not a priority as related to the incremental storage releases and the issuance of new permits, and that agricultural users, whether existing or new, will not be required at some point to make capital improvements and changes in practices necessary to prevent a crisis situation where the inefficient practices continue and more water from the Upper Columbia Basin or Lake Roosevelt is requested to subsidize the waste:

> *"Another option that has been advocated in comments on the Programmatic EIS and scoping comments on this Supplemental EIS is conservation. Commenters have suggested that Ecology should require conservation for all water users and not issue new water rights. The Columbia River Basin Water Management Program encourages and allocates funding for conservation projects. A number of conservation projects are being actively pursued in the Columbia River Basin, including on the Columbia Basin Project and in the Odessa Subarea. However, conservation is not expected to provide enough water to meet demand in those areas."* [22] (emphasis added)

This misses the point because conservation does not need to cover all of the needs at issues. Rather, conservation means making a dent when possible.

2-16 In contrast, Ecology states several times that conservation is a key goal of the CRWMP and Ecology's management of the limited water supply in the Columbia River Basin (all emphasis added):

> *"The Management Program recognized that a key priority of water resource management in the Columbia River Basin is the development of new water supplies, including storage and conservation in order to meet the economic and community development needs of people, and the instream flow needs of fish."* [23]

> *"The Act also establishes the Columbia River Basin Water Supply Development Account and authorizes its use to assess, plan, and develop new storage; improve or alter*

[21] DEIS, Appendix B.
[22] DEIS § 2.5, Alternatives Considered but Not Carried Forward; and § 2.5.2, Conservation.
[23] DEIS at Page FS-1.

operation of existing storage facilities; implement conservation projects; or undertake any other actions designed to provide access to new water supplies within the Columbia River Basin." [24]

"Ecology conducted agency consultation on the VRA and issued a SEPA Addendum to the Programmatic EIS in January 2008. Ecology does not currently envision proceeding with full implementation of portions of the VRA pertaining to new water rights until a pilot program has been completed. The purpose of the pilot program is to demonstrate that proposed conservation projects will result in saved water that could be used for issuing new water rights." [25]

"In addition, Ecology is considering three non-storage alternatives—enhanced water conservation, market-based reallocation of water resources, and ground water storage." [26]

"There is no term or expiration under the agreement; rather, this section of the MOU describes the intent of the parties to provide a meaningful immediate supply of water to
2-16 *benefit both instream and out-of-stream needs in the Columbia River Basin, and to work on other long-term storage and conservation alternatives.*

...

Ecology plans to continue to evaluate long-term storage and conservation plans to add to its water supply development portfolio and at some point replace the water described herein." [27]

"Although the water rights would be permanent, federal law prohibits Reclamation from entering into permanent water service delivery contracts. Ecology and Reclamation will negotiate the length of the service contract as part of a MOA covering the secondary use permits. There is a chance of adverse impact on permanent new municipal and industrial water rights if the water service delivery contract with Reclamation is not renewed when its term expires. However, by that time it is Ecology's intention to have provided alternative sources of water through new storage and conservation programs." [28]

"When instream flows will not be met, those holding temporary permits may divert only if water in Ecology's "drought insurance" program is available to mitigate the diversion. The drought insurance program includes the 33,000 acre-feet from Lake Roosevelt and water obtained by Ecology from dry-year leases, water conservation projects, and aquifer and surface storage." [29]

"The water right for irrigation water for the Odessa Subarea will be a permanent

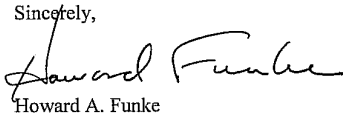
[24] DEIS § 1.1, Introduction, at Page 1-1.
[25] DEIS § 1.6.3, Columbia-Snake River Irrigators Association Voluntary Regional Agreement, at Page 1-11
[26] DEIS § 1.6.5, Yakima River Basin Water Storage Feasibility Study, at Page 1-12.
[27] See: FN8.
[28] DEIS § 4.2.2.5, Legal Considerations (non-drought years), at Page 4-61.
[29] See: FN18 (drought years) at Page 4-62.

2-16 *secondary use permit, which will authorize Reclamation to release water from Lake Roosevelt, which it stores under its storage certificate, C-11793, priority date May 16, 1938. The secondary use permit will contain language acknowledging the intent under the MOU that water will be developed from new storage and conservation to replace the water being provided from Lake Roosevelt (Haller, pers. comm., 2008)."* [30]

Conclusion:

In the spirit of cooperation, the Tribe concurs with and supports the incremental storage releases program. During implementation of the program, *"properly scoped studies and analysis utilizing best science"* must *"determine the effects of the proposed storage drawdown on Tribal resources and the relationship between increased consumptive use of water supplies and the survivability of endangered anadromous fish"*; further, *"[t]he State of Washington must expand its pursuit of*
2-17 *best science, enhance the protection of senior water right holders and protect a range of Tribal trust resources."* [31] Also, meaningful conservation efforts must occur through enforcement of existing rules as well as by development of new measures to prevent waste. This path will allow Ecology to take the hard look necessary to assess the cumulative impacts of increased drawdowns of Lake Roosevelt. If the negative impacts become significant beyond what can be fairly compensated for or mitigated against, or should the Tribe's federally reserved rights be implicated, then the 'no action' option should be reconsidered.

Sincerely,



Howard A. Funke

cc: Rudy Peone, STOI, Natural Resources
B.J. Keiffer, STOI, Natural Resources
Warren Seyler, STOI, Natural Resources

[30] DEIS § 4.2.3.5 Legal Considerations, at Page 4-75.
[31] FN2 at Page 18, Para. 2-3.

Comment Letter No. 2 – Spokane Tribe of Indians – Howard A. Funke

2-1. Comment noted.

2-2. The quoted statement from the Draft Supplemental EIS is from the Fact Sheet of that document and refers to future environmental review required specifically for the Lake Roosevelt Incremental Storage Releases Project. Potential cumulative impacts are described in Section 4.3 of the Supplemental EIS. The need for future environmental review of other projects proposed in the Columbia River Basin is acknowledged in Sections 1.6 and 4.3.

2-3. The Supplemental EIS describes a series of potential impacts none of which are individually significant. In Sections 1.6 and 4.3, Ecology has considered a wide range of impacts associated with other projects proposed in the region. These other projects could affect Lake Roosevelt and the Columbia River in the future. All of these projects are undergoing separate environmental review under SEPA and/or NEPA or will undergo such review when they are brought forward. This additional review and ongoing consultation between Ecology, tribes and local, state and federal agencies is expected to avoid or minimize cumulative impacts. Management of the Columbia River will be adaptively managed to further avoid cumulative impacts.

2-4. The new information that became available for the Supplemental EIS included the alternatives and options for flow releases. The additional information on the flow releases allowed Ecology to evaluate the effect of the releases on lake levels of Lake Roosevelt. That information was used to evaluate the potential impacts. Ecology determined that the drawdown of lake levels would occur for a few days to a few weeks in late August. The limited amount and duration of the drawdown is not expected to cause significant impacts.

2-5. For purposes of the Supplemental EIS, short-term impacts are those that would occur as a result of construction. See the discussion at the beginning of Chapter 4 of the Supplemental EIS. No construction is required to implement the storage releases project except for the infrastructure improvements in the Odessa Subarea as noted in the Supplemental EIS. Impacts of construction in the Odessa Subarea were evaluated in Section 5.1 of the Programmatic EIS. Additional information has been added to the Final Supplemental EIS regarding construction impacts associated with improvements to the Weber Siphons. Because there would be no other construction, no studies or analysis were required on construction or short-term impacts.

The impacts of increased shoreline exposure on cultural resources were described as long-term impacts in Section 5.1.1.9 of the Programmatic EIS. No additional analysis was necessary for the Supplemental EIS.

2-6. The sections of the Draft Supplemental EIS that are quoted in your comment letter are taken from the summary chapter. Additional information and analysis are provided for all subjects in Chapters 3 and 4 of the Supplemental EIS. The Supplemental EIS determined that the limited amount and duration of the lake drawdown is not expected to cause significant impacts.

2-7. As you state in your comment, the Supplemental EIS acknowledges that there are areas of uncertainty associated with climate change and the contamination of Lake Roosevelt and its shoreline. As stated in Section 4.2.1.2, Ecology and other managing agencies would coordinate to adapt to any changes in water availability in the Columbia River Basin

resulting from climate change. Additional information has been added to Section 4.2.1.9 regarding how Ecology will respond to the ongoing studies of Lake Roosevelt sediment contamination.

The tables and charts you reference contain new information about the timing of the storage releases, which was used to determine the amount and duration of the drawdown of Lake Roosevelt. The information on timing of the storage releases was not available for the Programmatic EIS.

2-8. Comment noted. Sections S.4 and 4.2.1.9 describe how Ecology will evaluate new information on Lake Roosevelt contamination.

2-9. The STI has been provided with all the studies that Ecology has received. Additional studies will be conducted under the agreement between the State of Washington and the CCT.

2-10. Impacts associated with the list provided in this comment were evaluated in the following sections of the Supplemental EIS:

Sloughing and erosion in Section 4.2.1.1
Exposure of contaminated soil in Section 4.2.1.9
Water quality in Section 4.2.1.3
Re-suspension of hazardous materials in Section 4.2.1.9
Groundwater in Section 4.2.1.4
Cumulative impacts in Section 4.3

2-11. This Supplemental EIS has further evaluated the impacts of additional drawdown of Lake Roosevelt. A model was not developed, but the amount of drawdown that would result from each alternative was estimated. The estimated drawdown amounts were compared to existing conditions and the extent of potential impacts to natural, cultural, and man-made resources were evaluated based on the estimated drawdowns. See Tables 4-2 to 4-8 for estimates of drawdown.

2-12. The information in your comment is taken from a discussion on page 5 of the December 2007 report "Impact of the Columbia River Water Management Program on Lake Roosevelt Water Levels" prepared for the CCT. The report was prepared before Ecology had developed the flow release alternatives for incremental releases from Lake Roosevelt. The information you cite is based on a worst-case scenario of releasing all the flows under the Lake Roosevelt Incremental Storage Releases Project in the month of May (page 5, paragraph 3 of the report). Ecology has never considered releasing all of the flows during one month and that is not an alternative presented in the Supplemental EIS. Releasing all of the flows during such a limited timeframe would not meet the purposes of the project. Because it is not a viable alternative, Ecology is not required to consider its impacts.

2-13. The impacts of climate change were evaluated in Section 4.2.1.2. Because of the uncertainty associated with precipitation and the frequency of drought years in climate models, the Supplemental EIS does not specifically evaluate those impacts. The Supplemental EIS does acknowledge that climate change could change the amount and timing of runoff to Lake Roosevelt. As stated in the Supplemental EIS, Ecology will coordinate with Reclamation and other managing agencies in the Columbia River Basin to adapt management of the Columbia River to changing conditions.

2-14. See the response to your Comment Number 2-3. The effect of the proposed operational changes at Libby and Hungry Horse Dams on Lake Roosevelt would be coordinated by

the FCRPS.

2-15. Although conservation is not a component of the Lake Roosevelt Incremental Storage Releases Project, it is part of the Columbia River Water Management Program as you note in your Comment Number 2-16. Ecology is pursuing conservation through other projects in the Columbia River Basin. In addition, Ecology will require that recipients of water from the flow releases implement conservation measures (Sections 2.4.1.2 and 2.4.2.2).

2-16. See the response to your Comment Number 2-15. Ecology agrees that conservation is an important component of water supply management in the Columbia River Basin.

2-17. Comment noted.

June 30, 2008

Derek I. Sandison
Department of Ecology
15 W Yakima Ave, Suite 200
Yakima, WA 98902-3452
Email dsan461@ecy.wa.gov

Re: Lake Roosevelt Comments

Dear Mr. Sandison,

3-1 Yakama Nation staff submits the following comments on the Supplemental Environmental Impact Statement (SEIS) for the proposed "Lake Roosevelt Incremental Storage Releases".

The SEIS fails to recognize some basic facts.

3-2 First, more water for out of stream uses equals less water for instream uses. It is fundamentally inaccurate claim that this plan will produce additional water for instream flow. An accurate statement would be that for every unit of instream flow lost to new out of stream uses, half that much flow may be retimed to partially mitigate for the loss of the additional out of stream water. The willingness of the Yakama Nation to allow staff to

3-3 participate in the exercise of retiming that water does not represent approval of or acquiescence in the removal of additional water from the instream flow budget of the Columbia River and should not be represented as such.

3-4 Second, the Yakama Nation and other Columbia River Treaty Tribes have the senior water rights to the Columbia River. The State has no authority to in any way diminish those Treaty Rights, and the Yakama Nation does not agree with any diminution of those rights associated with the proposed Lake Roosevelt action or other components of the State's Columbia River programs.

3-5 The State has switched from one misleading title for the proposed action to another. The term "drawdown", has now been replaced with "releases". In truth, only a small portion of the water in question would be released from Lake Roosevelt under this proposal. Release is an expression that most readers would take to mean that the water would be in stream below Grand Coulee. In reality, most of the water would be pumped uphill from Lake Roosevelt for new consumptive uses and would be lost to the Columbia River. These are proposed new diversions from the Columbia River and should be labeled as

3-5 such. The net result of this proposal is that there would be a loss of water to the Columbia River. Note that the term release is correctly used on page 3-20.

3-6 The Yakama Nation has previously submitted comments and correspondence related to the Lake Roosevelt proposal. These include, but are not limited to comments on the Draft EIS for the Columbia River Water Management Plan (CRWMP), Scoping comments on the Lake Roosevelt SEIS, comments on the Supply and Demand Inventories, and letters relating to the CRWMP and CRPAG. We incorporate all such previous correspondence by reference.

3-7 The Yakama Nation reserves all rights and remedies available to it including any remedies to protect its Treaty Rights. The Nation reserves all rights to make any argument with respect to and in any subsequent state and federal processes including but not limited to the issuance of new state water rights, federal water delivery contracts, NEPA, ESA or others.

Any new water rights or authorized diversions or "releases" that may result from this proposed action would be junior to the Treaty Rights of the Yakama Nation and would be subject to curtailment as needed to satisfy the Nation's Treaty Rights.

3-8 This proposal would result in a net loss of streamflow in the Columbia River. Any claims that this proposal would "enhance" however defined, or increase streamflow needs to be viewed in the context of net loss. Use of such terms as "additional water" is misleading.

3-9 Section 1.7 incompletely describes the major areas of concern stated in scoping comments. In particular, we previously expressed concerns about the reduction in stream flow that would inevitably result from the increased pumping from Lake Roosevelt to satisfy additional consumptive use (e.g. Odessa). Section 1.7 only mentions concerns with increased flow, whatever those may be. Unless the EIS clearly documents that the proposal would result in a net decrease in fish flows, documents when those flow deficits would occur, and fully discloses the additional problems those decreases in flow would cause for aquatic resources, the EIS can not be considered adequate.

3-10 Page 2.2 and elsewhere in the EIS where OCPI is discussed:
The Yakama Nation has already made clear its views on the use of OCPI as a tool for authorizing additional water use from the Columbia River. We incorporate by reference the letter from the Yakama Nation to Director Manning on this topic. The notion that any proposed new state-based use from the Columbia overrides the public and Tribal interest in the Columbia River ecosystem and river-based economy is offensive to those whose interests have depended for millennia on the health of the Columbia River instream economy. We wholly reject the approach of using either ad hoc or systematic invocations of overriding public interest to defeat the purposes of instream flow protection. Likewise individuals, such as those with State permits in the Columbia, who freely accepted water rights conditioned on instream flow or with full knowledge of non-sustainable rates of groundwater pumping have not earned "overriding consideration of

3-10 the public interest" to defeat those minimum flows. The flows in WAC and the OCPI process are based on state law and are not equal to the Treaty Water Rights of the Yakama Nation, which can not, in any event, be diminished or affected in any way by actions of the State.

3-11 The EIS does not make clear the fate of the "stream flow enhancement water". On page 2.3, mention is made of what occurs "after perfection of a water right". The meaning of perfection in this context is not clear. After "perfection" both the instream flow water and M&I water would be put in trust "for a minimum of one year" according to the SEIS. Permits would then be issued on the water in trust. This construction leaves unanswered about the fate of the instream flow water. Would it be permitted away downstream by the State? Would it be dedicated to stream flow to go to the ocean? Would the dedication to instream flow be permanent, temporary, or subject to subsequent determinations of OCPI? There are a number of questions about Ecology's proposals and their impacts that are not answered nor are their impacts nor other options disclosed.

3-12 4.2.2.3 Surface Water Water Quantity Short-term impacts: "No short-term impacts will occur…" This sentence, cut and pasted from elsewhere in the document, does not seem to fit here. The nature of the proposal would be to have short and long term impacts on surface water quantity.

3-13 The EIS fails to address the potential adverse impacts associated with reduction of September and October flows in the Columbia River which it concedes will occur. The EIS improperly cites the National Academy of Science (NAS) report to assert that flow reductions outside of July and August have no impact and require no analysis or mitigation. In fact, the National Academy of Science was asked to analyze increasing summer withdrawals from the river. They strongly advised against it. They were not asked to evaluate decreasing September and October flows, and their report is being improperly used to justify these flow reductions.

3-14 The sections on Instream Flow, Fisheries, and Cumulative Impacts all disregard the potential adverse impacts of reductions in fall flows. The tables on pages 4-55 and 4-66 show predicted decreases in flow in September and October of up to a 3% reduction in streamflow. Rather than actually perform any real analysis the SEIS writes off these impacts with such statements as

- "The differences in flow are a very small percentage of flow in the Columbia River downstream of Lake Roosevelt".

and

- "As tributaries enter the Columbia River, the percentages decrease".

and

- "No mitigation is proposed as the proposed releases will increase Columbia River flow during critical fish periods and will not cause negative impacts"

This is a wholly inadequate environmental review.

Thank you for the opportunity to comment on this document.

Sincerely,

Philip Rigdon, Deputy Director
Yakama Nation Department of Natural Resources

Comment Letter No. 3 – Yakama Nation – Phillip Rigdon

3-1. Comment noted.

3-2. Comment noted. The water that is being released from Lake Roosevelt for this project is water that currently remains behind Grand Coulee Dam under Reclamation's 1938 storage right. The Lake Roosevelt Incremental Storage Releases Project changes the timing of the release of that water to meet the multiple purposes of the Columbia River Water Management Act. The storage releases for fish are not intended as "partial mitigation" for out-of-stream use, but are part of the overall proposal to provide water for both out-of-stream and instream uses. The flow releases will be timed to provide maximum benefits to fish.

3-3. Your comment regarding the Yakama Nation's participation in the Lake Roosevelt Incremental Storage Releases Project is noted.

3-4. Your comment regarding tribal water rights to the Columbia River is noted. Ecology acknowledges that state action cannot impact treaty rights of the Yakama Nation or any other native tribe.

3-5. Your comment regarding the title of the project is noted. With the exception of the 30,000 acre-feet which will be diverted to Banks Lake to replace some ground water use in the Odessa Subarea, all of the water will be released from Grand Coulee Dam. A total of 52,500 acre-feet of water will be released from Grand Coulee in all years and 102,500 acre-feet will be released in drought years. Of those totals, 27,500 acre-feet will be retained instream during all years and 44,500 acre-feet will be retained instream during drought years. As you note, some of the water released from Grand Coulee will be diverted for new consumptive uses. However, Ecology will work with a panel of fisheries and water managers from WDFW, Reclamation, tribes and other agencies to time the releases of the water for municipal/industrial use and interruptible water rights to benefit fish to the extent possible.

3-6. Comment noted. These documents have been received by Ecology.

3-7. Comment noted.

3-8. See the responses to your Comment Numbers 3-2 and 3-5. As shown in Table 4-14, the Proposal will decrease Columbia River flows in September and October. These decreases are considered small relative to the overall volume of water in the river (less than 4 percent in drought years). Flows in the river will increase in all other months. Potential impacts associated with the reduced flows are described in Sections 4.2.2.3, 4.2.2,5 and 4.2.2.6. The impacts are not considered significant.

3-9. The Final Supplemental EIS has been revised to address stream flow reductions in more detail. See Sections 4.2.2.3, 4.2.2.5, and 4.2.2.4.

3-10. Ecology appreciates your views on the use of OCPI to resolve conflicts between instream flow rights and out-of-stream water rights. We also recognize the Yakama Nation's time immemorial rights and interests in the Columbia River ecosystem. Ecology recognizes that an OCPI determination is not to be used on a routine basis, but it is one of the tools available to Ecology to allocate water.

Ecology's objective is to use all of its available tools and resources to carry out the legislature's objectives, including the protection of existing water rights and, where possible, the enhancement of instream flows. The Preferred Alternatives (Sections 2.3.2.3

and 2.3.3 of the Final Supplemental EIS) include an adaptive management process that would allow fish and water managers from tribal, state, and federal agencies to schedule releases of water from Lake Roosevelt to maximize fish benefits. Under the adaptive management approach, the supplemental releases would be timed to provide maximum benefits to fish in the Columbia River downstream from Grand Coulee Dam. Because the releases of water would occur when the fisheries and water managers deem it would be most beneficial to fish, some releases could be made at times when the flows would not provide an in-time offset for out-of-stream uses, such as municipal and industrial. If this occurred during a year with forecast runoff at The Dalles Dam of less than 60 million acre-feet (a severe drought year), then a finding of OCPI would be required for the release schedule. Ecology would use an OCPI determination as a tool to provide flexibility in timing the flow releases to be most advantageous for fish.

3-11. Ecology agrees that the use of the phrase "after perfection of a water right" is confusing and has made changes to the text. The water for stream flow enhancement and municipal and industrial uses would be transferred to the Trust Water Rights Program based on the terms negotiated under the water supply delivery contract with Reclamation. After that time, water rights permits would be issued for the water in the Trust Program. The water dedicated to stream enhancement in the Trust Water Rights Program is intended to remain instream from Grand Coulee Dam to the mouth of the Columbia River. It will not be committed to mitigation of downriver out-of-stream uses. The water will be protected based upon its priority date of 1938. Because the water becomes available from Reclamation's water right for storage through a water service delivery contract and a drought relief contract, the water for instream flow is insured for the duration of the contracts. The term of the contracts between Ecology and Reclamation for both non-drought and drought years will be 40 years with an option to renew.

3-12. For the purpose of this EIS, short-term impacts refer to construction impacts (see the beginning of Chapter 4). No construction is required to implement the Lake Roosevelt Incremental Storage Releases Project other than infrastructure improvements in the Odessa Subarea. That construction is not expected to impact surface water quantity. Impacts of changing flows were evaluated as long-term impacts.

3-13. See the response to your Comment Number 3-9 regarding the impacts of reduced flows in September and October.

Your comment regarding the National Academy of Sciences report is noted. The findings of the National Academy of Sciences and their application to the Columbia River Basin Water Management Program were described in Section 1.3.1.3 of the Programmatic EIS (Ecology, 2007). The report is only cited in the Supplemental EIS (Section 2.3.2.1) to describe how Alternative 1A, which was evaluated in the Programmatic EIS, was developed. The proposed flow releases are not limited to the months of July and August. As noted in Section 2.3.1.1 of the Supplemental EIS, the July and August period was originally selected for the Programmatic EIS to agree with the requirements in the Columbia River Water Management Act. For the Supplemental EIS, Ecology developed other alternatives for the flow releases since the requirement in RCW 90.90.030 relates specifically to the approval of Voluntary Regional Agreements and not to all aspects of the Management Program. Because the July and August releases (Alternative 1A) would not meet the purposes of the incremental flow releases project, Alternative 1A was not

selected as the Preferred Alternative.

3-14. The text has been changed to address fall flow reductions in the Columbia River in more detail. See the response to your Comment Number 3-9.

CONFEDERATED TRIBES
of the
Umatilla Indian Reservation
P.O. Box 638
PENDLETON, OREGON 97801
Area Code 541 Phone 276-3165 FAX 276-3095

General Council and Board of Trustees Fish and Wildlife Commission

July 1, 2008
Via E-Mail

Derek Sandison
Central Regional Director
Washington Department of Ecology
15 West Yakima Ave., Suite 200
Yakima, WA 98902-3452
dsan461@ecy.wa.gov

Subject: Draft Supplemental Environmental Impact Statement for Lake Roosevelt Incremental Storage Releases Program

Dear Mr. Sandison:

4-1 The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) offers the following comments on the Draft Supplemental Environmental Impact Statement (SEIS) for the Lake Roosevelt Incremental Storage Releases Program.

4-2 In general, the CTUIR believes that the proposed storage releases would best meet fish needs by supplementing declining flows after the peak of the naturally-produced hydrograph has been achieved, for all water years as measured at McNary Dam. In an average year this would occur in June and the first half of July. In a dry year this would occur in late May through June. This would decrease fish travel time and delay increases in mainstem summer water temperatures.

Analysis by the Fish Passage Center in Portland indicates that allocating water for instream benefits to fish evenly over a two-month or longer period results in a flow increase of less than 1 kcfs per day.[1] The CTUIR does not believe that the "maximum fish flows option 1C(a)" in the SEIS provides the best fish benefits.[2] Spreading the water out from April to September would yield minimal to no fish benefits.

[1] Memorandum from Michelle DeHart, Fish Passage Center, to Peter Jensen, "Grand Coulee Draft," Feb. 7, 2008.
[2] SEIS, p. 51.

4-3 The Draft SEIS presents allocation schedules/alternatives for releases of stored water for instream fish water and out-of-river industrial and municipal uses under average and dry-year conditions. The CTUIR recommends, instead, that an adaptive management approach be used. Each year, after the January 1 runoff forecast is released, a committee consisting of the fish and water managers from appropriate tribal, state and federal agencies (e.g., WDOE, WDFW, Reclamation, NOAA Fisheries, USFWS, Tribes) would consider an augmentation schedule for Lake Roosevelt water, based on the projected the flow volumes and runoff. This will promote more "real-time" decision-making, leading to more positive migration conditions and benefits than would adherence to a more rigid and inflexible allocation scheme.

4-4 Furthermore, in April the U.S. Army Corps of Engineers often releases storage from its projects for flood control or to attempt to meet flood control rule curves for spring flows in dryer years. Releasing Lake Roosevelt water in April would therefore not be very productive if the Corps was already releasing storage to meet flood control rule curves in a wet year. Releasing Lake Roosevelt water in April would also reduce the ability to meet refill targets for flood control rule curves for salmon flows in dry years. Releasing stored water during September would also undermine the goal of refilling Lake Roosevelt by October 1.

4-5 Available data indicate that not many fish survive through the hydrosystem in August due to increasing temperatures, which are likely to become worse with climate change. Releasing a small volume of water during August will therefore not do much to improve unfavorable temperature and other migration factors.

4-6 Many adult sockeye salmon, summer Chinook and upper Columbia steelhead and upper Columbia juvenile spring Chinook and steelhead migrate in late May and June. Pacific lamprey, a species that is very important to the CTUIR and is severely depressed, migrate in May, June and early July. Unfortunately, the Draft SEIS did not address them.

The Columbia River Inter-Tribal Fish Commission (CRITFC), on behalf of the CTUIR and the other three Treaty Tribes, previously provided scoping comments on the Draft SEIS.[3] Among the issues identified in these comments and also not adequately addressed in the Draft SEIS are the following:

4-7
- The Incremental Storage Releases Program will result in an overall loss of water for fish, as only 1/3 of the released water is allocated to fish. Most of the adult salmon migration and a significant portion of the juvenile salmon migration occurs in September. Refilling Lake Roosevelt in September to meet power and resident fish needs, with no downstream releases during the month, will reduce mainstem Columbia River flows over 3% according to the Draft SEIS. While a relatively small reduction, the Draft SEIS did not examine the effects it will have on fish survival and migration.

[3] Letter from Olney Patt, Jr., CRITFC, to Derek Sandison, WDOE, "Comments on the Scope and Determination of Significance for Supplemental Environmental Impact Statement for the Lake Roosevelt Incremental Storage Release Project," Jan. 23, 2008.

4-8 ➢ The CTUIR's (and the other three Treaty Tribes') main subsistence and commercial salmon fisheries occur in September. Reducing September flows, particularly in dry years from refilling Lake Roosevelt, will likely negatively impact these fisheries by exacerbating pool fluctuations due to power operations. Pool fluctuations can cause problems with launching boats, using fishing equipment, and utilizing fishing sites.

4-9 ➢ The Draft SEIS states that "conservation is not expected to provide enough water to meet demand" in the Columbia Basin Project and Odessa Subarea, without any analysis that quantifies the current or future merits of conservation as a means to address, at least in part, increasing demands for more water.[4]

4-10 ➢ The Draft SEIS also states that "Ecology is not promoting the large-scale water marketing that would be required to provide the necessary volumes of water" due to "concerns about the impact to local economies from the transfer of the needed volumes of water."[5] More detailed analysis or quantification of such impacts is not provided. The U.S. Bureau of Reclamation has successfully established water markets in the Idaho portion of the Snake River Basin employing a "willing buyer-willing seller" approach. The SEIS should consider it as a potentially viable market-based solution respecting the free choices of the contracting parties.

4-11 ➢ The Draft SEIS does not mandate a complete water use inventory before additional water rights are considered. Existing water diversions should be quantified before considering whether to provide non-interruptible water rights to users that are currently cut off during dry and drought years.

The Draft SEIS, and the Storage Releases Program itself, should be considered more closely in terms of the following:

4-12 ➢ The 2008 Biological Opinion for the Federal Columbia River Power System (FCRPS BiOp) requires no reduction in river flows during the salmon flow objective period (April- August) (Table 1).

4-13 ➢ The 2008 FCRPS BiOp states that "Reclamation will not implement this action [Storage Releases Program] unless the state of Washington has secured the concurrence of the Tribes and Reclamation has separately consulted with them on a government-to-government basis" (Table 1).

4-14 ➢ The 2008 FCRPS BiOp also says that "the State and Reclamation would need to comply with their respective Environmental Policy Acts and Reclamation would need to submit a water permit application for approval by the State" (Table 1).

[4] SEIS, p. 70.
[5] *Id.*

4-15 Finally, it should be noted that the FCRPS "Action Agencies" responsible for implementing the 2008 FCRPS BiOp have indicated that they would be "convening a technical workgroup to investigate dry year operations and the summer drafting of Lake Roosevelt" in the coming weeks.[6] It may be premature and inappropriate to prescribe an instream water allocation regime in the Draft SEIS at this point when the subject is on the verge of being considered by a joint tribal-state-federal workgroup, which will probably address it more authoritatively and definitively.

4-16 The CTUIR encourages you to focus on the issues identified above in the Final Supplemental Environmental Impact Statement for the Program. In addition, we would be interested in meeting with Washington Department of Ecology staff to discuss them further. Thank you for your attention to this matter. If you have any questions, please contact Carl Merkle with our Department of Natural Resources at (541) 276-3449.

Sincerely,

/s/ Jay Minthorn

Jay Minthorn
Chairman
Fish and Wildlife Commission

[6] E-Mail Message from Katherine Cheney, NOAA Fisheries, to "Sovereigns," "Next FCRPS Sovereigns mtg. July 17 and hydro technical workgroup," July 1, 2008, 3:03 p.m.

Comment Letter No. 4 – Confederated Tribes of the Umatilla Indian Reservation – Jay Minthorn

4-1. Comment noted.

4-2. Your comment regarding alternatives for timing the flow releases is noted. Ecology has selected Preferred Alternatives that would schedule the flow releases to provide maximum fish benefits.

4-3. Please see the response to Comment Number 1-5 regarding adaptive management and the Preferred Alternatives in Chapter 2.

4-4. The proposal has been changed to present Preferred Alternatives that use an adaptive management approach to determine if the additional drawdown is necessary on a year-to-year basis to enhance fish flow. We agree that the release would not be productive if the Corps was already releasing water to meet flood control rule curves in a wet year. The Preferred Alternatives result in Lake Roosevelt refill occurring before October 1.

4-5. Your comment regarding fish survival is noted. The advisory panel that would be created to adaptively manage the flow releases would consider all factors, including temperature, in scheduling flow releases.

4-6. The anadromous fish resource assemblages dominating the mainstem Mid-Columbia region downstream of Chief Joseph Dam, including Pacific lamprey, were presented in Section 3.7.1 of the Programmatic EIS (Ecology, 2007) and were not discussed further in the Supplemental EIS.

4-7. Your scoping comments were received by Ecology and were considered in developing the scope of the Draft Supplemental EIS.

Withdrawals of water for municipal and industrial use and for additional mainstem river fish flows under the Lake Roosevelt Incremental Storage Releases Project would occur from water held in storage behind Grand Coulee Dam. The stored water has not been available or used for downstream flows in the mainstem Columbia River to date. As such, adverse effects on downstream fish assemblages would not be anticipated with the incremental flow releases compared to the No Action Alternative. For additional discussion of benefits to downstream fish assemblages with the proposed water release program, refer to Comment Number 19-20. Additional information has been added to the Final Supplemental EIS regarding impacts of reduced flows in September and October. See Sections 4.2.2.5 and 4.2.2.6.

4-8. See the response to your Comment Number 4-7 regarding September flows. The reduction in flows in September is not expected to cause pool fluctuations in downstream reservoirs. The flow decreases would occur gradually and would not occur over such a short period of time to cause rapid fluctuations in flow or water levels.

4-9. Ecology is pursuing conservation in the Columbia River Basin through other projects as noted in Section 2.5.2 of the Supplemental EIS. In addition, Ecology will require recipients of water allocated for municipal and industrial uses to meet conservation guidelines as part of the public interest test for issuing new water rights (Section 2.4.1.2). Interruptible water rights holders will be required to meet conservation of use restrictions (Section 2.4.2.2).

4-10. Water marketing is not included as part of the Lake Roosevelt Incremental Storage Releases Project; however, Ecology is evaluating water marketing potential for the Columbia River Basin through other projects, including the Yakima River Basin Water

Storage Feasibility Study.

4-11. Ecology is undertaking a number of projects that will provide information on water rights and water diversions in the Columbia River Basin. All state-based water rights have been imaged and mapped in Ecology's Geographic Water Information System. Document images and place of use overlays are available for viewing on Ecology's Columbia River website. Additionally, Phase 1 of the Columbia River water use measuring program began in 2007 and metering data will be available in 2009. Ecology has allocated $1 million in financial assistance to mainstem water users to facilitate meter installation. Ecology expects 90 percent of all water withdrawn from the Columbia River and Snake River to be measured and reported. This information will be used in evaluating the issuance of water rights associated with the Incremental Storage Releases Project.

4-12. Your comment is noted. Table 1 in the RPA section of the 2008 Biological Opinion describes Storage Project Operations to be included in the Annual WMP ("Water Management Plan"): "If the Lake Roosevelt drawdown component of Washington's Columbia River Water Management Program (CRWMP) is implemented, it will not reduce flows during the salmon flow objective period (April to August)" (Graves, 2007).

4-13. Ecology and Reclamation have interpreted the consultation provision of the FCRPS Biological Opinion to apply to consultation with the tribes most affected by the Lake Roosevelt Incremental Storage Releases Project—the Confederated Tribes of the Colville Reservation and the Spokane Tribe of Indians. The tribes and the state of Washington have signed Water Resources Management Agreements for Lake Roosevelt that include the Tribes' support for the project. Ecology will consult with other tribes in the Columbia River Basin when it evaluates individual water rights that will be issued for water released under the project.

4-14. This Supplemental EIS meets the State Environmental Policy Act requirements for the Lake Roosevelt Incremental Storage Releases Project. It is anticipated that Reclamation will submit an application for a secondary water use permit when the Final Supplemental EIS is completed. Reclamation will determine the necessary steps for National Environmental Policy Act compliance when it issues service contracts for the secondary water use permit.

4-15. Your comment regarding the technical workgroup is noted. The Biological Opinion includes assessing the operations of Lake Roosevelt as discussed in Sections 3.6 and 4.2.1.4. The need for ongoing discussions and communication between the State of Washington, the action agencies and the tribes is noted in Section 4.2.1.5.

4-16. Comment noted.

Comment Letter No. 5

United States Department of the Interior

BUREAU OF RECLAMATION
Ephrata Field Office
P. O. Box 815
Ephrata, Washington 98823

IN REPLY REFER TO:

EPH-2003
ENV-1.10

June 30, 2008

Mr. Derek I. Sandison
Washington State Department of Ecology
12 West Yakima Avenue, Suite 200
Yakima, WA 98902-3452

Subject: Washington State Department of Ecology (Ecology), Draft Supplemental Environmental Impact Statement (EIS), Lake Roosevelt Incremental Storage Releases Program, Washington

Dear Mr. Sandison:

5-1 Thank you for the opportunity to review the subject document. Reclamation has worked closely with Ecology and your contractors during the development of the document. Comments were provided to you during our June 26, 2008 meeting.

5-2 We are supportive of your efforts to utilize a portion of the water storage behind Grand Coulee Dam and will continue to work with the State on the Columbia River Water Management Program.

If you have any questions or we can provide additional background information, please contact Mr. Jim Blanchard, Special Projects Officer, at 509-754-0226.

Sincerely,

William D. Gray
Assistant Area Manager

Comment Letter No. 5 – Bureau of Reclamation, Ephrata Field Office – William Gray

5-1. The comments you provided during the meeting have been incorporated into the Final Supplemental EIS.

5-2. Comment noted.

State of Washington
Department of Fish and Wildlife
Mailing Address: 600 Capitol Way North ~ Olympia, WA 98501-1091 (360) 902-2200 TTD (360) 902-2207
Main Office Location: Natural Resources Building ~ 1111 Washington Street S.E. ~ Olympia, WA

June 30, 2008

Derek I. Sandison, Central Regional Director
Washington State Department of Ecology
15 West Yakima Ave. Suite 200
Yakima, WA 98902-3452

Subject: Lake Roosevelt Incremental Storage Releases Project Draft SEIS Comments

6-1 Washington Department of Fish and Wildlife (WDFW) recognizes the importance of the Columbia River Basin Water Management Program for improving instream conditions for fish in the Columbia Basin, as well as providing for other water uses. We support opportunities to increase flows that benefit the species we are mandated to protect, perpetuate, and manage, and the Lake Roosevelt Incremental Storage Releases Project provides such an opportunity. WDFW appreciates the opportunity to provide comments on the Draft Supplemental Environmental Impact Statement (SEIS); Our comments reflect our mandate to "… preserve, protect, perpetuate, and manage the wildlife and food fish, game fish, and shellfish in state waters and offshore waters" (RCW 77.04.012).

WDFW values our collaboration with Ecology, and appreciates that WDFW input contributed significantly to the draft. There are a few issues within the draft, however, that need emphasis:

6-2
- There are four river flow conditions - "Wet," "Normal," "Dry," and "Drought" - that need to be defined and compared, then applied consistently throughout the document. These terms have different definitions depending upon the reader's context and background. In particular, under Section 2.3, the definition of a "dry" year needs to be better explained and tied to the MOU between the State of Washington and Colville Tribes. This is especially important when considering the alternatives for releases of water for instream use, since the dry year definition applied in the draft SEIS is not the same definition applied under the FCRPS BiOp.

6-3
- WDFW is cited as concluding there is no impact to fish/wildlife from the 1-to-1.5-foot drawdown resulting from this project. In section 4.2.1.6, WDFW's identified potential for indirect effects, through loss of zooplankton production and from entrainment, is omitted. WDFW does not concede the potential for either direct or indirect affects. We do acknowledge that the increment of impact attributable to this 1-to-1.5-foot drawdown is likely not measurable in the context of the range of effects from existing operations.

6-4
- Throughout Section 4, references to the MOU between the State of Washington and Colville Confederated Tribes and to the Accord between BPA and Colville Tribes are muddled. Although the BPA/CCT Accord is important in the overall context of this project, it is the MOU between State of Washington and CCT that is most relevant with respect to this project.

More detailed comments are provided in Attachment 1.

6-5 With respect to the policy alternatives, WDFW has sent Ecology our preferred alternatives for Section 2.3-Proposal regarding water releases under separate cover. WDFW does not identify a preferred alternative for allocation of the water from this project. We wish to note, however, that alternatives involving issuance of water rights in tributaries must be mitigated within those tributaries, and that allocations of "municipal/industrial" and "drought" water that result in withdrawal farther downstream can increase benefits to instream resources in the reaches between release at Grand Coulee Dam and the point of withdrawal.

6-6 Please do not hesitate to consult us on fish and wildlife related issues as you work toward the final SEIS for the Lake Roosevelt Incremental Storage Releases Project. WDFW appreciates the opportunity to comment, and will continue to work collaboratively with Ecology to ensure that implementation of the Columbia River Basin Water Management Program provides benefits to both instream and out-of-stream needs.

Sincerely,

T. Scott

Teresa Scott

Policy Coordinator

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE LAKE ROOSEVELT INCREMENTAL STORAGE RELEASES PROGRAM

Comment 1:

FACT SHEET

6-7 **Permits, Licenses, and Approvals Required for Proposal: p FS-2**

The Lake Roosevelt Incremental Storage Releases Program requires Ecology to issue secondary use permits for water stored in Lake Roosevelt under Reclamation's 1938 storage right. Ecology will also issue new water rights to municipal and industrial users and supplemental drought permits to holders of interruptible water rights who receive water from the storage releases. Ecology will also issue drought permits for holders of interruptible water rights who receive water from the storage releases. Reclamation will issue service contracts to irrigators in the Odessa Subarea. Ecology will issue a superseding certificate or permit to Odessa Subarea water users who exchange ground water use for surface water.

- This statement is either redundant or not well differentiated.

Comment 2:

CHAPTER 1.0 INTRODUCTION AND BACKGROUND

6-8
- Much of the background material for this project is buried throughout the document, and even readers well grounded in one or more of the socio-political contexts can get confused about how each is relevant to this proposal. Simple introductory/background descriptions such as a primer on hydropower facilities and operations, a very short description of flood control rule curves, how the BiOp constrains releases under the proposal, and exposition of the context and effects of the various tribal agreements, would be extremely helpful in Chapter 1.0.

Comment 3:

CHAPTER 2.0 PROPOSAL AND ALTERNATIVES

2.3 Proposal: p2-2

6-9
- WDFW's comments and recommendations on the proposed municipal and instream water releases have been submitted in a separate letter, entitled "Preferred Alternatives for Water Releases from the Lake Roosevelt Incremental Storage Releases Program – Draft SEIS" and dated June 20, 2008. Those comments and recommendations with not be reiterated herein but should also be considered.

Comment 4:

2.3 Proposal:

Table 2.4 Maximize Fish Flows Option 1C(b) – Dry Year: p 2-14

6-10
- There appears to be a typographical error. The April, May, and June Odessa Release figures are mistyped as 155, 149, and 154, respectively. The correct values

6-10 are 34, 65, and 101, respectively.

Comment 5:

2.4.1 Allocation for Municipal and Industrial Supply: p 2-27

6-11
- Alternatives that allow permitting for withdrawals in tributaries do not meet WDFW's mitigation goal to achieve no loss of habitat functions and values in the programs we initiate, regulate, or review.

  Ecology has proposed four options for allocating storage releases to fulfill pending applications for municipal and industrial uses. Each of these options may be considered separately or in combination with each other.

  Option 2.4.1.2 - Allocation to Users Whose Water Use Would Impact the Columbia River - allows for permitting of pending applications in tributaries. Water for municipal and industrial uses will be available in the Columbia River but not the tributaries. Options 2.4.1.3 and 2.4.1.2.4 also allow for permitting of pending applications in tributaries. These options do not provide mitigation water for local impacts to tributaries. Mitigation water **must be found** for tributary impacts before pending applications in tributaries are permitted.

Comment 6:

2.4.2 Allocation for Interruptible Water Rights: p 2-29

6-12 There are approximately 379 holders of interruptible water rights in the Columbia River Basin. Most of those water rights are for irrigation along with municipal, power and other uses. Ecology is considering seven options for allocating the 33,000 acre-feet of water to those water users during drought years. Ecology would run a drought insurance program for the 33,000 acre-feet and notify interruptible water right holders of program requirements. Each interruptible water right holder would file an application for a drought permit.

- The 379 interruptible water rights holders are within the one-mile corridor of the Columbia River, and do not include all interruptible /pro-ratable water rights holders in tributaries within the Columbia River Basin. Please indicate that in the paragraph. It might also be helpful to view the 33,000 acre-feet in context with the entire estimated need for those 379 interruptible water right holders.

6-13
- Six options are listed in the draft SEIS. What is the seventh option?

Comment 7:

CHAPTER 3.0 AFFECTED ENVIRONMENT

3.4.2.1 Lake Roosevelt; Sampling Efforts; Results; Temperature: p 3-19

6-14 Mean monthly temperatures across all sampling locations for 2002 to 2005 (as reported by the STI) ranged as follows (Figure 3-3):

- June: 54.7 to 57.9 degrees F (12.6 to 14.4 degrees C)
- July: 63.1 to 61.5 degrees F (17.3 to 16.4 degrees C)
- August: 65.3 to 67.64 degrees F (18.5 to 19.8 degrees C)

- September: 64.6 to 65.8 degrees F (18.1 to 18.8 degrees C)
- October: 59.5 to 61.7 degrees F (15.3 to 16.5 degrees C)

6-14 ❖ Is there some significance to listing the July values high to low? All other numbers are low to high.

Comment 8:

3.8 Wildlife and Plants:
3.8.1 Lake Roosevelt:
3.8.1.1 Plant Communities and Habitats; Reservoir Drawdown: p 3-44

6-15 A study of Lake Roosevelt's biological resources in 1993 found that the littoral zone of the lake has limited production of emergent and aquatic bed vegetation due to reservoir fluctuation. Voeller (1993) observed little aquatic plant community growth and low benthic macroinvertebrate assemblages due to the lack of stable littoral habitats. For an approximately three-month period, the lake drawdown separates the riparian habitats from the reservoir by an expanse of barren land.

❖ The above paragraph indicates there is very little emergent vegetation due to current operations and yet information in section 3.8.1.2 Wildlife Species, Reservoir Drawdown contradicts that statement by listing the many species that live there. Please reconcile the two sections.

Comment 9:

3.8.1.2 Wildlife Species: p 3-45

Observations of priority species including bald eagle, golden eagle, osprey, northern goshawk, Merriam's wild turkey, Rio Grande wild turkey, blue grouse, Lewis woodpecker, and white headed woodpecker are common to the area (WDFW, 2008). Shoreline habitats provide areas for roosting and breeding, including several communal bald eagle roosts found in proximity to the lake. WDFW has identified areas that support high concentrations of waterfowl in Lake Roosevelt including large numbers of migrating or wintering ducks and geese. Common species in these concentration areas are mallard, northern pintail, cinnamon teal, redhead, canvasback, lesser scaup and Canada geese. Areas of emergent vegetation are important for nesting for species such as red-winged and yellow-headed blackbird, marsh wren, grebe, bittern, Canada
6-16 geese, and muskrat.

WDFW has noted occurrences of California floater, western toad, and Pacific western Townsend's big eared bat (WDFW, 2008). Other known common reptiles and amphibians include sagebrush lizard, short-horned lizard, western rattlesnake, bull snake, western terrestrial garter snake, bullfrog, and salamander species.

3.8.2 Columbia River Downstream:
3.8.2.2 Hanford Reach: p 3-48

Multiple priority species occurrences have been recorded by WDFW, including mule deer, Rocky Mountain elk, Rocky Mountain bighorn sheep, black-tailed jackrabbit, and Ord's kangaroo rat. Golden eagle, prairie falcon, peregrine falcon, Swainson's hawk, common loon, and chukar have also been observed multiple times. Racer, striped whipsnake, night snake, and sagebrush lizard are common reptiles in the vicinity of the river (WDFW, 2008).

3.8.3 Odessa Subarea and Banks Lake:
3.8.3.1 Odessa Subarea: p 3-48

Some areas of intact and disturbed shrub-steppe are present. WDFW notes shrub-steppe, wetland, and riparian priority habitats throughout the northern portion of the Odessa Subarea. Priority species regularly found in this area include ferruginous hawk, sage sparrow, sharp-tailed grouse, Washington ground squirrel, and white-tailed jackrabbit.

Extensive wetland habitat containing waterfowl concentrations is present in northwestern portion of the Odessa Subarea. Mule deer and ring-necked pheasant habitat is common. American white pelican and tundra swan occur in the north-central portion, while swan, prairie falcon, loggerhead shrike, sage thrasher, and tiger salamander have been recorded in the northeastern portion. Occurrences of Washington ground squirrel are common in the western and southern portions of the subarea.

6-16 ❖ In each of the paragraphs above, the terms "common" and "regularly" are used without definition. The general understanding of common to a layperson is that the species is plentiful and there is no concern for its survival. Even though the above species may frequent the area, many are on the Priority Habitats and Species, , State Species of Concern, and federal lists because of low abundance in Washington. Do NOT portray these species as plentiful or easily found. Those species are

- western toad (Federal Species of Concern, FSC; State Candidate, SC),
- bald eagle (FSC; State Sensitive, SS),
- golden eagle (SC),
- osprey (State monitored, SM),
- northern goshawk (FSC, SC),
- Lewis' woodpecker (SC),
- white-headed woodpecker (SC),
- western grebe (SC),
- California floater (FSC, SC),
- sagebrush lizard (FSC, SC),
- striped whipsnake (SC),
- ferruginous hawk (FSC; State Threatened, ST),
- sage sparrow (SC),
- Washington ground squirrel (Federally Controlled, FC; SC), and
- white-tailed jackrabbit (SC).

6-17 ❖ In addition to the species listed above, bull snake is also known as a gopher snake, and bullfrog although present is non-native and considered invasive.

Comment 10:

6-18

3.8 Wildlife and Plants:
3.8.1 Lake Roosevelt:
3.8.1.1 Plant Communities and Habitats; Reservoir Drawdown: p 3-46

Shoreline areas that provide emergent vegetation for nesting waterfowl are generally located within embayments such as the Sanpoil River and Marcus Flats (Figures 3 through 7 and 17 in the Map Folio at the end of this document). These areas likely have a gently sloping littoral zone that allows the deposition of fine sediments that promote plant growth and are sheltered from wind and wave action.

- ❖ See section 3.8.1.1. Plant Communities and Habitats, Reservoir Drawdown. Please reconcile the two sections.

Comment 11:

6-19

3.11 Recreation and Scenic Resources:
3.11.1.1 Recreational activities and use levels: p 3-55

- ❖ Information on recreational fishing is missing from this section. The SEIS should acknowledge recreational fishing as a component of "recreation." Section 4.11.1.1 - Recreational Fishing Effects - provides a good linkage from fish impacts (and mitigation thereof) to recreational fishing.

Comment 12:

CHAPTER 4.0 IMPACTS AND MITIGATION MEASURES FOR INCREMENTAL STORAGE RELEASES

6-20

4.2 Proposal:
4.2.1 Lake Roosevelt (and other relevant sections therein)

- ❖ Many of the conclusions made within the draft SEIS for potential impacts from Lake Roosevelt incremental releases where drawn from average lake elevations. Averages temper the data to a single point per time unit instead of depicting the range of data. WDFW is concerned about impacts that will occur during the extremes of fluctuations rather than the average fluctuation. WDFW acknowledges that Lake Roosevelt is in a constant state of fluctuation and a specific time unit must be chosen. Please indicate the range of fluctuation by the unit utilized in the figures along with the average. This information would be informative in figures 4-1 through 4-7.

6-21

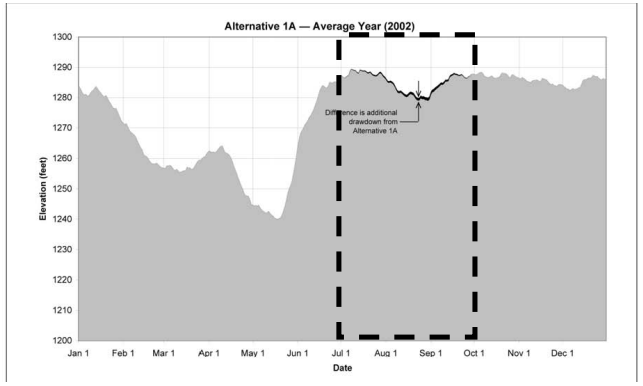
A monitoring/management plan should be developed and implemented to measure when lake levels fall to with in the 25th percentile of the of the low elevation (percentile, frequency and duration would be determined in the management plan). This will allow for verification of Ecology's modeling results and provide an opportunity for alternative actions (such as salvaging stranded fish etc) to be identified and implemented to minimize impacts.

Comment 13:

6-22

4.2.1.3 Surface Water
Water Quality
Long-term/operational impacts:
Figure 4-1. Lake Roosevelt Water Elevation – Alternative 1A: p 4-11
Figure 4-2. Lake Roosevelt Water Elevations – Alternative 1B: p 4-13
Figure 4-3a. Lake Roosevelt Water Elevations – Alternative 1C: p 4-15
Figure 4-3b. Lake Roosevelt Water Elevations - Alternative 1C: p 4-17
Figure 4-4. Lake Roosevelt Water Elevations – Alternatives 1D, 1E: p 4-19

- ❖ Please bracket or highlight the starting date and ending date within the figure. This will highlight the timing of the incremental releases. See example below.
- ❖ Also explain how the average was calculated. What is the unit that is being averaged, hourly, or daily average to weekly, etc? The graph units are monthly but there is variation within the monthly unit.
- ❖ Please indicate the range of fluctuation by the unit utilized in the figures along with the average.



Comment 14:

4.2.1.6 Fish
Long-term/operational impacts
Littoral Habitats
Kokanee Salmon: p 4-31

In their review of the Columbia River Basin Water Management Program, WDFW concluded the worst-case additional drawdown of approximately 1 foot under non-drought conditions and 1.5 feet under drought conditions would not directly affect kokanee salmon at the shoreline (WDFW, 2007). This conclusion is a result of the absence of documented shoreline spawning and the open-water habitat use of this species.

- Following is a direct quote of the passage cited above, although the passage was included as part of WDFW's annual contract report to Ecology, and not as a "Review of the program:"

  "Due to the … absence of documented shoreline spawning, and the open water habitat use of this species, the Washington Department of Fish and Wildlife (WDFW) concludes that the effects of an additional one-foot drawdown will not directly affect kokanee at the shoreline. Indirect effects may occur with the loss of zooplankton and fish through entrainment." 6-23
- The EIS neglected to include the sentence on indirect affects;
- WDFW does not concede the potential for either direct or indirect affects, but acknowledges that the increment of impact attributable to this 1-to-1.5-foot drawdown is likely not measurable in the context of those impacts from existing operations.
- Suggested replacement:

"WDFW suggests (WDFW, 2007) that direct effects to kokanee salmon at the shoreline from the additional 1-to-1.8-foot drawdown would likely not be measurable in relation to the wide range of impacts from existing reservoir operations. This is because kokanee in Lake Roosevelt primarily utilize open water habitat. Indirect effects may occur with the loss of zooplankton and fish through entrainment, which are discussed in subsections below."

Comment 15:

4.2.1.6 Fish
Artificial Propagation (Kokanee, Rainbow Trout, White Sturgeon)
Reservoir Residence Time 6-24
Table 4-12. Estimated Change in Reservoir Retention Time (days) Compared to Current Conditions: p 4-35 (Excerpt follows)

Table 4-12. Estimated Change in Reservoir Retention Time (days) Compared to Current Conditions

Alternative				Retention Time in Days		
Maximum Monthly Outflow				Baseline	With Proposal	Difference
Alternative	Outflow (cfs)	Month	Drawdown (feet)	Days	Days	Days (%)
Example at 1,280 feet msl -**Average Year** - 1-foot elevation change						
1A	672	August	1,279	45	45	18 (1.7%)
1B(a)	285	August	1,279	45	45	13 (1.2%)
1C(a)	305	August	1,279	45	45	13 (1.2%)

6-24

- This table is confusing without additional information or, perhaps, corrections. Data for days "With Proposal" are shown as identical to "baseline," yet the "Difference" values seem to indicate they are not identical. Please explain how "Difference in Retention Time in Days" is calculated or correct entries for "With Proposal" days.
- Does this table refer to fish retention time or water particle retention time?

Comment 16:

4.2.1.6 Fish
Fish Entrainment Kokanee Salmon/Rainbow Trout
Table 4-13. Maximum Monthly Outflow under Various Flow Release Alternatives Compared to Existing Conditions: p 4-36 (excerpt follows)

Table 4-13. Maximum Monthly Outflow under Various Flow Release Alternatives Compared to Existing Conditions

6-25

Alternative	Maximum Monthly Outflow (CFS)1/	Peak Month	Existing mean monthly discharge at GCD (KCFS)2/	Increase in outflow (%)
Average Year				
1A	672	August	94.2	0.7
1B(a)	285	August	94.2	0.3
1C(a)	305	August	94.2	0.3

- Utilize same outflow units for comparison purposes.

Comment 17:

6-26 **4.2 Proposal**
4.2.2 Columbia River Downstream
4.2.2.3 Surface Water: p 4-55
Tables 4-15, 4-16, 4-17.

- "Estimated difference in Columbia River Flow Downstream of Lake Roosevelt" – as compared to what? "Average?" Also, is Table 4-17 the same as Table 4-15 except represented in percentages instead of cfs?

Comment 18:

"Mitigation" paragraphs throughout CHAPTER 4.

- 6-27 Under "Mitigation" for section 4.2.2.3 under "Surface Water Quantity," the SEIS states that "… proposed flows will increase Columbia River flow during critical fish periods and will not cause negative impacts to stream flows." It is unfortunate to characterize a reduction in flow (September) as "not causing negative impacts to instream flow." And, it presumptive to assume that the period in question may not be a "critical fish period." In the same section under "Surface Water Quality:" to indicate that "no mitigation is necessary because no construction is proposed" is missing the point entirely. This is an unfortunate conclusion or expression of the conclusion. See also Section 4.2.2.5 – Legal Considerations - under "Biological Opinion."
- 6-28 Conclusions reached in the SEIS may be supportable, but many are framed in an inflammatory manner. Certainly WDFW could not agree that a reduction in flow or increase in temperature constitute "no impact." Ecology should closely examine and revise "mitigation" paragraphs throughout Chapter 4.
- 6-29 Please explain why 2.7° F was chosen to note a difference between upstream and down stream temperatures. Is this difference statistically or biologically significant?

Comment 19:

Water Quality
Long-term/operational impacts: p 4-57

6-30 The incremental storage releases would release water that is cooler than 68 degrees F (20 degrees C) (Table 4-18). However, maximum upstream water temperatures were substantially warmer than maximum downstream temperatures in July of wet years and drought years (shaded cell in Table 4-13). Summer water temperatures downstream of Lake Roosevelt are typically 64.4 to 68 degrees F (18 to 20 degrees C), so the Proposal would not degrade downstream water temperatures except potentially in the summer months of wet and dry years.

- Change to "(Shaded cell in Table 4-18)".

Table 4-18. Average Daily Water Temperature Upstream and Downstream of Grand Coulee Dam: p 4-58 (Portion of table below)

Year and Month	*Upstream Water Temperature, Measured at the Forebay [a]*		*Downstream Water Temperature, Measured Downstream of the Dam [a]*	
	Minimum °F (°C)	*Maximum °F (°C)*	*Minimum °F (°C)*	*Maximum °F (°C)*
June	52.3 (11.3)	56.5 (13.6)	50.0 (10.0)	55.8 (13.2)
July	56.5 (13.6)	61.5 (16.4)■	54.1 (12.3)	58.5 (14.7)■
August	61.5 (16.4)	67.3 (19.6)	58.5 (14.7)	64.8 (18.2)
September	65.7 (18.7)	67.1 (19.5)	63.7 (17.6)	66.9 (19.4)
October	59.7 (15.4)	65.7 (18.7)	70.0 (16.1)	66.2 (19.0)
November	52.5 (11.4)	59.5 (15.3)	53.2 (11.8)	60.8 (16.0)
December	48.6 (9.2)	52.2 (11.2)	45.5 (7.5)	52.9 (11.6)

■ Indicates that there is a difference of more than 2.7°F (1.5°C) between the upstream and downstream locations. However, both locations are below 64.4°F (18°C).
▲ Indicates that there is a difference of more than 2.7°F (1.5°C) between the upstream and downstream locations. However, the upstream location is above 64.4°F (18°C).

- 6-31 Please explain why 2.7° F was chosen to note a difference between upstream and down stream temperatures. Is this difference statistically or biologically significant?
- 6-32 Why does the EIS downplay the potential for degradation of downstream temperatures in summer months for both wet and dry years? This would seem significant in the context of the entire action, especially with respect to the assumption that water releases during those months are beneficial to fish. Please explain further.

Comment 20:

Figure 4-11 Locations of Interruptible Water Rights: p 4-69

- 6-33 First, this figure depicts only the interruptible rights within the one-mile-corridor of the Columbia River Mainstem – the ones relevant in the context of this proposal – and does not represent interruptible or prorated rights in tributaries. Labeling should indicate this.
- This figure is truncated at Walla Walla, yet significant interruptible rights occur in the McNary and John Day Pools.

Comment 21:

4.2 Proposal
4.2.3 Odessa Subarea and Banks Lake
4.2.3.7 Wildlife and Plants: p 4-78

6-34 "No short-term impacts to wildlife or plants will occur as a result of the proposed water to be diverted to the Odessa Subarea." … "The conveyance systems would be located in existing disturbed and agricultural areas and few impacts to plants and wildlife are anticipated."

- These two statements, appearing in the same paragraph, contradict one another. Is it "no impacts" or "few are anticipated?"

Comment 22:

4.3 Cumulative Impacts: p 4-81

6-35
- WDFW agrees that, though impacts to fish/wildlife/habitat resources from Lake Roosevelt Incremental Storage Release might occur, those impacts are not likely significant or measurable in the context of the range of impacts from existing reservoir operations.

Comment Letter No. 6 – Washington Department of Fish and Wildlife – Teresa Scott

6-1. Comment noted.
6-2. The definition of dry year is consistent with the Water Resources Agreement with the CCT and will be the basis of decision making for flow releases.
6-3. Comment noted. Please also see the response to your more detailed Comment Number 6-23.
6-4. References to these documents have been clarified throughout the Supplemental EIS.
6-5. The letter you provided on your preferred alternatives was received and was considered in developing the Preferred Alternative for the Final Supplemental EIS. Your comment regarding mitigation in tributaries is noted.
6-6. Comment noted.
6-7. The sentence has been revised.
6-8. General background information on the operation of Lake Roosevelt is provided in Section 1.4. Additional background information specific to elements of the environment is provided in Chapter 3.
6-9. See the response to your Comment Number 6-5.
6-10. Table 2-4 has been corrected.
6-11. Your comment regarding the allocation alternatives is noted.
6-12. Comment noted. A new map of the interruptible water rights has been included in the Final Supplemental EIS (Figure 4-12). The new map includes the area downstream of McNary Dam. Text has been added to the description of the map to make it clear that interruptible water rights on the Wenatchee, Okanogan, and Methow Rivers are not depicted.
6-13. The text has been revised to say six options.
6-14. The text has been revised so that July is consistent with the other months listed.
6-15. The text in Section 3.8.1.2 has been revised to state that reservoir fluctuation limits the establishment of suitable habitats for nesting waterfowl and breeding amphibians along the shoreline.
6-16. Comment noted. It was not our intention to portray listed or candidate species as common. The text in Sections 3.8.1.2, 3.8.2, and 3.8.3 has been revised to state more clearly that priority species noted as occurring in the area are not common or regularly occurring, but have been merely documented in the WDFW PHS data.
6-17. The text in Section 3.8.1.2 has been revised to note that bullfrogs are nonnative and considered invasive.
6-18. Based on your comment and further analysis, the text of Section 3.8.1.2 stating that habitat for nesting waterfowl occurs in certain embayments has been revised.
6-19. The importance of recreational fishing on Lake Roosevelt was generally described in the Programmatic EIS. Because no impacts were anticipated to recreational fishing, no additional information was provided in the Supplemental EIS.
6-20. The conclusions made in the Supplemental EIS regarding potential impacts from Lake Roosevelt releases were drawn from specific years representing an average (2002), dry (2003), or drought (2001) year. The data used in the Chapter 4 figures are daily observed values from those specific years. The horizontal axes in the figures show monthly units because daily labels would be cluttered and too difficult to read.
6-21. The Supplemental EIS did not identify significant potential impacts to fish in Lake

Roosevelt from the changed reservoir operations. Therefore, Ecology does not believe a monitoring program is warranted. Ecology will continue to work with WDFW to determine if impacts to fish result from the project.

6-22. Figures 4-1 to 4-4 have been revised to include starting and ending dates of additional drawdown. The text has been revised to clarify the figures, which are daily hydrographs of a representative average, dry, or drought year.

6-23. Comment noted. The text has been modified to reflect your concern. Indirect effects on zooplankton production and fish entrainment were addressed in later subsections of the Supplemental EIS since the section you refer to only addressed littoral habitats.

6-24. The table (now Table 4-11) has been modified per your suggestion.

6-25. The table (now Table 4-12) has been revised to make the units consistent.

6-26. The estimated difference is compared to the average monthly flows using current operations. Table 4-16 (formerly 4-17) is the same as Table 4-14 (formerly 4-15) except the values are represented in percentages instead of cfs.

6-27. The Supplemental EIS has been changed to address fall flow reductions in the Columbia River. See Sections 4.2.2.5 and 4.2.2.6.

6-28. The mitigation section for water quality has been revised to clarify the impacts and mitigation requirements, as necessary. Under SEPA regulations (WAC 197-11-660), mitigation measures are required for specific, adverse environmental impacts identified in an EIS. If no significant impacts are identified, no mitigation is offered. The only significant impacts identified in the Supplemental EIS were to recreational facilities on Lake Roosevelt and appropriate mitigation is proposed for those impacts.

6-29. The mitigation sections have been reviewed and revised, as necessary. See also the response to your Comment 6-29.

6-30. Table 4-18 from the Draft Supplemental EIS has been replaced with a new Figure 4-11. See the response to your Comment Number 6-31.

6-31. The difference was not chosen because it was statistically or biologically significant. The 2.7 degrees F difference was chosen to highlight instances where there was a greater difference in water temperature at the two locations. The discussion of operational effects on water temperatures has been revised in the Final Supplemental EIS to focus on how the operating procedures of releases from Grand Coulee Dam and other factors influence the temperature of the water released from Lake Roosevelt. Table 4-18 in the Draft EIS has been replaced with Figure 4-11 which displays downstream water temperatures for 1997 through 2007.

6-32. The Final Supplemental EIS has been revised to include an expanded discussion of operational effects on downstream water temperatures to incorporate evaluation of the potential to maintain cool water releases for prolonged periods (Reclamation, 2000).

6-33. Comment noted. See the response to your Comment Number 6-12 regarding Figure 4-11.

6-34. The paragraph has been revised to be consistent.

6-35. Comment noted.

From: Dave McClure [mailto:DaveM@co.klickitat.wa.us]
Sent: Tuesday, July 01, 2008 10:39 AM
To: Sandison, Derek (ECY)
Subject: SEIS Comments

Hi Derek,

7-1 Please find attached Klickitat County's comments on the Draft SEIS. Thank you.

David McClure, Director
Klickitat County Natural Resources Department
228 West Main Street, MS-CH-37
Goldendale, Washington 98620
Phone: (509) 773-2481
Fax: (509) 773-6206
email: davem@co.klickitat.wa.us

Klickitat County Comments on
Draft Supplemental EIS for Lake Roosevelt Incremental
Storage Release Program

7-2 **Section 2.3:** The discussion of chapter 173-563 WAC should inform that the instream flows and average weekly flows do not apply to any application for water from the mainstem Columbia River on which a decision is made by Ecology on or after July 27, 1997 (WAC 173-563-020(4)).

RCW 90.82.130(4) provides for the use of approved watershed management plans as a primary consideration in determining the public interest related to water resource decisions. Where there an approved watershed management, is should be included as a primary consideration in the Director of Ecology's OCPI determination.

7-3 **Subsection 2.3.1:** Releases of the water allocation for out of stream uses (municipal, industrial, and interruptibles) should be timed to maximize utility for the water right holders.

7-4 **Subsection 2.4.1.2:** As provided in WAC 173-563-020(1), Chapter 173-563 WAC "applies to public **surface waters of the main stem Columbia River** [emphasis added] in Washington State and to any ground water withdrawal of which is determined by the department of ecology to have a **significant and direct impact** [emphasis added] on the surface waters of the main stem Columbia River. The extent of the "main stem" Columbia River shall be the Columbia River from the upstream extent of tidal influence (Bonneville Dam-River Mile 146.1) upstream to the United States-Canada border (River Mile 745) and include those areas inundated by impounded waters at full pool elevations." As drafted, subsection 2.4.1.2 implies that Chapter 173-563 WAC applies to municipal and industrial users that are not subject to Chapter 173-563 WAC. This should be corrected.

7-5 It is unclear why an OCPI determination would be needed for municipal and industrial uses/water right permit applicants that are not subject to Chapter 173-563 WAC.

7-6 **Subsection 2.4.1.4**: If a "regional equity" scheme is used to allocate water, the regions should be based on the management units delineated in WAC 173-563-040(1) WAC or based on WRIA.

7-7 **Subsection 2.4.2:** As provided in WAC 173-563-056(1)(c), out of stream diverters are regulated on a first-in-time, first-in-right basis. Therefore, it is appropriate that the allocation to interruptible water right holders be on a first-in-time, first-in-right basis.

Comment Letter No. 7 – Klickitat County Natural Resources Department – Dave McClure

7-1. Comment noted.

7-2. Sections 6.1.6 and 6.1.11 of the Final Programmatic EIS (Ecology, 2007) describe Ecology's Preferred Alternative relative to instream flow conditions applicable to existing water rights and water developed under the provisions of RCW 90.90. Ecology agrees that the adopted instream flows in WAC 173-563-040 do not apply to applications filed after July 27, 1997. Instead, the rule requires that instream flow conditions or mitigation be identified through the consultation process identified in WAC 173-563-020(4). Also, RCW 90.90.030 provides that permits issued as a result of participation in a Voluntary Regional Agreement will not be interruptible. Finally, Section 2.4 of the Supplemental EIS describes the allocation options for water stored in Lake Roosevelt under Reclamation's Reservoir Certificate 21869, not for allocation of new water under an application filed subsequent to July 27, 1997.

7-3. Comment noted.

7-4. The description in Section 2.4.1.2 of the Draft Supplemental EIS (changed in the Final Supplemental EIS) did not intend to imply that Chapter 173-563 applied to user not subject to that administrative rule. Ecology has selected a Preferred Alternative for allocation of municipal and industrial users that meets the requirements of WAC 173-563-020. See Section 2.4.1.1 of the Final Supplemental EIS.

7-5. WAC 173-563 does not exempt industrial or municipal water supplies from instream flow requirements. It provides that the flows are to be developed through consultation with affected state and federal agencies, tribes, and local governments. Further, the adopted flows (WAC 173-563-040) are water rights that must be considered in the impairment review associated with new applications for permit or transfers of existing water rights.

7-6. Comment noted.

7-7. Comment noted.

OKANOGAN COUNTY
OFFICE OF PLANNING AND DEVELOPMENT
123 - 5th Ave. N. Suite 130 - Okanogan, WA 98840
(509) 422-7160 • FAX: (509) 422-7349 • TTY/Voice Use 800-833-6388
email: planning@co.okanogan.wa.us

June 2, 2008

Derek I. Sandison
Department of Ecology
15 West Yakima Ave. Suite 200
Yakima, WA. 98902-3452

RECEIVED
JUN 03 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

RE: Lake Roosevelt Comments

Dear Mr. Sandison,

8-1 Thank you for the opportunity to comment on the Proposed Lake Roosevelt Incremental Storage Release Project Draft Supplemental EIS. After reviewing the proposal I offer that Okanogan County has concerns about the EIS.

8-2 1) Lower water level brought about by the additional drawdown of Roosevelt Lake is a probable, significant, adverse impact.

The Okanogan County Board of County Commissioners believes the impact associated with lower water levels is over-stated. It is questionable whether the amount of water allocated for withdrawal will result in a noticeable difference if the future withdrawals are anticipated and planned for during high water times. In addition, the calculations for the return flow of non-consumptive water use from irrigation, domestic, and municipal activities are inadequate. The calculations of true consumptive use must be realistic. The impacts of the additional withdrawal are further mitigated as the points of withdrawal will likely be spread throughout the drainage.

8-3 2) The additional withdrawal of water from Lake Roosevelt will create public and environmental benefits that outweigh any probable, significant, and adverse impacts.

8-4 The additional water, if allocated to municipalities, agriculture, and community water systems in that order of priority, will benefit the public. One of the issues faced by the Counties in the drainage is the pressure of rural development proposals. While those seeking the rural lifestyle will always be a factor, in many cases a single family well or small group B system on an exempt well is the only realistic option. Several small cities in Okanogan County face tremendous obstacles in trying to infill or expand because of the lack of a water right. Because new water rights are virtually impossible to obtain the

8-5 Department of Ecology has caused an artificial supply and demand imbalance which has priced water rights out of reach for these municipalities. The aggressive program of water right purchases and transfers facilitated by the Department of Ecology has exacerbated this situation. Because of the resources, both in time and money, necessary to complete a transfer and to financially absorb the cost of the water right routinely lost through "wastage" or "relinquishment" most small municipalities are out of the market.

8-6 One of the major objectives of the Growth Management Act was to direct growth into municipalities where the higher density could be better served with fewer impacts. Affordable housing is generally possible only where urban services are available. The additional water from Lake Roosevelt, if allocated with these priorities in mind, can achieve a great deal consistent with these two important objectives.

8-7 3) The additional water withdrawal from the Roosevelt Lake should be part of a much larger effort to revise water policy in the drainage.

The array of disjointed laws, rules, policies, and historic practices that govern the allocation and use of water in the drainage are often the greatest obstacles to effective decision making. By way of example, WAC 173-548 or the Methow Rule, was written as an emergency rule later codified as the cited WAC as a result of the Early Winters Ski Resort proposal in the 1970's. The ski resort was never permitted yet the rule passed in anticipation of it has never been revised in any meaningful way. All elements of the WAC, including in-stream flows, need to be re-examined using principles of good watershed planning rather than to provide restrictions to a development and the anticipated secondary development that never occurred.

8-8 4) There appears to be reluctance on the Department of Ecology to move efficiently towards additional withdrawal of water from Lake Roosevelt.

8-9 The critical methodology applied by the Department of Ecology to this proposal would seem in stark contrast to their refusal to examine the potential impacts of the water right sale/transfer program facilitated by the Department. It would appear at face value that some concern exists in the Department that the additional water will reduce some of the market demand on existing water rights. This assertion is supported by the Departments on-going assertion that the drainage is over appropriated. By creating the high demand for existing water rights and facilitating the sale and transfer of these rights the Department is able to bring these rights under scrutiny. Through their analysis for "wastage" and "relinquishment" or by using the Washington River Conservancy to buy portions of the rights the Department is able to reduce the amount of water under existing rights using the money of the development community. Whether this program is good or bad is academic in this discussion. The desire of the Department to keep the demand for existing water rights high should not impact the analysis and implementation of the additional water from Roosevelt Lake.

Thank you for the opportunity to commenting on the Proposed Lake Roosevelt Incremental Storage Release Project Draft Supplemental EIS.

Nathan Wehmeyer
Natural Resource Planner II

Cc: Perry Huston, Director
File

Comment Letter No. 8 – Okanogan County Office of Planning and Development – Nathan Wehmeyer

8-1. Comment noted.

8-2. The Supplemental EIS does not conclude that the drawdown of Lake Roosevelt would be a significant adverse impact. The only significant impacts noted for the drawdown of Lake Roosevelt would be impacts to boat ramps for a few days to few weeks during drought years. In order to approach the impacts conservatively, return flow from non-consumptive water use was not considered. These non-consumptive flows will increase the Columbia River flow at points downstream of Grand Coulee Dam, but will have no effect on the water levels of Lake Roosevelt.

8-3. Comment noted.

8-4. Comment noted.

8-5. Your comment regarding water transfers and the price of water rights is noted. The Washington State Legislature has directed Ecology to study the impacts of downstream transfers by November 15, 2009 (RCW 90.90.080). Ecology will meet this deadline and the other requirements of the legislation to study impacts and assist affected counties.

8-6. Your comment regarding housing goals of the Growth Management Act is noted.

8-7. Your comment regarding water policies is noted.

8-8. Ecology anticipates that action will be taken on the Lake Roosevelt Incremental Storage Releases Project upon completion of this Final Supplemental EIS later this summer.

8-9. Your comments are noted.

STEVENS COUNTY FARM BUREAU

PO BOX 618, Colville, Washington 99114 *(509)258-4041*

June 30, 2008

To: Derek I. Sandison
Department of Ecology
15 West Yakima Ave., Suite 200
Yakima, WA 98902-3452

From: Wesley L. McCart
Stevens County Farm Bureau
4979 Lyons Hill Rd
Springdale, WA 99173

Subject: Draft Supplemental Environmental Impact Statement for the Lake Roosevelt Incremental Storage Releases Program – dated May 25, 2008

I, Wesley L. McCart, state the following for the record on behalf of Wesley L. McCart and the Stevens County Farm Bureau:

9-1 We oppose the current distribution of water during drought years as stated based on the MOU referenced in appendix A. The current law, RCW 90.90, states that 1/3 should be for instream flow augmentation and 2/3 should be for out of stream uses, including existing interruptible water right holders on the mainstem Columbia River. This would allow for the distribution of 50,000 acre-ft in drought years to be proportioned as 16,667 acre-ft for instream flow and 33,333 acre-feet for out of stream use. The MOU drafted and signed by then Governor Locke was for the Columbia River Initiative, which was defeated and never put into legislation. An existing MOU for distribution purposes does not allow you to violate state law. Therefore, the MOU must be changed as well as the distribution of water allocated. Under your current proposal of 17,000 for instream use, 333 acre-feet of water is short changed to agriculture, which would be approximately 100+ acres of total season farmland irrigation, or enough water to supply short season needs in crops like orchards that may save thousands of acres of trees and several years of subsequent losses of crops, or very valuable municipal water supply. We support the total allocation of 50,000 acre-ft, but ask that you correct the distribution to follow state law, not an invalid MOU.

9-2 We support allocations to achieve regional equity as stated in section 2.4.1.4. We feel it is extremely important that pending municipal and industrial water applications that would withdraw water from behind Grand Coulee Dam be considered. We also believe pending agricultural water applications should be included as well as interruptible rights from behind the Grand Coulee Dam in drought years.

9-3 We are concerned about the effects the drawdowns will have on our local economies. As stated in section 3.11.1.3, five boat ramps will be affected by water levels. Four of five of these ramps are in northern Stevens County above Kettle Falls. These ramps include Marcus Island, Evans, Napoleon Bridge, and North Gorge. There is no data to back up the claims that the users of these facilities will go somewhere else, just a personal communication based on a guess. This loss of use of an entire area of the system, refer to your map for clustered location, does have a significant economic hit to the local economies. When local dollars are lost, other infrastructure and support businesses are also lost. If we are to maintain healthy local economies, these effects must be mitigated.

9-4 2ESSB6874 under section 3 calls for studying these economic losses. We would like to stress that when site specific studies are complete, that specific mitigation for the effects takes place. Such things as extending boat ramps or similar types of mitigation must occur.

9-5 Further, under section 3.14.1, the Inchelium-Gifford Ferry is talked about. Although loss of this vital transportation link will only occur occasionally, in drought years, further drawdowns will extend the hardship. Farmers use this Ferry to deliver hay and other products. Schools use this system to transport children back and forth to both sides of the Lake. It is an economic hardship to extend travels, especially with current and future fuel prices, to the Kettle Falls bridge and back down again, or expect people to travel to the Keller Ferry. The Keller Ferry may only be thirty miles, but I question if this is road miles, and in the case of school bus travel this would extend a pupils trip by 1-2 hrs twice a day. We must mitigate for this effect, by extending the ramps, or other means of making the Ferry year round.

Thank you for allowing me to comment on this matter.

Respectfully submitted,

Wesley L. McCart
Stevens County Farm Bureau
4979 Lyons Hill Rd.
Springdale, WA 99173
(509) 258-4041
wpmccart@juno.com

Comment Letter No. 9—Stevens County Farm Bureau – Wesley L. McCart

9-1. The requirement to allocate one-third of active storage to augment instream flows and two-thirds to out-of-stream uses applies only to new storage facilities funded through the Columbia Basin Water Supply Development Account (RCW 90.90.020). The Lake Roosevelt Incremental Storage Releases Project is not a new storage facility. However, the water allocation is approximately one-third to stream flows and two-thirds to out-of-stream uses.

The MOU between Ecology, Reclamation, and the three Columbia Basin irrigation districts is still valid and was not tied to passage of the Columbia River Initiative.

9-2. Comment noted.

9-3. The source of the personal communication cited is an employee of the Lake Roosevelt National Recreation Area who is familiar with recreational use.

9-4. Your comments regarding economic impacts are noted. As stated in Section 4.2.1.10 of the Supplemental EIS, Ecology is working with the National Park Service to better define impacts to specific recreational facilities and to develop an adaptive management mitigation plan. That plan may include extending or relocating ramps to make them usable during low water periods.

9-5. The distance from the Inchelium-Gifford Ferry to alternative crossings has been revised in Section 3.14.1. Section 4.2.1.13 has been revised to clarify that the project is not expected to cause additional impacts to the Inchelium-Gifford Ferry. As part of the agreement between the State of Washington and the Confedered Tribes of the Colville Reservation, the State will support a federal appropriation for ongoing maintenance and repair of the ferry and an evaluation of a bridge at the ferry location.

OGDEN MURPHY WALLACE
P. L. L. C.
ATTORNEYS AT LAW

PETER A. FRALEY
pfraley@omwlaw.com

June 23, 2008

VIA E-MAIL DSAN461@ECY.WA.GOV

Derek I. Sandison
Department of Ecology
15 West Yakima Ave. Suite 200
Yakima, WA 98902-3452

Re: Lake Roosevelt Draft SEIS Comments

Dear Mr. Sandison:

Our office represents the City of Bridgeport. On behalf of the City, we respectfully submit the following comments in response to the Draft SEIS for the Lake Roosevelt Incremental Storage and Releases Program as set forth in Ecology Publication No. 08-11-012 dated May 15, 2008 (the "Draft SEIS") for consideration by the Department of Ecology ("Ecology").

10-1 In general, the City supports and encourages additional efforts to make water available to cities and towns in Washington State, whether that be by releases from Lake Roosevelt for cities and towns along the Columbia River, or by legislation to recognize the needs of growing communities. The Draft SEIS provides one potential avenue to enable the City of Bridgeport to plan for the future. The primary focus of the City's comments relate to the Policy Options for Water Allocation, in particular the Allocation for Municipal and Industrial Supply. Additionally, comments are offered regarding the Release Alternatives as described in Section 2.3.1 and its subsections.

10-2 1. **Section 2.4.1 - Allocation for Municipal and Industrial Supply**. The City supports allocating water to cities and towns planning under the Growth Management Act based on need rather than the existing "first in time first in right" priority system. Given the fact that no new water rights have been issued along the Columbia River for nearly two decades, Ecology should consider factors other than the date the application was filed in determining and allocating this important resource. Ecology is encouraged to use the following factors to evaluate the needs of the applicants:

A. Health and Safety Considerations. Higher priority should be given to applicants addressing health and safety concerns that would be alleviated by the issuance of additional water rights. This priority could be similar to the priority processing provided

to competing applications as defined and set forth in WAC 173-152-050. This higher priority would include those systems out of compliance with Department of Health regulations, for which the lack of water is a contributing factor.

10-2 B. Cities and Towns at Capacity. Many cities and towns are at the capacity of their water rights, but have not initiated steps to declare a building moratorium, while a de facto moratorium or limit for new connections exists. Many of these same cities and towns have taken a number of steps to increase efficiency, including: (a) adoption of water rate schedules with significant increases and escalating rates for higher use; (b) annual or frequent leak detection surveys, (c) where possible, placing parks, cemeteries and similar public open spaces on irrigation rather than public water systems, and (d) installing new and replacing old meters to more accurately reflect and measure water usage. In response, many cities and towns have reduced the gallons per day per equivalent residential unit, thus freeing up some water for additional connections (which creates some reluctance to adopt an outright building moratorium). The declaration of a building moratorium can be a factor, but the underlying issue should be investigated and considered as well by Ecology in determining the relative priorities and needs. More specifically, cities and towns that have taken all reasonable steps to become an efficient water system, yet are at or near the capacity of their water rights should be treated in a similar fashion as those cities and towns who have declared a building moratorium. Additional factors that could be investigated include whether standards similar to those set forth in RCW 90.03.386 are being pursued, and whether the city or town has implemented or is in the process of implementing of cost-effective water conservation measures. Should water be made available first to an inefficient public water system where a building moratorium has been declared, or to an efficient public water system that is at or near capacity but a building moratorium has not been declared? We submit that it is the latter. While this will require more investigation on Ecology's behalf, it ultimately is a better allocation and use of the resource.

C. Growth Management Act. Higher priority should be allocated to cities and towns complying with and planning under the rules and regulations set forth in the Growth Management Act (the "GMA"). This is an important policy question: who should benefit from the "municipal" water being made available, public entities planning under the GMA or private interests that meet the definition of a municipal water supplier under chapter 90.03 RCW? The State of Washington has already made a significant policy decision by adopting the GMA, establishing urban growth areas, and encouraging long range planning. In order to achieve the greatest societal impact and benefit, cities and towns planning under the GMA should be considered before private interests. Only after the needs of our growing communities are met, should "municipal and industrial" water be made available to private interests. Otherwise, by limiting the ability of the cities and towns to plan for reasonable growth due to lack of water, will only cause further erosion of the policies and goals of the GMA by pushing development into areas outside of

10-2 established urban growth areas, whether that is by means of exempt wells or conversion of other water rights.

10-3 2. **Sections 2.3.1 and 2.3.2 - Release Alternatives - Each Year and Drought Years**. It appears that in every alternative, the maximum period that water will be made available for municipal purposes is from April through September, a 6 month period. Cities and towns with existing water rights may have the opportunity to incorporate a 6-month seasonal water right into its overall water right management plan. However, as the number of months are reduced (see Options 1A, 1C(b), 1C(c), and 1E) the potential benefit associated with the water being made available for a city or town decreases. For a city or town that has a near term projected short fall of 30%, making water available during the months of July and August may only provide a fraction of what is needed (one-sixth, or 16.7%). In some regards, the decision in Section 2.3.1 regarding the timing of the release and the availability of the water must be made prior to considering the priority allocations set forth above as this will impact the degree to which any municipal or industrial user will be able to actually use the water. Put another way, municipal applicants who have more immediate needs that can be satisfied by seasonal water rights, should have a higher priority over an applicant who has filed an application prior in time, but is unable to rely on a 2 or 4 month seasonal water right without taking some addition steps in the future (i.e. purchase additional water rights). Immediate and demonstrated needs should be addressed prior to uncertain or speculative needs.

10-4 As a final comment, in Section 2.4.1 of the Draft SEIS, it appears that Ecology is considering charging all water users to offset certain transaction costs of acquiring the water related to the Lake Roosevelt Drawdown. This is a state-wide issue that should be addressed in a more comprehensive fashion, rather than passing the costs onto the citizens living in more rural and farming communities on the dry side of the state. As a component of government, incorporated cities and towns should be exempt from any fee arising from water to be made available from the Lake Roosevelt drawdown outlined in the Draft SEIS.

Thank you for the opportunity to comment.

Very truly yours,

OGDEN MURPHY WALLACE, P.L.L.C.
OFFICE OF THE CITY ATTORNEY

W. Brett Amsine

for PETER A. FRALEY
PAF:wba

cc. Mayor Steve Jenkins

Comment Letter No. 10 – City of Bridgeport – Peter Fraley

10-1. Comment noted.
10-2. Your comment regarding the allocation of water for municipal and industrial supply is noted.
10-3. Your comment regarding the timing of the flow releases is noted.
10-4. Your comment regarding Ecology charging a fee to offset transaction costs is noted. Ecology will develop an administrative framework for cost recovery that includes appropriate public review.

From: Bob Alberts [mailto:ALBERTSB@pasco-wa.gov]
Sent: Tuesday, May 27, 2008 2:07 PM
To: Sandison, Derek (ECY)
Subject: Lake Roosevelt Drawdown comments

Derek:

11-1 The documents refer to mitigating 10cfs of water rights for the Quad-cities permit. The actual amount of mitigation water committed to by the Department of Ecology's past Director was for up to 15cfs and a minimum of 10cfs. The documents should make it clear that the Quad-cities water right may use the Lake Roosevelt municipal water for future migration water without being in line with a new permit application.

11-2 The City of Pasco is in favor of the new program to provide water and certainty to our City and others for today and the future.

Bob Alberts
Director of Public Works
City of Pasco

Comment Letter No. 11 – City of Pasco, Department of Public Works – Bob Alberts

11-1. The Supplemental EIS in Section 2.4.1.3 correctly describes the mitigation framework in the Settlement Agreement related to permit S4-30976P, which is used as one example of a priority use of water. The section also indicates that allocating water based on priority needs can be combined with other alternatives.

11-2. Your comment in favor of the project is noted.

Richland

505 Swift Boulevard, P.O. Box 190 Richland, WA 99352
Telephone 509-942-7390, Fax 509-942-5666

www.ci.richland.wa.us

PUBLIC WORKS DEPARTMENT
Administration

June 30, 2008

Derek Sandison , Regional Director
Central Region Office
Washington State Department of Ecology
Columbia River Management Program
15 W. Yakima Avenue Suite 200
Yakima, WA 98902-3452

Subject: **COLUMBIA RIVER MANAGERMENT PROGRAM**
"LAKE ROOSEVELT COMMENTS"

Dear Derek:

12-1 Thank you for allowing us the opportunity to comment on the Lake Roosevelt Draft Supplemental EIS. Attached are our general comments and also specific comments that relate to sections in the EIS. The Columbia River plays an integral role in the future of Richland and it is important that we be involved in the decisions concerning the Columbia River.

You can contact me at 509-942-7558 or progalsky@ci.richland.wa.us or Nancy Aldrich at naldrich@ci.richland.wa.us or 509-942-7508 if you have any questions.

Thank you.

Sincerely,

PETE ROGALSKY, P.E.
Public Works Director

cc: File
Nancy Aldrich

Attachment

CITY OF RICHLAND COMMENTS ON THE
DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE
LAKE ROOSEVELT INCREMENTAL STORAGE RELEASES PROGRAM

General Comments

12-2 1. Currently, municipalities and/or potable water purveyors are subject to the Water Use Efficiency Rule (WUE) as administered by the Department of Health. Presentations to the Columbia River Policy Advisory Group have suggested that the program apply water conservation standards to participants in the program, perhaps on a project-specific basis. The City suggests that conservation programs applied to municipalities be consistent with the Water Efficiency Rule. If new standards are developed for the Columbia River program the City suggests they be done through an open rulemaking process for transparency and consistency with other requirements. Any new conservation requirements should not put a water right holder in conflict with the conservation requirements of the WUE.

12-3 2. Ecology should stay focused on the core goals of the program (i.e. to aggressively develop new water resources for in-stream and out-of-stream uses) as mandated by the legislation. The many scenarios presented in the draft EIS are somewhat confusing. The City believes that allocation of the Lake Roosevelt releases should be programmed to maximize their mitigation value for water users. For instance releases should not be programmed to directly offset uses where the Biological Opinion or other mitigation requirements would not impose mitigation. The public does and should expect that the significant investment it is making in the Columbia River program should be made to its maximum benefit.

12-4 3. Ecology should consider including in the Lake Roosevelt release program a periodic review of mitigation needs as directed by new science, federal regulation, or other input. The review should provide an opportunity to reprogram releases to optimize their benefit under changing conditions.

12-5 4. The City understands that Ecology believes that a determination of Overriding Considerations of the Public Interest is required to support many of the actions proposed in this program. The Columbia River legislation articulates the clear public interests underlying the program. It seems odd that a separate administrative determination by staff is needed to implement the actions contemplated by the legislation. If these staff actions are indeed required the City hopes that Ecology falls back on the legislation's direction and avoids making these decisions based on some other set of complex criteria.

Specific Comments

12-6 1. Section 2.3.2 – Releases for Drought Years
The City of Richland prefers Alternative 1E, since it is the option that maximizes the mitigating effectiveness of the release program. The City does not understand the OCPI requirement in this case, since the release program is fully mitigating out of stream withdrawals.

12-7 2. Section 2.4.1.2. – Allocation of Municipal and Industrial Supply
The City of Richland opposes this option of allocation. This concept would unnecessarily complicate the analysis of impact and mitigation on the Columbia River mainstem. The EIS document implies that a proposed tributary use may require mitigation on both the tributary and the Columbia River mainstem. Presumably adequate mitigation on the tributary would resolve any mitigation needs on the Columbia. Including Lake Roosevelt release water as a mitigation option will dilute the effect of Lake Roosevelt releases for those uses with direct mitigation needs.

12-8 3. Section 2.4.1.3 - Allocation of Municipal and Industrial Supply
Court required mitigation by Ecology for current water right holders should be a top priority of the Lake Roosevelt water. The draft EIS may understate the water needed to resolve mitigation requirements for the first increment of water authorized under the Quad-Cities Water Right. The City encourages Ecology to consult with the Quad-Cities partners about its needs prior to finalizing the mitigation volume made available to these users.

The Quad-Cities Water Right was approved as a long-term (50 years) water supply plan for the region. Since the permit requires full mitigation of future withdrawals the City requests that Ecology's water resource planning under the Columbia River Program continue to develop mitigation opportunities beyond the Lake Roosevelt release program. It is apparent from Ecology staff communications that the Lake Roosevelt release program represents a finite, and perhaps, short term solution to water supply development on the Columbia River. The City believes the State must continue to be a partner in support of sound planning for all water users on the River, and in particular those for whom plans have been endorsed through issuance of a water right permit. It may be prudent to reserve a portion of the 25,000 acre foot municipal and industrial reserve for future mitigation called for in the Quad-Cities permit and develop a mechanism for the communities to reserve this water.

12-9 4. Section 2.4.2 – Allocation for Interruptible Water Rights
The City of Richland prefers Policy Option for Water Allocations to be the priority date allocation described in section 2.4.2.5. Alternatively, the City could support the market based allocation described in section 2.4.2.3. The City opposes the option identified in 2.4.2.2 wherein the State will allocate water through a State-derived hierarchy of beneficial uses.

Comment Letter No. 12 – City of Richland, Public Works Department – Pete Rogalsky

12-1. Comment noted.
12-2. Your comment regarding conservation standards is noted. As described in Section 2.4.1.2, Ecology will meet with the Department of Health to determine how to integrate the requirements.
12-3. Your comment regarding the flow releases is noted.
12-4. Your comment regarding periodic review of the project is noted. Ecology has selected Preferred Alternatives for the flow releases that will be based on adaptive management and adjustments to existing conditions. See the response to Comment Number 1-5.
12-5. Your comment regarding the Overriding Considerations of the Public Interest is noted.
12-6. Your comment in support of Alternative 1E is noted. A finding of OCPI may be required for Alternative 1E because the April to June flow releases downstream of Grand Coulee Dam would be dedicated exclusively to fish—not for in-time replacement of out-of-stream uses. Therefore, in years when the WAC 173-563 adopted flows are applied to flow-conditioned permits, an OCPI finding would be required to allow diversion of water when the weekly average flows are not met or exceeded.
12-7. Your comment opposing the water allocation alternative is noted.
12-8. Your comment regarding allocation based on priority needs is noted.
12-9. Your comment supporting a preferred allocation is noted.

Comment Letter No. 13

113 Lakeshore Drive
PO Box 8
Pateros, WA 98846

City of Pateros, Washington
Incorporated 1913

Phone: 509.923.2571
Fax: 509.923.2971
E-mail: pateros@swift-stream.com

RECEIVED
JUN 0 9 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

June 5, 2008

Department of Ecology
15 W Yakima Ave. Suite 200
Yakima, WA 98902-3452

RE: Lake Roosevelt Incremental Storage Release Project EIS

13-1

The city of Pateros would like to provide the following comments to the Lake Roosevelt Incremental Storage Release Project:

1. We are highly supportive of any plan to increase water to municipalities and irrigators in eastern Washington and wish to be included in the Columbia River Basin Water Management program.
2. We have a water rights application on file (G4-31832) since August 23, 1993 which would double our withdrawals from our wells to 1,000 gpm, daily.
3. We are approaching our limit on withdrawals under our current permit, because of several new developments in town.
4. We have already put in place water saving measures in town to try to conserve water and are willing to participate in water reuse programs but these measures will not solve all of our water needs.

The city of Pateros requests that we be considered a top priority city in this EIS and that we be kept involved in the process as it moves forward.

Sincerely,

Gail A Howe

Gail A Howe, Mayor
City of Pateros

Comment Letter No. 13 – City of Pasco – Gail A. Howe, Mayor

13-1. Your comments supporting increased water supply for municipalities are noted.

Comment Letter No. 14

City of
Kettle Falls
P.O. Box 457
Kettle Falls, Washington 99141

509-738-6821
(FAX) 509-738-4577
Mayor
City Council
Clerk/Treasurer
Building Inspector
Fire Department
Planning Commission
Project Manager/Grant Writer

509-738-6821
(FAX) 509-738-2052
Public Works Dept.
City Superintendent

509-738-6700
(FAX) 509-738-2052
Police Department

June 17, 2008

RE: Draft SEIS Lake Roosevelt

To Whom It May Concern:

14-1 The City of Kettle Falls is concerned over the additional drawn down and increase in downstream water rights on Lake Roosevelt. The City of Kettle Falls applied for a Water Right increase on June 22, 1998 (G330206) for 1,900 GPM (20 year demand ± 530 GPM for standby source). This permit has been in review with the Department of Ecology for the past 10 years.

The Growth Management Act (GMA) is designed to allow and plan for healthy growth in our communities. As a result of GMA, more people are moving into towns and urban areas as opposed to rural areas. This growth increases the pressure on municipal systems as towns continue to grow.

14-2 As a municipal water system provider, we are quickly approaching capacity. If the issuance of additional water rights downstream has an impact on Kettle Falls and the other communities on the northern portion of Lake Roosevelt, then the City of Kettle Falls strongly opposes this proposal. The town of Marcus has a similar Water Right application in review as well. If the proposal for a downstream increase is approved, then the current Water Right applications for Kettle Falls and Marcus should be included and approved as part of this proposal.

Respectfully

David M. Keeley
Project Manager

580 Meyers St. Kettle Falls, Washington 99141

Comment Letter No. 14 – City of Kettle Falls – David M. Keeley, Project Manager

14-1. Your comment regarding your water right application is noted.

14-2. Under the Preferred Alternative for the allocation to municipal and industrial users, Ecology would allocate a portion of the flows to achieve regional equity. Some of this water could be allocated to jurisdictions above Grand Coulee Dam (see Section 2.4.1.1).

From: dolsenecon@aol.com [mailto:dolsenecon@aol.com]
Sent: Monday, June 02, 2008 1:08 PM
To: Sandison, Derek (ECY)
Cc: DonO@WattsBros.com; bossconsulting@earthlink.net
Subject: Comments on DSEIS Lake Roosevelt Incremental Storage Release Program

Derek:

15-1 For the administrative record, please see CSRIA's attached scoping comments on the DSEIS that are also being submitted for the released DSEIS. The CSRIA comments remain the same.

Please also note that CSRIA's public comments/submissions within the PAG on this issue should be considered as part of the administrative record, per this comment request.

My thanks,

Darryll Olsen, Ph.D.
CSRIA
509-783-1623 office

Columbia-Snake River Irrigators Association
Technical Memorandum

DATE: January 3, 2008

TO: Mr. Derek Sandison, Regional Manager and EIS Coordinator
Central Regional Office, WADOE

FROM: Darryll Olsen, Ph.D., CSRIA Principal Consultant

SUBJECT: CSRIA Scoping Comments on the Supplemental EIS for the Lake Roosevelt Incremental Storage Release Project

---

15-2 The CSRIA is supportive of the Lake Roosevelt Incremental Storage Release Project (water shifting proposal) to meet new water right needs for the Quad-Cities, Brewster, and potentially other local communities; for a portion of the Odessa Sub-Area; and for conversion (drought permits) of a portion (quantity allocation) of the existing, mainstem interruptive water rights to firm status.

Our scoping comments focus specifically on water management actions for the interruptive water rights program, where a portion of the interruptive rights would be "firmed" with Lake Roosevelt water releases (about 33,000 acre-ft, with another 17,000 acre-ft. provided for additional fish flows).

15-3 We note that the Lake Roosevelt water would be used in combination with demand-side recalibration of the existing water rights (under the CSRIA-Ecology Voluntary Regional Agreement) and exercising the critical flow adjustment for low water-year conditions to adequately firm the interruptive water rights for a 2001 water-year condition. It requires all three actions (Lake Roosevelt water, water right recalibration, and the critical flow adjustment) to make the interruptive water right conversion program effective, and deal with all pertinent water rights.

15-4 Consequently, we address the overall use of the combined water sources, per our scoping comments. Additional briefing papers on this subject will be provided to the Ecology Director, as well.

Interruptive Water Rights Planning Period/Quantity Requirements:

15-5
- For planning purposes, the CSRIA recommends that water demands for firm water right conversion be targeted to a 2001 water-year condition, and not a 1928-1932 or 1976-77 water-year condition (critical water definition). If this is done, then there will be adequate water to cover the interruptive rights, per the three measures described above.

3030 W. Clearwater, Suite 205-A, Kennewick, WA 99336
509-783-1623, FAX 509-735-3140

- If a water-year condition emerges providing less water than that available for a 2001 condition, then the 2001 mitigation program should be implemented, with the existing Columbia River flow target WAC temporarily suspended in conjunction with a drought declaration by the Governor (and with emergency authority granted by existing rules).

Interruptive Water Rights and Lake Roosevelt (or Other) Water Allocations:

- Lake Roosevelt water should be allocated equitably among all the interruptive water rights (equitable pro-rationing), with no attempt made to prioritize the water rights per purpose, class, timing, or crop type.

- During a 2001 water-year condition, voluntary reductions or curtailments of water rights, or temporary leasing options for non-use, are supported.

Interruptive Water Rights and the Critical Flow Adjustment:

- There already exists a critical flow adjustment (OCPI) allowed under the current administrative rules.

15-5

- The "lower" flow target should be a firm planning constraint for issuing future drought permits for relief/conversion of interruptive water rights. There are: 1) no measurable fish benefits to be obtained from stopping the engagement of the critical flow adjustment (see attached NOAA Fisheries data/analyses for Columbia River fall chinook migration, 2001 water year conditions); 2) the adjustment provides some tangible relief for interruptive water rights; and 3) supplying "new" water for the flow adjustment will likely take away water that could otherwise be used for the development of new water rights.

- There is no compelling, nor reasonable, technical or policy justification for the Ecology Director to refrain from exercising the critical flow adjustment option (OCPI) under a low-water condition (like 2001), per exiting administrative rules. There are no measurable fish benefits, but there are very real economic and policy (litigation) impacts.

- The CSRIA further notes that the existing rule for a "two-stage" adjustment to critical flow targets is a very strange and flawed provision, not well thought-out by the original rule drafters. Its fundamental utility is very vague and questionable.

15-6 The CSRIA anticipates further discussion of this issue with Ecology management staff.

Attachment

Pacific Northwest Project Technical Memorandum On Columbia River Flows

DATE: November 10, 2006 (revised).

TO: Mr. Jay Manning, Director, WADOE
Mr. Gerry O'Keefe, Coordinator, Columbia River Partnership
and Interested Parties

FROM: Darryll Olsen, Ph.D.
Regional Planner/Resource Economist

SUBJECT: The "Ghost" Haunting the NRC/NAS Columbia River Report
Is "Empirical Science"—And the Ghost Has Daunting Implications
for State Proposals Toward Columbia River Water Management

Introduction:

Prepared for the WADOE, the NRC/NAS report[1] on the impacts of future Columbia River water right withdrawals and water management has been haunted by a lack of quantitative explanation, or more appropriately termed, "Empirical Science."

A great uneasiness pervades the report's conclusions, with contradictory statements by the report authors incanting that the actual fish impacts cannot be measured, but nevertheless the non-measurable impacts are deemed to create "substantial risk" to fish survival. There exists an eerie, disturbing feeling that a critical "presence" does exist here, but hidden from direct awareness, or at least shielded from clear vision by the NRC/NAS study's strained rationalizations.

That "presence" is, in fact, "Empirical Science." When the doors of perception are opened, and "Empirical Science" is brought into a clear and focused light, its revealing implications for proposed state actions become troublesome.

3030 W. Clearwater, Ste., 205-A, Kennewick, WA 99336
509-783-1623, FAX 509-735-3140, E-Mail: DOlsenEcon@AOL.com

[1] National Research Council/National Academy of Sciences, "Managing the Columbia River: Instream Flows, Water Withdrawals, and Salmon Survival ," NRC/NAS, 2004, at NAS Website.

Background and Review of Recent Flow-Survival Data:

As stated by the NRC/NAS report, the primary emphasis on "risk" to migrating fish was directed toward low water-year events (like 2001), during the summer months (July-August), when peak water withdrawals and low flows coincided[2]

The dominant fish run affected during this period likely would be Mid-Columbia (wild) fall chinook, as well as other runs such as the ESA-listed Snake River fall chinook run.

For fish migrating through the Lower Snake River system and the John Day Pool, the basic empirical data and analyses for assessing the impacts of flow regimes on fish travel time, temperature and survival are contained within the following studies: 1) Smith, S. G., W. G., Muir, et al. 2002. *"Survival of Hatchery Subyearling Fall Chinook Salmon in the Snake River and Lower Snake River Reservoirs, 1998-2001."* Report by the National Marine Fisheries Service to the U.S. Department of Energy, BPA, Portland, OR; and 2) Muir, W. G., et al. 2004. *"Survival of Subyearling Fall Chinook Salmon in the Free-Flowing Snake River and Lower Snake River Reservoirs in 2003 and from McNary Dam Tailrace to John Day Dam Tailrace in the Columbia River from 1999 to 2002."* Report by the National Marine Fisheries Service to U.S. Dept. of Energy, BPA, Portland, OR.

The NRC/NAS authors actually referenced one of the reports (Smith and Muir, et al., 2002) as follows: "correlations were not significant between annual fish survival and the average river condition variables [flow, temperature, turbidity]".[3] No statistically significant flow-survival relationship could be detected for migrating fish within the mainstem Columbia River, even in a low water-year event like 2001 (*within year relationship*).

But there is much more to be understood about the empirical data and analyses.

These studies observed that water temperature and flow were highly correlated for the *combined data, 1999-2002 period.* For the combined data, flow and survival were moderately correlated, as was temperature and fish survival. When data for all years were combined (1999-2002), travel time versus flow and temperature relationships were not statistically significant (adjusted values). For between-year conditions, higher flows generally relate to higher survival rates; the year 2001 displayed lower survival rates compared to the other years. For analyses of individual years *(within-year operations)*, 1999-2001, there did not exist a statistically significant relationship between flow and survival or temperature and survival, but temperature did exhibit the highest level of correlation to survival.

In all years, when water temperatures exceeded 19 degrees C., survival rates generally decreased. Moreover, the report authors (Muir, et at. 2004) observed that below 19.3 degrees C the survival-temperature relationship was "nearly zero," and above 20.6 degrees C the survival-temperature relationship was "nearly zero." In other words, when

[2] NRC/NAS pg. 60.
[3] NRC/NAS Report pg. 60.

temperature changes occurred and crossed a threshold, independent of flow levels, survival levels changed as well. Below or above the threshold level, survival levels were relatively "flat."

This temperature "threshold effect" also was a defining point in another University of Washington study, briefly referenced by the NRC/NAS study, but not given close attention. This study, prepared by the Columbia Basin Research Office, UW (Anderson, J., 2004, *A Resolution of the Flow-Survival Debate.* Columbia Basin Research Office, UW, and presentation materials to the NRC/NAS Report authors) observed that the 2001 spring-summer data for migrating chinook salmon through the Lower Snake River to the McNary project displayed a non-linear relationship between flow and survival.

Survival rates actually varied greatly at the same flow levels, when the flow levels were measured during different time periods, with differing temperatures (see Figures 1 and 2 below). For example, during one flow (time) period of about 60 kcfs, survival rates were about 70%, and during another flow (time) period, survival rates were about 20%. The driving factor was temperature, not flow; and *flow was observably not controlling temperature.*

Figure 1.

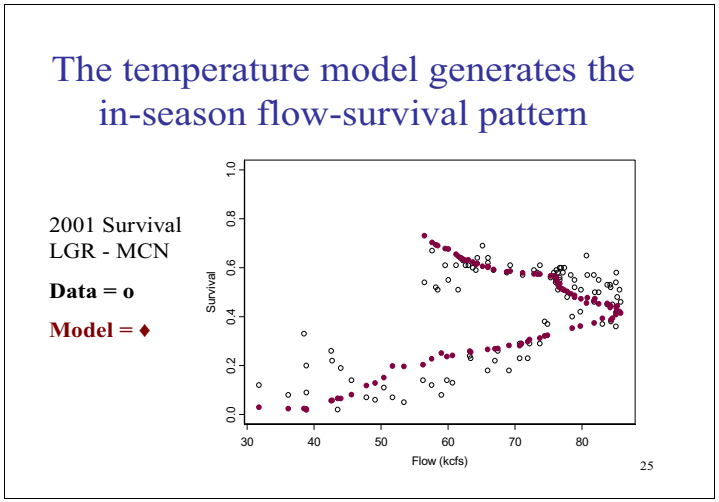
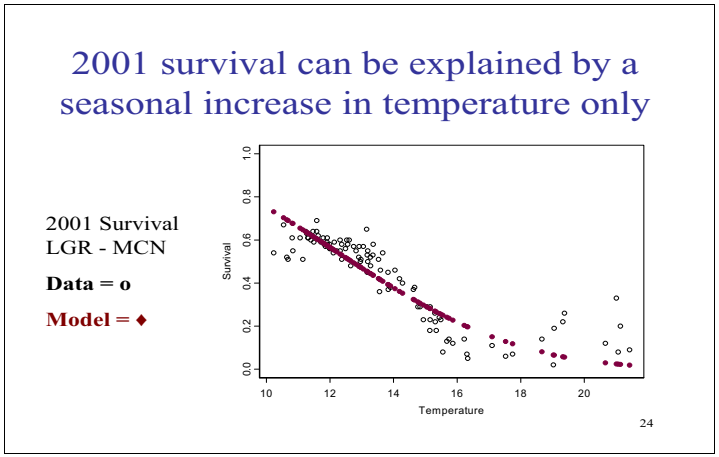


Figure 2.



The data and analyses provided by Muir, et al. (2004) (Report Table 20), also can be reviewed in greater detail regarding statistical significance and explained variance (predictability of the relationship between flow and survival). As noted by the report authors, the flow and survival relationship for the *combined data* may be statistically significant, because of the large sample size involved, but the explanatory power between the variables is relatively low. For example, for the *combined 1999, 2001, and 2002 data* (the year 2000 was omitted from analysis here), an estimated correlation coefficient between flow and survival (r = .506) suggests that the amount of explained variation in survival relative to flows (r^2) is about 0.26 (26%). That is, about 26% of the change in survival levels can be statistically explained by changes to flows—when *multi-year data are combined.* This suggests that other factors—within years--have a much more powerful influence on survival through the pool than flows.[4]

A comparison of the *within-year data* for 2001 (low water year) and 2002 (intermediate water year) gives greater insight into the nature and consistency of the variable relationships. Table 1 below depicts the flow-temperature-travel time and survival data for 2001 (low flow year), for an analysis sample of migrating fall chinook through the

[4] There are two important problems affecting the interpretation of combined year data for water (fish) management operations. First, the different years, with many different environmental conditions and variables, actual represent distinct sample populations. Combining data from distinct sample populations within a statistical analysis will provide misleading results. Data must be from the same sample population. And second, actual water management operations can only affect within year conditions—flow regime changes only affect a single, within-year situation, not water-fish-temperature-flow conditions across multiple years.

John Day Pool (Muir, et al. 2004).

Table 1. 2001 John Day Pool Fall Chinook Survival

Year	Study Group Release Date (End)	McNary/ J.D. Flow (kcfs)	McNary Temperature (Degrees C)	Estimated Temperature Gain Between McN-J.D. (Degrees C)	Travel Time (Days)	Survival Rate (%)
2001	June 25	125/89	16.9	2.4	13.8	.57
2001	July 02	117/80	17.6	3.0	27.6	.56
2001	July 09	92/85	19.2	1.9	26.9	.52
2001	July 16	81/79	20.5	0.2	16.6	.65
2001	July 23	82/84	20.4	0.6	13.7	.59
2001	July 30	82/91	21.4	0.1	13.3	.60

In 2001, the flow and travel time rates fluctuated across the fish release groups, producing mixed results. The lowest flow period (81 kcfs) corresponded to the highest survival rate of .65, while the highest flow period (125 kcfs) corresponded to one of the lower survival rates of .57. The travel times across this flow regime generally decreased, with the decreasing flows.

Table 2 below depicts the flow-survival-temperature-travel time data for 2002 (intermediate water year), for an analysis sample of migrating fall chinook through the John Day Pool (Muir 2004).

Table 2. 2002 John Day Pool Fall Chinook Survival

Year	Study Group Release Date (End)	McNary/ J.D. Flow (kcfs)	McNary Temperature (Degrees C)	Estimated Temperature Gain Between McN-J.D. (Degrees C)	Travel Time (Days)	Survival Rate (%)
2002	June 25	326/309	15.7	1.2	3.8	.89
2002	July 02	322/271	17.0	0.6	4.6	.94
2002	July 09	262/252	16.8	1.4	5.2	.68
2002	July 16	240/226	18.7	0.3	5.0	.81
2002	July 23	229/186	19.7	1.0	4.8	.60
2002	July 30	173/161	20.1	0.6	7.7	.66
2002	Aug 06	160/153	20.2	1.1	8.7	.81
2002	Aug 13	157/146	20.1	1.0	5.6	.45
2002	Aug 20	144/150	21.0	0.0	4.9	.57

In 2002, data were collected over a more extended period of time than in previous years, adding the month of August.

In the latter half of July and through August, the temperatures moved above 19 degrees C. It is noticeable that a large degree of variation in the flows ranging from 229 to 144 kcfs produced mixed results related to travel time and survival; across this flow regime, travel time fluctuated from 4.8 days (229 kcfs) to a high of 8.7 days (160 kcfs), and then back down to 4.9 days (144 kcfs). The survival rate varied as well, but the highest rate of survival (.81) corresponded to the peak travel time for the period (8.7 days), while the lowest survival rate (.45) occurred at a travel time of 5.6 days. Here, there does not appear to be a consistent relationship between travel time and survival.

The above 2001 and 2002 data for *within-year observations* confirm that it is difficult, if not impossible, to relate changes in survival arising from changes in flow or travel time.

Empirical Science Implications for Water Management:

The above data and analyses have important implications for state water management proposals targeting fall chinook (summer period runs) survival in the mainstem Columbia River. This applies most specifically to a low water-year condition like 2001, and during a peak water withdrawal period, such as the months of July and August.

The following conclusions are derived from the empirical data and analyses depicted above but not fully, or adequately, considered by the NRC/NAS study:

- One estimate of water needed for new water rights represents about 250,000 acre-ft., or about 1 kcfs during the peak irrigation withdrawal period during the month of July (57,500 acre-ft.). A 1 kcfs change to flows will have absolutely no significant (or likely empirical impact) on either temperature or fish survival.

- Under the state's December, 2004, Columbia River Initiative (CRI) proposal, the "no net loss plus" multiplier of 1.5 dictated that if 500,000 acre-ft. were withdrawn from the river, then 750,000 acre-ft. would have to be "returned" (750,000 acre-ft. of water shifted to the July-August summer period). If the full 750,000 acre-ft. of water were shifted to these months, not taking into account any actual net withdrawals, the "shifted" flow would be about 6.3 kcfs.

- Even under a "gross" increase of 6.3 kcfs, there would be no significant (or likely empirically measurable impact) on either temperature or fish survival.

- If about 40% of the 750,000 acre-ft. of the water "shifted" was used for irrigation water withdrawals in July and August, then about 450,000 acre-ft. of water would increase flows by about 4 kcfs (net increase). There would be no significant (or likely empirically measurable impact) on either temperature or fish survival.

- The state's proposal to shift initially about 100,000 acre-ft. of water within the Grand Coulee Project to the month of August would increase flows by about 1.7 kcfs. There would be no significant (or likely empirically measurable impact) on either temperature or fish survival.

- It will not be possible to control temperatures in the mainstem Columbia River—and thus fish survival--with the flow regime changes contemplated by the state. It is unlikely that any potential flow regime change would have a meaningful impact.

The implications of the Empirical Science are: 1) small, incremental water withdrawals for new mainstem water rights (250,000 acre-ft.) would have no "measurable" affect on temperature or fish survival; 2) the state's "no net loss plus" proposal would have no measurable affect on temperature or fish survival; and 3) state funds allocated to implement the "no net loss plus" proposal would produce no empirically "measurable" fish benefits.

Stated succinctly, state funding used to shift more water into the July-August period for the mainstem Columbia River will have no empirically measurable fish benefits. To the extent that state funding for fish projects is limited, the state dollars spent on the Columbia River will lead to fewer dollars available for other fish—and water--projects that may yield more tangible benefits elsewhere.

Failure to acknowledge the ghost haunting the NRC/NAS report will invoke a price.

Comment Letter No. 15 – Columbia-Snake River Irrigators Association – Darryll Olsen

15-1. Comment noted. The comments you submitted during scoping of the Draft Supplemental EIS are attached and included in the Final Supplemental EIS.
15-2. Comment noted.
15-3. Your comment regarding recalibration of water rights is noted. The recalibration only applies to participants in the CSRIA Voluntary Regional Agreement and not to all interruptible water rights included in the Lake Roosevelt Incremental Storage Releases Project.
15-4. Your briefing paper is attached and was considered in the preparation of the Programmatic EIS (Ecology, 2007). Your comment regarding additional briefing papers is noted.
15-5. Your comments regarding the water right conversion are noted.
15-6. Comment noted.

COLUMBIA BASIN
DEVELOPMENT LEAGUE

P.O. Box 1235 Royal City,WA,99357

June 30, 2008

VIA ELECTRONIC MAIL

Derek Sandison, Central Regional Director
Washington Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902-3452

Dear Mr. Sandison:

RE: Draft SEIS for Lake Roosevelt Incremental Storage Releases Program Comments

16-1 The Columbia Basin Development League is a 501(c)(6) non-profit organization established in the early 1960's to encourage the development and support the ongoing maintenance and operation of the Federal Reclamation Columbia Basin Project. Since that time the League has closely followed issues affecting Project operations.

The League has focused its resources recently on efforts to address the problems associated with the depletion of the aquifer in the Odessa Ground Water Management Subarea. In late 2004, the U.S. Bureau of Reclamation, Washington Department of Ecology and the three Columbia Basin Project Irrigation Districts entered into a Memorandum of Understanding to work together on a number of projects aimed at addressing water management issues in the Columbia River Basin generally, and on the Columbia Basin Project specifically.

The MOU became one of the underpinnings for Ecology's Columbia River Water Management Program established by the Washington Legislature in 2006. One central element that has carried through this program has been an effort to provide early action access to new water resources for both instream and out of stream uses in the region by utilizing unused capacity in the Columbia Basin Project water reservation held by Reclamation.

The League has reviewed the Draft Supplemental Environmental Impact Statement for the Lake Roosevelt Incremental Storage Releases Program (LRISRP) which, when implemented, will include a new diversion of 30,000 acre/feet of water to replace ground water used for existing irrigated agriculture in the Odessa Subarea. The LRISPR will also provide new drought relief, municipal/industrial and instream flow supplies.

16-2 The CBDL believes Ecology has completed a comprehensive analysis of the potential impacts of the LRISPR and the benefits of the Program far out reach the impacts that have been identified. A key factor is a recognition that operational levels of the Lake Roosevelt Reservoir will be well within the current operational range when implementing the annual drawdown necessary to offset the diversion for new supplies.

Ecology has proposed a number of actions to be undertaken to address minor impacts where they have been identified. The net effect will be that for the general public there will be no noticeable change when the program is implemented. The CBDL believes the SEIS adequately addresses all potential impacts and should serve as a basis for issuing the new permits for Columbia River water use.

Sincerely,

Michael V. Schwisow
Project Director
Columbia Basin Development League

Comment Letter No. 16 – Columbia Basin Development League – Michael V. Schwisow

16-1. Comment noted.
16-2. Your comment in support of the project is noted.

From: Scott Revell [mailto:SRevell@kid.org]
Sent: Monday, June 30, 2008 4:03 PM
To: Sandison, Derek (ECY)
Subject: Lake Roosevelt Incremental Storage Releases Draft SEIS

Mr. Sandison:

17-1 The Kennewick Irrigation District supports the incremental storage release proposal. The proposal is an important water management tool for Columbia River water resources.

As stated in the draft SEIS, the proposal involves very few environmental and recreational impacts. On balance, these impacts are a very small price to pay for the additional flexibility that the new water resources will provide. As a downstream water user, the KID supports the availability of additional Columbia River water for both the holders of interruptible water rights and new water rights.

Thanks you for the opportunity to submit comments.

Scott Revell
District Planner

Comment Letter No. 17 – Kennewick Irrigation District – Scott Revell

17-1. Your comment in support of the project is noted.

June 30, 2008

Derek Sandison
Central Regional Director
Washington State Department of Ecology
15 West Yakima Ave., Suite 200
Yakima, WA 98902-3452

Via email: dsan461@ecy.wa.gov

Dear Mr. Sandison:

18-1 Thank you for this opportunity to comment on the draft Supplemental Environmental Impact Statement (SEIS) for the Lake Roosevelt Incremental Storage Releases Program.

American Rivers is a national, non-profit conservation organization dedicated to protecting and restoring healthy natural rivers and the variety of life they sustain for people, fish, and wildlife. We have a growing national network of members and supporters totaling over 65,000 people. American Rivers' Northwest office serves over 2,000 members in Washington, Oregon, and Idaho. WEC is a statewide, non-profit, nonpartisan organization devoted to environmental protection in the state of Washington. Since its founding in 1967, WEC has actively participated in issues concerning the state's water resources.

18-2 As we stated in our comments on the scoping of this SEIS, American Rivers and WEC view re-operating Lake Roosevelt as a promising way to help meet eastern Washington's water needs and the goals of the Columbia River Water Management Program in a relatively cost-effective, environmentally friendly manner, while providing some benefit to instream flows during the salmon and steelhead migration season. While we continue to have some questions about the effect of the proposed program on downstream salmon stocks (particularly the Hanford Reach fall chinook stock) and some concerns about the nature and durability of water rights granted through the re-operation of Lake Roosevelt, this project has the potential to meet demonstrated water needs while reducing – and in combination with conservation, efficiency, and other non-structural water management tools, helping to eliminate – any perceived need for substantial public investments in expensive, environmentally harmful new surface storage dams.

A. Response to Our Scoping Questions

18-3 In our comments on the scoping of this EIS, we asked the following questions:

1. What are the impacts to Columbia River flows and the aquatic ecosystem during the times of year when the flow would have otherwise been released? What are the impacts to salmon, including ESA-listed stocks and Hanford Reach fall chinook?; and

2. What happens to the water rights issued as a result of new Lake Roosevelt operations in the event that those operations end or are curtailed for any reason, including an end to the agreement establishing the modified operations?

18-4 The draft SEIS provides only a cursory and incomplete answer to our first question, indicating in one short paragraph that the "flow level increases are unlikely to have a measurable influence on habitat conditions or aquatic resources in the mainstem Columbia River, but are expected to help meet stream flow targets and provide cumulative benefits to fish," p. 4-64 – 65. We request that the final EIS provide more information and documentation explaining this conclusion, particularly with respect to protecting Hanford Reach fall chinook during spawning and emergence. Will refilling Lake Roosevelt in the fall and winter affect the ability of downstream dam managers to manage dam releases for the protection of Hanford Reach spawners, redds, and newly hatched fish?

18-5 In response to our second question, the draft SEIS essentially states that if the drawdown releases are curtailed, Ecology must seek a replacement source for the 132,500 acre-feet of water that would disappear. This serves to reinforce our concerns – which we nevertheless hope will prove to be academic – about the durability and sustainability of water rights issued under the drawdown program. Should the program be curtailed, we urge Ecology to look for ways to acquire immediate water savings/replacement through environmentally-friendly means such as conservation, and to take a conservative view of how much water actually needs to be replaced. Ecology needs to take preventive measures to avoid a conflict from developing should the new water rights to lose their underlying mitigation water. We urge Ecology to include appropriate language in the

18-6 certificates to address that contingency and to consider options for an "insurance plan" that might provide adequate mitigation under the unlikely circumstance that water is urgently needed in future decades.

B. Recommendations Regarding Storage Release and Policy Alternatives

18-7 With respect to storage release alternatives, we support Alternative 1C, the "Maximize Fish Flows" option. The quantity of water released by the drawdown can best contribute to cumulative improvements in flow conditions and meeting Federal Columbia River Power System Biological Opinion flow targets by targeting the times when fish would most benefit from additional flow.

18-8 Regarding policy options for water allocation, of those listed we most support the "Market-Based Allocation" option. This is because it will force those who want additional water to look into whether the drawdown is the best source for "new" water, or whether alternatives such as conservation would better serve their water supply needs. This would also, presumably, offset some of the costs of administering the drawdown, and provide the Columbia River Water Management Program funds to invest in conservation, efficiency, and other alternatives to improve instream flows and water supply.

18-9 We propose that Ecology adopt an allocation option as part of the drawdown program (and throughout its administration of the Columbia Water Program) that combines the market approach with one that assures that water users have invested in conservation and efficiency (potentially with the help of Columbia Program funds) before other "new" water is made available to them. This is part of ensuring that the "public interest" test for new water rights is met. Absent a demonstration that water users are making the best use of existing water supplies, state investment and assistance in acquiring new water supplies for private or municipal entities is premature.

Thank you for your consideration of our comments.

Sincerely,

Michael D. Garrity
Associate Director, Columbia Basin Programs, American Rivers

Michael Mayer
Legal Director, Washington Environmental Council

Comment Letter No. 18 – American Rivers and Washington Environmental Council – Michael D. Garrity and Michael Mayer

18-1. Comment noted.

18-2. Your comments regarding the Lake Roosevelt Incremental Storage Releases Project are noted.

18-3. Your scoping comments were considered in the development of the Draft Supplemental EIS. See the responses to your Comments 18-4 and 18-5 for specific responses to your questions.

18-4. The Supplemental EIS has been revised to include more detailed information on fall flow reductions in the Columbia River caused by refilling Lake Roosevelt. See Sections 4.2.2.3, 4.2.2.5., and 4.2.2.6.

18-5. Water rights based on the proposed water supply contract would be the same as any other water rights held by irrigation districts, municipalities, and individuals in many areas in Washington and the western United States. The federal contracts are for a period of no more than 40 years and can be extended. To the extent that water supplies created through program funding are not permanent or may not be completely reliable, Ecology intends to develop contingency plans to manage the risks associated with the potential future loss of that supply.

18-6. Your comment regarding water rights certificates is noted. The issuance of individual water rights for water from the flow releases will be evaluated in the future and Ecology will consider how to address these issues at that time.

18-7. Your comment in support of Alternative 1C is noted. The Preferred Alternative is a modification of Alternative 1C.

18-8. Your comment in support of a market-based allocation is noted. Ecology is including a market strategy in the Preferred Alternative for the allocation of water to holders of interruptible water rights (Section 2.4.2.2).

18-9. Your comment regarding market-based allocation and conservation is noted. See Sections 2.4.1.2 and 2.4.2.2 regarding conservation requirements for recipients of water from the flow releases.

June 17, 2008
Derek L. Sandison, Regional Director
Washington Department of Ecology
Central Regional Office
15 W, Yakima Ave, Suite 200
Yakima, WA 98902-3452

Re: Comments on draft SEIS for Lake Roosevelt Incremental Storage Release "drawdown" Program

Dear Mr. Sandison:

19-1 Thank you for the opportunity to provide comments on the supplemental environmental impact statement for the Lake Roosevelt "drawdown" proposal. These comments are submitted on behalf of the Center for Environmental Law & Policy (CELP), the Sierra Club Upper Columbia River Group, Sierra Club Cascade Chapter, and the Columbia Water Conservation Alliance (CWCA).

CELP is a non-profit membership organization working to defend and develop ecologically and socially responsible water laws and policies. Sierra Club UCR and Cascade Chapter represent more than 30,000 members in Washington State and North Idaho who use and enjoy the Columbia River, including Lake Roosevelt. CWCA is an alliance of sporting, conservation and landowner groups in the Columbia River watershed who are dedicated sensible, sustainable and affordable water supply management.

CELP has been involved with the Columbia River Management Plan since its inception. CELP is a party to a continuing settlement agreement governing future allocations of river water to the Quad Cities of Kennewick, Richland, West Richland, and Pasco, which we believe will be affected by the Lake Roosevelt drawdown proposal.

The State of Washington is at a crossroad in terms of water management. Faced with climate change and population increases, it is crucial that the state engage in deliberate, informed, and thoughtful water management planning now, in order to prevent water conflicts and shortages in the future. Policy decisions based on incomplete or erroneous information will place Washington's water security in further jeopardy and shift the burden of water shortages to future generations.

Board of Directors: Karen Allston – Kathy George – Anne Johnson – John Osborn MD
Staff: Rachael Paschal Osborn – Patrick Williams – Sasha Cornellier
Honorary Board: Billy Frank Jr. – Prof. Estella Leopold – Gov. Mike Lowry
Prof. Charles Wilkinson – Fran Wood MD

Spokane: 509.209.2899 Seattle: 206.547.5047
www.celp.org

I. GENERAL COMMENTS

1. Tribal Payments

19-2 As an initial matter, it is important to state that our organizations do not object to provisions for payments to the Colville Confederated Tribes and the Spokane Tribe to compensate for historic damage to tribal interests in the Columbia River.

2. Future Water Shortages

19-3 The state's plan for distribution of additional water from Lake Roosevelt inadequately describes problems relating to future water supply that will profoundly affect Lake Roosevelt management. First, the consequences of climate change are not yet fully known, but are projected to cause a substantial change in the Columbia River hydrograph. The headwaters of the Columbia River (i.e., the Columbia Ice Fields of British Columbia) are projected to undergo record loss of snowpack and glaciation. This will result in less water available in Lake Roosevelt during summer months. See Attachment 1.[1]

19-4 Second, there is a significant likelihood that the Columbia River Treaty between the United States and Canada will be renegotiated in the relatively near future. It is understood that British Columbia residents are dissatisfied with current operation of the Canadian Columbia River reservoirs and may seek changes in river operations when the Treaty expires. This may result in less water availabale in Lake Roosevelt for allocation during summer months. The extent of the impacts associated with climate change and the Columbia River Treaty are unknown. Given these important unknowns, the allocation of new water rights from Lake Roosevelt would be irresponsible and likely to lead to future water supply crises, when water supply is inadequate to fulfill existing water rights, much less new ones. The various alternatives proposed in the SEIS will ultimately exacerbate Eastern Washington water supply shortages. The SEIS fails to adequately disclose these impacts or discuss alternatives or mitigation.

3. Cumulative Impacts

19-5 The SEIS is inadequate because of the Department of Ecology's failure to connect this project to the other pieces of the Columbia Water Management program, including a number of other dams and water infrastructure proposals that will destroy habitat in Eastern Washington.

4. Inability to Measure Specific Releases

19-6 The SEIS fails to discuss the inability of the United States Bureau of Reclamation to accurately measure the amount of water that will be released from Grand Coulee Dam pursuant to this proposal.

5. The SEIS fails to discuss all recreational impacts.

[1] Hamlet, Mote, Mantua, & Lettenmaier, "Effects of Climate Change on the Columbia River Basin's Water Resources," (Nov. 2005) (www.paleolands.org/pdf/ClmtChngColumbBasn.pdf)

19-7 The SEIS fails to fully identify recreational and associated economic impacts that will occur as the result of the lake being drawn down during the height of the recreational season. The SEIS also fails to propose adequate mitigation for these impacts.

6. CELP-Quad Cities Agreement.

19-8 CELP is party to a binding settlement agreement with the state of Washington and the Quad Cities (Kennewick, Pasco, Richland and West Richland) that requires mitigation for new water rights granted to the Cities, along with specific water conservation requirements. (Center for Environmental Law & Policy v. Department of Ecology, et al., PCHB No. 02-216, Stipulation, Settlement Agreement, and Order of Dismissal (8-19-03)). See Attachment 2. The SEIS is inadequate in its failure to analyze the relationship of the Lake Roosevelt drawdown proposal to the requirements of the settlement agreement, including the impacts on water conservation and future supply options associated with providing water subsidies to the Quad Cities. Analyze the potential for future litigation over this settlement agreement.

I. Specific Comments

Sections S.4, 1.6.6, 3.10.1.1, 4.2.1.9

19-9 Failure to discuss or consider impacts of the drawdown on exposure of Teck Cominco (TC) contamination of Lake Roosevelt sediments, water and air quality is a major omission in the SEIS document. It is not sufficient to simply put this discussion off for future analysis. There are substantial, adverse impacts associated with TC-based pollution of Lake Roosevelt that should be analyzed, discussed and mitigated. The conclusion that the drawdown will not result in additional exposure of reservoir bed and banks, followed by admission that the drawdown will in fact cause exposure at different times is not logical.

Sections 1.6 and 4.3

19-10 The Supplemental EIS (SEIS) for Lake Roosevelt Incremental Storage Releases fails to consider the comprehensive impacts of all of the programs/proposals aimed at expanding the Columbia Basin Project. The Columbia watershed is one of the most heavily dammed river basins in the world. Unremitting development of dams, reservoirs, and irrigation projects have destroyed untold riverine, terrestrial, wildlife, and cultural resources.[2] The incremental evaluation of various interconnected projects that are designed to take water out of the Columbia River violates both the letter and spirit of SEPA. The project discussed in the SEIS is related to:

- Potholes Supplemental Feedroute (federal Environmental Assessment and FONSI dated 8-07 and state Mitigated Determination of Non-Significance, dated 1-17-08),
- Odessa Subarea Special Study (appraisal investigation dated 9-29-06, as updated 10-07 and 11-07),
- Columbia Mainstem Off-Channel Study (appraisal evaluation dated May 2007),

[2] *See* World Commission on Dams, Ortolano, L, et al, Grand Coulee Dam and the Columbia Basin Project, USA (2000), www.dams.org.

19-10
- Yakima Storage Study (draft EIS dated January 2008),
- Walla Walla storage and pump exchange studies (U.S. ACE reconnaissance report dated 10-30-97, no information regarding state funding and role released to public),
- Shankers Bend storage project (Okanogan PUD FERC application dated 5-17-07, no information regarding state funding and role released to public)
- Odessa Subarea stratigraphic study (Columbia Groundwater Management Area, ongoing, no information regarding state funding and role released to public).
- Miscellaneous water storage projects, including but not limited to the Lincoln County Passive Hydration Project, Mill Creek Water Storage Project, Campbell Creek Reservoir project, WRIA 44/50 Surface Water Storage, now being funded by Department of Ecology.[3]

The above-described studies are incorporated into these scoping comments by reference. CELP will provide copies of each to you upon request.

The Programmatic Environmental Impact Statement to which the supplement EIS is supposed to tier does not provide adequate description or information about the above-referenced projects. The SEIS should be re-issued with adequate discussion of the relationship among programs and projects, how the state of Washington plans to allocate water among the various demands represented by the above-referenced projects, and the cumulative impacts of these projects on environmental, cultural and socio-economic resources of the Columbia Basin.

Sections 2.3 and 2.4.1.2

19-11 The description of the proposal fails to acknowledge that the "overriding considerations of the public interest" (OCPI) decision is an exception to protection of water resources that, by law, must be used sparingly. Annual use of OCPI would contradict the intent of the exception. In addition, the various proposals that would remove water from the Columbia River but not mitigate for it in time are likely to violate federal laws relating to endangered species and operational requirements for the U.S. Bureau of Reclamation.

Section 2.4 generally

19-12 The "policy" options section fails to discuss water pricing as an allocation mechanism. If water users are required to pay full price for water, including transaction costs (including for example the cost of developing this SEIS), cost of foregone hydropower, cost of water transportation infrastructure, and a fee for the privilege of using public resources (as for example occurs for mineral resources), allocation would take care of itself. This is serious omission in this discussion.

[3] Department of Ecology, Columbia River Basin Water Management Grant Program, Draft Funding List for 2007 Competitive Grant Cycle (6-08) (www.ecy.wa.gov/programs/wr/cwp/cr_grantapps.html)

Section 2.4.1

19-13 Although we do not agree with the fundamental premise of the drawdown project, any proposal to allocate more water from Lake Roosevelt should be fully paid for by the water users, including transaction costs, foregone energy production and transportation costs.

Section 2.4.1.1

19-14 The one-mile boundary for identifying groundwater connected to the Columbia River is not supported in science.

Section 2.4.1.2

19-15 The proposed use of the Lake Roosevelt drawdown as a substitute for McNary Pool water does not satisfy the terms of the CELP v. Ecology settlement agreement.

Section 2.4.3

19-16 The SEIS fails to adequately address the consequences of issuing permits within a temporary program. This section, as well as the entire document, improperly presupposes that the water issued to interruptible and industrial/municipal users will be retrievable in the future. That is, upon changing conditions, the Department of Ecology (DOE) will have the ability to rescind water permits already issued to users. What the SEIS does not discuss is how water supplies will be made available to new out-of-stream users in the event that Lake Roosevelt storage quantities do decrease in the future (due to climate change, revocation or amendment of the Columbia River Treaty, as discussed in Section I(2) above and below). Water users will make investments in reliance on the water made available under this program. Although the SEIS discusses the need to address long-term options, the discussion is inadequate and fails to address the lack of incentive for Ecology to pursue and evaluate such options.

19-17 There are two anticipated situations that are likely to occur and that will impact the volume of water available within the watershed in the relatively near future. First, the revocation or renegotiation of the Columbia River Treaty, which governs management of various dams on the Columbia River in the United States and Canada, could result in delayed annual filling of Lake Roosevelt, possibly affecting the pool level of the reservoir. While there is discussion of this issue in Sections 3.6.3 and 4.2.1.5, this discussion does not accurately or adequately reflect the nature of the concerns in British Columbia and the potential for impacts on Lake Roosevelt water availability. The SEIS should acknowledge that Washington state, through this SEIS and permitting action, is attempting to leverage a negotiating position that will in fact effect the Columbia River Treaty.

19-18 Second, although we are not yet sure of the exact parameters of climate change in this basin, we do know that it will result in impacts to the watershed. Hydrologists and scientists generally agree that the ice fields at the head waters of the Columbia are shrinking and will continue to do so. They also expect the winter precipitation to fall more as rain then snow.[4] Consequently, the "reserve" of water in the mountains that releases water throughout the spring, and upon which filling of Lake Roosevelt is dependent, will not be available, or will be substantially reduced, in the future. Instead, late winter and spring rainfall will immediately enter the tributaries of the Columbia, rushing down the watershed.

[4] See footnote 1.

19-18 Ecology must be prepared to adapt the management of Lake Roosevelt, as well as other reservoirs in the watershed to effectively manage water supply. Existing water rights may be at risk of going unfulfilled. The permits the DOE will issue with the water obtained from the SEIS drawdown will be further at risk. It does not make logical sense to convey additional water to out of stream uses when these changes will occur in the foreseeable future. While there is some recognition of this problem in Sections 3.3.3 and 4.2.1 of the SEIS, the discussion and proposed mitigation is entirely inadequate.

Section 2.5

19-19 The SEIS fails to consider market solutions. Economic choices have environmental consequences. Existing demand for water in the Columbia watershed is not simply for water, but for "free" water – i.e., water that is subsidized by the public and provided to water users at less than the true cost to develop it. Virtually all demand can be controlled and met through economic policies and methods, including appropriate pricing, water banks, acquisitions and transfers, and other mechanisms.[5] The state is making an economic choice not to study water markets as a means to address water supply needs.

Section 3.7

19-20 The SEIS fails to quantify the benefit of the instream flow quantity (27,500 AFY) with respect to fish. Although the SEIS goes to great length to describe the fish and habitat conditions in Lake Roosevelt, the Columbia River downstream of Grand Coulee Dam, Banks Lake, and the Odessa Subarea, it fails to state the actual benefit that fish will receive from this influx of water. Similarly, the document fails to explain the legal right of the 27,500 AFY

19-21 committed for instream flows. Specifically the document fails to explain the mechanism by which instream flows will be protected in the Columbia River, i.e., will this water flow all the way to the Pacific Ocean, or will the quantity of water dedicated to instream flows be diverted from the Columbia River at some point downstream for a different use? Correspondingly, if it is the intention to allow the instream flow to flow through the entire river system, the SEIS contains no discussion of these flows will be regulated or protected.

Section 3.11.1 and 4.2.1.10

19-22 The SEIS acknowledges that there are continuing problems with dispersed recreation and crowding of existing recreational areas, but fails to identify, describe, or discussion mitigation for exacerbation of these conditions that will be caused by the drawdown. The adaptive management approach to mitigation is inadequate.

Conclusion

19-23 After a hundred years of water management policies that have over-appropriated most of Washington's rivers and destroyed many of their values, including native fish and wildlife habitat, recreation and scenic beauty, one would hope that Washington state had learned that continuing over-appropriation of water resources is not the answer. One would hope the state would:

[5] Glennon, Robert, "The Quest for More Water – Why Markets Are Inevitable," at the PERC (Property & Environment Research Center, Bozeman, MT) website: http://www.perc.org/perc.hph?ld=823.

19-23
- Promote ecologically sustainable water programs
- Adopt a precautionary approach to water management
- Consider the social justice impacts of its actions before moving forward.

The Lake Roosevelt drawdown program indicates that is not to be the case.

Thank you for the opportunity to provide comments.

Yours very truly,

Rachael P Osborn

Rachael Paschal Osborn, Executive Director
Center for Environmental Law & Policy, and on behalf of:

Sierra Club Cascade Chapter
Sierra Club Upper Columbia River Group
Columbia Water Conservation Alliance

Comment Letter No. 19

Effects of Climate Change on the Columbia River Basin's Water Resources

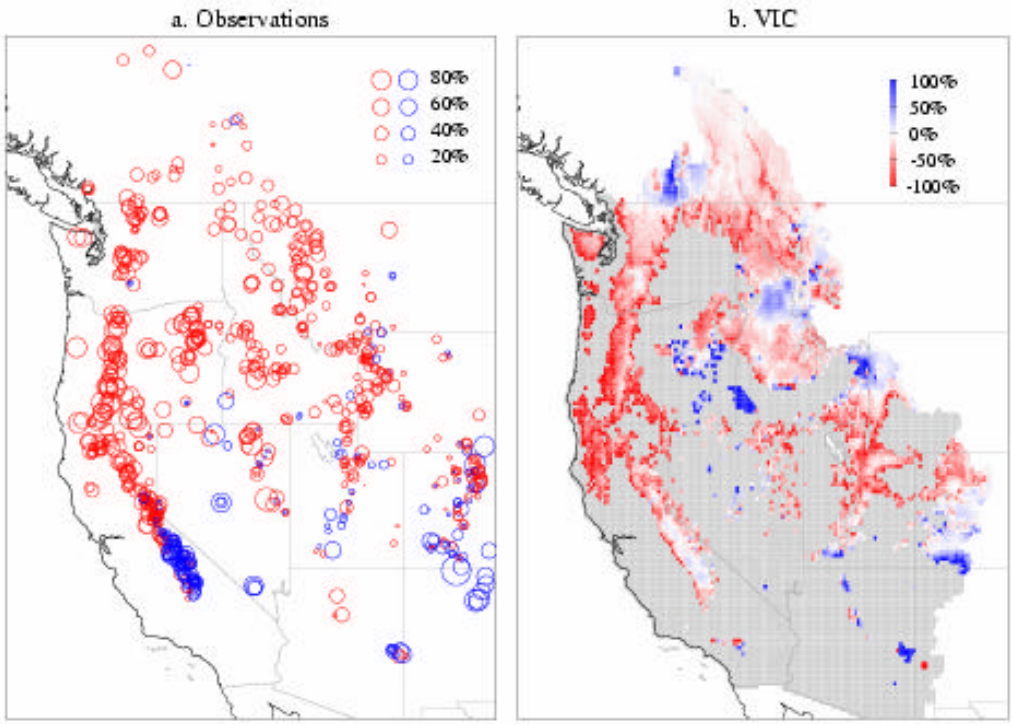
JISAO Center for Science in the Earth System
Climate Impacts Group
and Department of Civil and Environmental Engineering
University of Washington

Nov, 2005

Alan F. Hamlet
Philip W. Mote
Nathan Mantua
Dennis P. Lettenmaier

Trends in April 1 SWE 1950-1997

Comment Letter No. 19



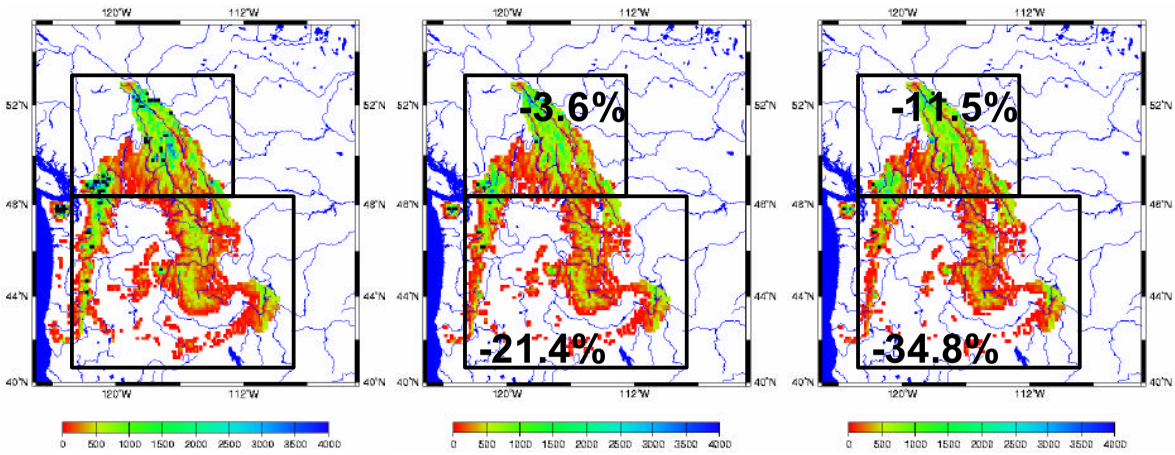
Mote P.W.,Hamlet A.F., Clark M.P., Lettenmaier D.P., 2005, Declining mountain snowpack in western North America, BAMS (in press)

Changes in Simulated April 1 Snowpack for the Canadian and U.S. portions of the Columbia River basin

(% change relative to current climate)

Comment Letter No. 19

Current Climate | "2020s" (+1.7 C) | "2040s" (+ 2.25 C)



April 1 SWE (mm)

ORIGINAL

RECEIVED
AUG 11 2003
ENVIRONMENTAL
HEARINGS OFFICE

RECEIVED
AUG 20 2003
ATTORNEY GENERAL'S OFFICE
Ecology Division

BEFORE THE POLLUTION CONTROL HEARINGS BOARD
STATE OF WASHINGTON

CENTER FOR ENVIRONMENTAL LAW & POLICY, Appellant, v. STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, and CITIES OF RICHLAND, KENNEWICK, PASCO and WEST RICHLAND, Respondents.	PCHB No. 02-216 STIPULATION, SETTLEMENT AGREEMENT AND ORDER OF DISMISSAL

The parties, Center For Environmental Law and Policy (CELP), the Washington State Department of Ecology (Ecology), and the Cities of Richland, Kennewick, Pasco and West Richland (collectively Quad-Cities), through their attorneys, Karen Allston and Shirley Nixon (for CELP), Assistant Attorneys General Barbara Markham and Sarah Bendersky (for Ecology), and Tom Pors (for the Quad-Cities) enter into the following:

STIPULATION

1. On November 19, 2002, Ecology issued a Report of Examination to the Quad-Cities approving with conditions application S4-30976 for a municipal, industrial, and commercial water right from the Columbia River.

2. On December 18, 2002, CELP appealed the Report of Examination to the Pollution Control Hearings Board.

3. To avoid the costs, time, and uncertainty associated with litigation, the parties have entered into the following SETTLEMENT AGREEMENT to fully and finally resolve CELP's appeal.

SETTLEMENT AGREEMENT

1. Within 30 days of dismissal of this case by the PCHB as contemplated by this SETTLEMENT AGREEMENT, Ecology will issue a water right permit to the Quad-Cities.[1] Except as modified by the terms of this SETTLEMENT AGREEMENT, the permit will be consistent with the terms contained in the November 19, 2002, Report of Examination. The permit will include the ROE conditions and Recommendations A through I, and the terms specified in paragraphs 2, 3, 6, 7, 8, and 11 of this SETTLEMENT AGREEMENT.

2. The permit issued to the Quad-Cities will expressly specify that any time Ecology approves the use of mitigation to offset diversion increments after the first increment (the first increment is defined as the first 10 cubic feet per second (cfs) of diverted water), Ecology shall issue an order that is subject to appeal to the Pollution Control Hearings Board or any successor body with jurisdiction to hear appeals from Ecology water right decisions.

3. The permit issued to the Quad-Cities will expressly set forth the additional conservation requirements set forth in Exhibit A to this Settlement Agreement. The permit will specify that these conservation requirements will be the minimum conservation requirements that the Quad-Cities shall meet during the entire life of the permit. If the Department of Health adopts more stringent rules relating to water conservation, the Quad-Cities will plan and implement their plans to meet or exceed the more stringent rules.

4. With respect to the Quad-Cities' diversion of the first increment (10 cfs) of water, the right to divert water will be interrupted when the specified flow conditions described in Condition E are not met, unless the following mitigation for consumptive use is in place. Table 5 in the November 19, 2002 Report of Examination identifies the two groups of

water rights Ecology currently intends to use as mitigation for the first increment of Quad-Cities' water use. The first group is listed in the first 6 columns of Table 5 under the heading "Department of Ecology Trust Water Rights" (hereafter referred to as "the Buckley trust water rights"). The second group is listed in the second half of the table and labeled as the Grandview Farm Water Rights (hereafter referred to as "the Simplot water"). To make the Buckley trust water rights eligible to be considered as mitigation for the Quad-Cities' water right, Ecology will change the purpose and place of use of the Buckley water rights so that the purpose of use includes "mitigation for municipal use" and so that the place of use includes "the McNary Pool of the Columbia River". To make the Simplot water eligible to be considered as mitigation for the Quad-Cities' water right, Ecology will complete the steps necessary to put the Simplot water into trust with the purpose of use designated as "mitigation for municipal use" and the place of use designated as "the McNary Pool of the Columbia River." If Ecology is unable to complete the acquisition of the Simplot water, Ecology must acquire and put into trust other water rights from the McNary Pool of an equivalent quantity as the Simplot water. The intent of this paragraph is that trust water rights used for mitigation shall be from the McNary Pool and of equivalent quantity and period of use as shown in Table 5 of the ROE.

5. CELP believes that water already placed in trust should not subsequently serve as mitigation for later appropriations. CELP does not believe that the Buckley trust water rights constitute sufficient mitigation to offset the Quad-Cities' diversion of water from the Columbia River. In the interests of settlement, however, and so long as the trust water right certificates are amended as described in the preceding paragraph, above, CELP is accepting the use of these rights as mitigation for a portion of the first 10 cfs of the Quad-Cities' diversion. The Parties agree that they will not cite the use of this mitigation, or the fact of entry into this SETTLEMENT AGREEMENT, for legal or policy precedent for future mitigation efforts.

6. To determine the amount of perpetual mitigation for the first increment of water use, Ecology has used an 80 percent consumptive use estimate. *I.e.,* Ecology has assumed that for the first 10 cfs of diverted water, there will be a consumptive use of 8 cfs. Concurrent with the times that the Quad Cities submit each successive Regional Water Forecast and Conservation Plan (RWFCP) Ecology will reevaluate this 80 percent consumptive use estimate based on then-current metering and other data showing actual water returned to the system, and will assure that the appropriate amount of water-for-water mitigation is in place. If consumptive use increases above 80%, in order to keep the diversion for the first 10 cfs not subject to interruption, Ecology will transfer into trust additional water rights from the McNary Pool to offset the additional consumptive use.

7. Any future proposed mitigation plans submitted by the Quad-Cities for review by Ecology shall be governed by the following terms:

a. Mitigation for appropriations beyond the first ten cfs will be according to the following "fifty percent or more/fifty percent or less" formula: fifty percent or more of water consumptively used by the Quad Cities during times when flows established in Condition E are not met will be mitigated by flow replacement using water upstream of the McNary Dam in the Columbia River system; the balance of the mitigation will be accounted for by fish habitat improvements that benefit Columbia River system fish at least to the same extent as would replacement water.

b. For any habitat project mitigation proposed by the Quad-Cities under this provision, the Quad-Cities will demonstrate based upon best available science and other applicable legal requirements that the proposed mitigation will benefit Columbia River system fish at least to the same extent as would replacement water.

c. In determining whether any habitat project mitigation proposed under this provision is acceptable, Ecology will consult with and give a high degree of deference to the Washington State Department of Fish and Wildlife, the Confederated Tribes and

Bands of the Yakama Nation, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

d. *Reopener.* During the life of the Quad-Cities' permit, any party hereto may request that the other parties accept a mitigation formula using a percentage different than the fifty or more-fifty or less percentages specified in paragraph 7a. Any agreement among the parties to revise these percentages shall be documented through a written amendment to this agreement signed by all of the parties.

8. The permit issued to the Quad-Cities will expressly specify that 10 cfs of the Quad-Cities' water right is allocated from the John Day/McNary Pools reservation for municipal water use pursuant to WAC 173-531A-050. Ecology will reduce the amount of water available from the municipal reservation established under WAC ch. 173-531A to reflect this allocation to the Quad-Cities.

9. Thirty-one days after: (a) the permit is issued, provided there are no appeals, or (b) after all appeals are finally terminated, Quad-Cities has the affirmative obligation to:

a. Withdraw all pending applications for new water rights except for certain groundwater applications that are for supplemental rights for alternate places of withdrawal. A list of all pending applications to be withdrawn pursuant to this section is attached to this agreement as Exhibit B. The City of Richland shall request to Ecology in writing that Applications G4-30990, G4-30981 and G4-30980 be issued as supplemental to the annual quantity of the Quad-Cities' permit S4-30976. The City of West Richland shall request to Ecology in writing that Applications G4-32304 and G4-32395 be issued as supplemental to the annual quantity of the Quad-Cities' permit S4-30976.

b. Abandon or voluntarily relinquish all water rights that the Quad-Cities are not currently using. A list of all water rights (represented by claims, certificates, or permits) to be abandoned or voluntarily relinquished pursuant to this section is attached to this agreement as Exhibit C.

10. Ecology considers the top three paragraphs at the top of page 11 of the November 19, 2002, Report of Examination stricken from the ROE. The permit will include no reference to the top three paragraphs at the top of page 11 of the Report of Examination or the content therein, and Ecology agrees that the language and content therein has no precedential effect.

11. The non-interruptibility of water use beyond the first 10 cfs requires that the Quad Cities submit a mitigation plan to Ecology for approval. Unless extraordinary circumstances exist, when the Quad-Cities proposes a mitigation plan for future diversion increments under their water right, the Quad-Cities will submit their plan at least one year before the Quad-Cities needs a final decision from Ecology. Ecology will use this one year period for public notice, consultation, and to accomplish any necessary water right trust transfers. For purposes of this section "extraordinary circumstances" is defined only as factual circumstances that establish the need for an Ecology response time of less than one year. In no case will Ecology shorten its review and decision time so as to preclude Ecology from fulfilling its public notice and consultation obligations.

12. Ecology will provide input and actively participate in the Department of Health's statewide rulemaking efforts required by the Laws of 2003, E2SHB 1338, Section 7, addressing (a) conservation requirements, (b) needs assessments and (c) needs projections for water systems plans.

13. By April 30, 2004, Ecology will complete its development of a guidance document describing how and when it will perform a "maximum net benefits analysis" in the context of water resource rulemaking. In developing this guidance document Ecology will

seek input from CELP and other interested parties. At a minimum, Ecology agrees to meet with representatives from CELP every other month between September 2003 and April 2004 to review, discuss, and consider CELP proposals regarding the scope and content of this guidance document.

14. Ecology will not file a CR 102 containing draft rule language pertaining to the rulemaking for the Columbia River pursuant to the Columbia River Regional Initiative until after Ecology receives a final report and recommendations from the National Academy of Sciences (NAS) panel.

15. Subject to the limitations contained in this section, Ecology will not process any applications for new water rights permits from the Columbia River during the pendency of the Columbia River Regional Initiative process and before the date that rules related to that process become effective, or until January 1, 2005, whichever date is earlier. Ecology will abide by this suspension to the extent it is authorized to do so by law. Ecology will process applications during the suspension only: (a) if a court orders it to process an application, or (b) if an application is for a nonconsumptive use that would substantially enhance or protect the quality of the natural environment, or (c) if the agency must process an application to address a public health and safety emergency. The Quad-Cities agree not to sue or otherwise seek court orders compelling Ecology to process any pending application for a new water right from the Columbia River during the time frame set forth in this paragraph.

16. CELP agrees not to appeal, or assist anyone else in an appeal, of the permit issued pursuant to this SETTLEMENT AGREEMENT or any modification to the purpose or place of use of the Buckley trust rights, except that the permit issued may be appealed if its terms varies from the terms of this SETTLEMENT AGREEMENT. CELP and the Quad-Cities reserve the right to appeal any other future appealable orders of Ecology, including those described in paragraph 2 of this SETTLEMENT AGREEMENT.

17. Based upon the terms of this SETTLEMENT AGREEMENT, the parties jointly request that the PCHB enter the following order dismissing this case with prejudice.

CHRISTINE O. GREGOIRE
Attorneys for Department of Ecology

Dated: 8/7/03

BARBARA A. MARKHAM, WSBA #30234
(360) 586-6749

Dated: 8/7/03

SARAH BENDERSKY, WSBA #30481
(360) 586-6770

CENTER FOR ENVIRONMENTAL LAW & POLICY

Dated: 8/8/03

KAREN ALLSTON, WSBA #25336
(206) 223-8454

Dated: 8/8/03

SHIRLEY WATERS NIXON, WSBA #25756
~~(360) 457-2771~~ (206) 223-8454

CITY OF KENNEWICK

Dated: 7-30-03

JOHN S. ZIOBRO, WSBA #25991
(509) 585-4272

CITY OF WEST RICHLAND

Dated: 7-28-03

TERRY M. TANNER, WSBA #21381
TANNER & HUI
(509) 943-0654

CITY OF RICHLAND

Dated: 8/6/03

THOMAS O. LAMPSON, WSBA #13707
(509) 942-7385

CITIES OF RICHLAND, KENNEWICK, PASCO AND WEST RICHLAND

Dated: 8/6/03

THOMAS M. PORS, WSBA #1778
LAW OFFICE OF THOMAS M PORS
(206) 340-4396

CITY OF PASCO

Dated: 7/29/03

LELAND B. KERR, WSBA #6059
PAINE, HAMBLEN COFFIN
BROOKE & MILLER LLP
(509) 735-1542

I. ORDER OF DISMISSAL

This matter having come before the Pollution Control Hearings Board upon the joint motion of the parties and based upon the SETTLEMENT AGREEMENT, and the Board having reviewed the SETTLEMENT AGREEMENT and the records and files herein, and having determined that the parties have agreed to a full and complete settlement of this appeal, now, therefore,

IT IS ORDERED that:

1. The appeal of *CELP v. Ecology and the Cities of Richland, Kennewick, Pasco and West Richland*, PCHB No. 02-216 is dismissed with prejudice;

2. Each party is to bear its own costs and fees.

Dated this 19th day of August, 2003.

POLLUTION CONTROL HEARINGS BOARD

ROBERT V. JENSEN, Presiding

KALEEN COTTINGHAM, Member

WILLIAM H. LYNCH, Member

Presented by:

CHRISTINE O. GREGOIRE
Attorneys for Department of Ecology

BARBARA A. MARKHAM
SARAH BENDERSKY
(360) 586-6749

CENTER FOR ENVIRONMENTAL LAW & POLICY

KAREN ALLSTON, WSBA #25336
(206) 223-8454

SHIRLEY WATERS NIXON, WSBA #25756
(360) [redacted] (206) 223-8454

CITY OF KENNEWICK

JOHN S. ZIOBRO, WSBA #25991
(509) 585-4272

CITY OF WEST RICHLAND

TERRY M. TANNER, WSBA #21381
TANNER & HUI
(509) 943-0654

CITY OF RICHLAND

THOMAS O. LAMPSON, WSBA #13707
(509) 942-7385

CITIES OF RICHLAND, KENNEWICK, PASCO AND WEST RICHLAND

THOMAS M. PORS, WSBA #17718
LAW OFFICE OF THOMAS M PORS
(206) 340-4396

CITY OF PASCO

LELAND B. KERR, WSBA #6059
PAINE, HAMBLEN COFFIN
BROOKE & MILLER LLP
(509) 735-1542

H. To access water beyond the initial 10 cfs, the Quad Cities shall submit an updated RWFCP to the Department of Health and the Department of Ecology on a six-year schedule consistent with the schedule for review of water right quantities. The Quad Cities shall coordinate the preparation and completion of their individual water system plans and related supply, demand, and conservation programs. Prior to completion of the plans, the RWFCP will be completed jointly by the Quad Cities to compare demand to available supply and to evaluate the conservation achieved and the conservation projected resulting from implementation of the program described in section 6. The Quad Cities may submit the RWFCP for access to additional water, under the same process described in this condition, prior to any six-year interval if demand forecasts or other circumstances warrant earlier review. The full quantities of water recommended for a permit in this report may be appropriated in six-year increments associated with submittal of the RWFCP, and only when the applicable minimum instream flow is equaled or exceeded, or when the consumptive water use associated with appropriations under this permit is mitigated. Ecology will review the demand estimates, the water conservation elements of the plan, return flows estimates, and other relevant information contained in the plan that comprises the mitigation or flow replacement proposal. Following public comment, Ecology would approve, conditionally approve, or deny the proposed mitigation plan through an Order. If the Order denies the proposed mitigation or flow replacement proposal, then the appropriation for that 6-year increment would be subject to interruption when the flow objectives in this permit are not met, as described in Condition E.

1. The non-interruptibility of water use beyond the first 10 cfs requires that the Quad Cities submit a mitigation plan to Ecology for approval. Unless extraordinary circumstances exist, when the Quad Cities propose a a mitigation plan for future diversion increments under their water right, the Quad Cities will submit their plan at least one year before the Quad Cities need a final decision from Ecology. Ecology will use this one year period for public notice, consultation, and to accomplish any necessary water right trust transfers. For purposes of this section "extraordinary circumstances" is defined only as factual circumstances that establish the need for an Ecology response time of less than one year. In no case will Ecology shorten its review and decision time so as to preclude Ecology from fulfilling its public notice and consultation obligations. The mitigation required for withdrawals of water in the succeeding six-year periods shall be proposed by the Quad Cities in their six-year RWFCPs for approval by the Department of Ecology.

2. Upon issuance of an Order by Ecology approving in conformance with Recommendation E of this permit one or more trust water rights or approving another replacement water program or a mitigation program proposed by the permittee to offset the full projected consumptive use during periods when flow objectives are not met, the six-year appropriation will not be conditioned as interruptible.

3. The maximum quantity of withdrawals of water requiring mitigation during the succeeding six-year periods will be presented in the RWFCPs and determined by subtracting estimated return flow from the maximum diversion amount. Return flow calculations shall be based on best available science and shall reflect seasonal conditions. During the course of that six-year period, actual quantities to be mitigated will depend on daily recording and monthly reporting of actual

water use under this permit, return flow estimates corresponding to the season of water use, and whether or not the then current flow objectives are achieved during that period.

4. Each RWFCP shall include a Conservation Program demonstrating how the best available and reasonable conservation technology will be implemented in the subsequent six-year period. The Conservation Program shall meet, as a minimum, current (as of date prepared) Department of Health requirements as well as the conservation conditions described below. In addition, the RWFCP with its Conservation Program shall be submitted to the Department of Ecology for review and approval consistent with the six-year schedule for reviewing water rights. The RWFCP shall propose and implement water conservation activities in the following areas: reducing leakage and unaccounted- for water from the municipal water supply system; and monitoring, accounting for (separately) and reducing commercial, industrial, residential (indoor) and landscape water use. The Conservation Program shall include a detailed profile of current water use characteristics for each conservation category defined above including their total annual demand, average demand, unit demand and peak demand. Compliance with the Conservation Program for each six year period shall be a condition of the permit.

5. The Quad Cities RWFCP shall comply with Department of Health rules (*Conservation Planning Requirements, Washington State Department of Health PUB 331-008, March 1994*) which currently require that these plans contain, as a minimum:

   - *Water Use Data Collection Requirements.* Systems must report the best currently available data on water use for the categories of use, which are identified by the department.
   - *Water Demand Forecast.* A complete forecast, including an estimate of reduction of water use from implementation of water conservation measures, must be developed.
   - *Conservation Program.* A Conservation Program must be developed and implemented. The Conservation Program elements must include: Conservation Objectives; Evaluation of Conservation Measures; and Identification of Selected Conservation Activities.

   If the Department of Health adopts more stringent rules relating to water conservation, the Quads Cities will plan and implement their plans to meet or exceed the more stringent rules.

6. In addition to the general water conservation requirements described above, the following Conservation Program activities are required as conditions of this permit. The Quad Cities will initiate development of the following programs within one year after issuance of the permit and will adopt them for implementation within two years of the date of permit issuance.

   For the purposes of the following conservation program elements, the term "implement" means obtaining and expending funding for capital facilities and operational staff, program assessment, and monitoring and reporting associated

with each program element in a manner and on a schedule to achieve, and once achieved to maintain, the stated goal or target.

i. Leak Detection Program

The Quad Cities shall implement a program to reduce leakage and unaccounted for water for each water supply system within the Quad Cities area. Leakage and unaccounted for water includes water loss due to leaking water mains and smaller distribution lines and inefficient fixtures, including inaccurate metering. Unaccounted for or unmetered water consumption also includes uses such as street sweeping, contractors, flushing hydrants, dust control, and erosion control by the Cities, County and private parties. The goal of the program is to reduce unaccounted for water to no more than 10% of the total diversion by 12/31/2010.The improvements to achieve the goal that are not concluded by 2010 must be identified and incorporated in the State approved Water System Plan for the city's capital improvement program with a completion date of no more than 2016.

ii. Large Meter Testing Program

The Quad Cities shall implement a program by December 31, 2005 to test all large meters (greater than 2-inches diameter, primarily used in commercial/industrial connections) and repair or replace all meters found to be defective. The testing and maintenance program will continue after the December 31,2005 date on a schedule consistent with the manufacturers recommendations.

iii. Residential Meter Repair/Replacement Program

The Quad Cities shall implement a program by December 31, 2005 to test and repair or replace all residential water meters on a schedule consistent with manufacturers' recommendations. The testing and replacement program will continue after the December 31,2005 date on an appropriate schedule to ensure that the users meters are reasonably accurate.

iv. Residential Retrofit Program

The Quad Cities shall implement a residential retrofit program by December 31, 2004 to provide the public with low-flow shower heads, toilet tank displacement bags, leak detection tablets and other residential water conservation measures. The initial program will be completed by December 31, 2008.

v. Source Metering Replacement and Improvement

The Quad Cities shall implement a source metering replacement and improvement program by December 31, 2005 to ensure that all water sources are accurately monitored.

vi. Develop a Water Audit Program for Large Water Users

The Quad Cities shall develop and implement a water audit program for large (commercial, industrial and institutional) water users. At least 50% of the large water users will be audited by December 31, 2007 and the remainder of the audits completed by 2010. The water audit program shall continue on an ongoing repeat schedule for those large customers where the audit suggests that reasonable additional water use reduction is possible.

vii. Develop a Joint Plan with Irrigation Districts to address Urban Area Irrigation Needs

The Quad Cities shall pursue development of a Joint Plan with Irrigation Districts whose service areas overlap with the Quad Cities service area. The Plan shall address irrigation water supplies for landscape use (e.g., which entity supplies landscape water and Quad Cities policies on serving those areas) and landscape water demands during water-short periods when Irrigation Districts may prorate their water users. This plan will be completed by December 31, 2009.

viii. Develop an Integrated Water Shortage and Drought Response Plan

The Quad Cities shall develop an integrated Water Shortage and Drought Response Plan for periods when water demands exceed allowed diversions. This plan will be completed by December 31, 2007.

ix. Develop a recommended School Education Program

The Quad Cities will work with the school districts within the UGA for the Quad Cities to define appropriate classroom materials and assist the school districts with implementation of the program. The plan will be outlined and a recommended program be adopted for initial implementation by the cities within two years from the issuance of the permit. The implementation in the schools will be on the schedule approved by the school districts.

x. Develop a General Public Education Program.

The Quad Cities will develop a public education program as committed to in the Regional Water Supply Plan that will include outreach to all customers emphasizing the efficient use of both indoor and outdoor watering, consumptive use records on water bills, the promotion of water efficient devices such as low flow shower heads, and regional publications explaining conservation programs. This program shall be developed by December 31, 2005 and implemented on an on-going basis.

Quad Cities
Water Rights for Settlement
Exhibit B - Pending Applications to be Withdrawn

Water Right Number	Instantaneous Quantity (gpm)	Annual Quantity (Acre-Feet)	Source	Priority
Applications to be Withdrawn				
Pasco				
G3-29957	2,500	4,032	Wellfield	April 16, 1996
S3-29979	7,181	6,400	Columbia River	August 6, 1996
Richland				
G4-30262	250		Well	May 24, 1990
S4-30185	5,660	2,042	Columbia River	November 22, 1989

Quad Cities
Water Rights for Settlement
Exhibit C - Water Rights and Claims to be Voluntarily Relinquished

Water Right Number	Instantaneous Quantity (gpm)	Annual Quantity (Acre-Feet)	Source	Priority
Kennewick				
Water Right Claim No. 301518	44,800	6,000	Columbia River	July 1906
Richland				
Claim 063206	500	80	Well D-15	May-44
Certificate 5532	2,000	3,200	Well	March 21, 1960
Certificate 6134	1,200	1,920	Well	December 18, 1961

Comment Letter No. 19 – Center for Environmental Law and Policy – Rachael P. Osborn

19-1. Comment noted.

19-2. Your comment regarding the tribal agreements is noted.

19-3. Climate change and its potential impact on Columbia River water supply, including impacts on snowpack, are described in Section 3.3, specifically Section 3.3.1.1 of the Supplemental EIS. Attachment 1 to your comment letter, a PowerPoint presentation on climate change in the Columbia River Basin, is included as part of this letter. The Mote et al. publication on which the PowerPoint presentation was based is cited in Section 3.3.3 of the Supplemental EIS. As noted in Section 3.3, the impact on runoff and surface water supplies in the Columbia River Basin is not known. As stated in the Supplemental EIS, Ecology will coordinate with Reclamation and other Columbia River managing agencies to adapt to changes in runoff and reservoir levels that result from climate changes.

19-4. Potential changes to the Columbia River Treaty are described in Sections 3.6.3, 4.2.1.5, 4.2.2.5, and 4.2.3.5. There is no certainty that the Treaty will be changed or how any changes would affect releases of water from Lake Roosevelt. As stated in the Supplemental EIS, any changes to reservoir operations resulting from future Treaty negotiations would require adaptive management of the reservoir, which would be included in the Treaty negotiations.

19-5. Other projects that could affect the Columbia River Basin are described in Section 1.6 of the Supplemental EIS and were also described in the Programmatic EIS (Ecology, 2007). Cumulative impacts of the Lake Roosevelt Incremental Storage Releases Project and other projects are described in Section 4.3 and were described in Sections 4.3 and 5.5 of the 2007 Programmatic EIS. Those sections acknowledge that the development of additional water projects in the Columbia River Basin could cause cumulative impacts that would exacerbate the impacts of existing facilities. Potential cumulative impacts include additional impediments to fish passage and increased migration times, increased total dissolved gas problems, water quality degradation, further reductions in shrub-steppe habitat and resulting impacts to wildlife, and could result in social opportunity costs. Because the Lake Roosevelt project involves changes to an existing reservoir within its existing authorization, impacts of the project are not expected to be significant and would not by itself cause significant cumulative impacts.

Many of the other projects proposed in the Columbia River Basin are speculative at this time and, therefore, specific potential impacts cannot be determined. As described in Section 1.6 of the Supplemental EIS, all of the proposed projects will undergo separate environmental review under NEPA and/or SEPA when or if the projects are carried forward. The future environmental reviews will identify impacts of the individual projects and cumulative impacts to the Columbia River Basin. Ecology will work with other managing agencies in the Columbia River Basin to identify potential cumulative impacts and develop an adaptive management strategy to minimize impacts of any further water project development. Ecology is committed, through the Columbia River Water Management Act (RCW 90.90.010(3)(a)), to basin-wide management approaches that do not result in increased cumulative impacts.

The Supplemental EIS has evaluated the impacts of the Lake Roosevelt Incremental Storage Releases Project at an appropriate level under SEPA. According to WAC 197-11-055(2)(a)(i), "the fact that proposals may require future agency approvals or agency review shall not preclude current consideration, as long as proposed future activities are specific enough to allow some evaluation of their probably environmental impacts." The Supplemental EIS acknowledges that some components of the Proposal will require future agency proposals and that impacts of those specific actions will be evaluated separately.

19-6. Reclamation does and will continue to accurately measure the amount of water stored in and released from Grand Coulee Dam. Reclamation uses a combination of measuring devices to determine the amount of water stored and released.

19-7. The Draft Supplemental EIS acknowledged that the lake drawdowns could impact some recreational facilities during drought years. As noted in Section 4.2.1.10, Ecology is working with the National Park Service to further define those impacts and to identify methods to mitigate the impacts. Since the Draft Supplemental EIS was published, Ecology has received a report from NPS that further quantifies the impacts to recreational facilities and recommends specific mitigation for those measures. Information from that report has been incorporated into this Final Supplemental EIS (Section 4.2.1.10 and Appendix F). Ecology will continue to work with NPS to prioritize and implement specific mitigation measures.

19-8. Your Attachment 2, the Quad City Agreement, is attached to your comment letter. All parties to the settlement agreement, including Ecology, are bound by the terms of the settlement. Any option chosen by Ecology for incremental storage releases from Lake Roosevelt will not alter Ecology's or the Quad Cities' obligations under the settlement agreement. The discussion of the settlement agreement in Section 2.4.1.3 of the Supplemental EIS acknowledges Ecology's obligations pursuant to the agreement. Analysis of the potential for future litigation over the settlement agreement is beyond the scope of the EIS. See also the response to Comment Number 11-1.

19-9. The potential impacts of the drawdown on the exposure of contaminated sediments are discussed in Section 4.2.1.9. The Supplemental EIS notes that the Lake Roosevelt Incremental Storage Releases Project will not lower lake levels below the shoreline area exposed by current operations, but the project will cause the lake to be approximately 1.1 to 1.8 feet lower than it is currently for short periods during the peak recreation season. If contaminated sediments are located in those areas, this could increase human exposure to those sediments. Because the exact location and extent of the contamination is unknown at this time, specific impacts cannot be determined, but are being evaluated as part of the ongoing Remedial Investigation and Feasibility Study conducted by EPA and Teck Cominco. The Supplemental EIS has been revised to clarify how Ecology will develop mitigation measures if the study determines that the Lake Roosevelt Incremental Storage Releases Project causes adverse impacts by re-entraining sediments (Section 4.2.1.9).

19-10. This Supplemental EIS is tiered to the Programmatic EIS because it provides additional discussion of impacts associated with the Lake Roosevelt Incremental Storage Releases Project based on new information about the amount and timing of the releases. This meets the requirements of WAC 197-11-060(5).

Section 1.6 of the Supplemental EIS describes the status of the major projects proposed in the Columbia River Basin. The description includes the separate environmental review that is being conducted on projects which are proposed, or will be conducted when or if a project is carried forward. Ecology is also funding, through the Columbia River Basin Water Supply Development Account, initial feasibility studies for a number of other projects, such as those you cite in your comment. The Supplemental EIS is not intended to describe the impacts of all water resources projects in the Columbia River Basin. Section 4.3 of the Supplemental EIS does describe the potential cumulative impacts of the Lake Roosevelt Incremental Storage Releases Project. See also the response to your Comment Number 19-5.

19-11. The description in Section 2.3 of how OCPI applies is accurate. It is intended to be used when Ecology considers water right applications, when the WAC 173-563 adopted flows are not met, and the "mitigation releases" are not scheduled to provide in-time offsets to the out-of-stream diversions. The OCPI determination is not intended to be routine or to be used as a general approach to create water supplies by waiving the instream flow requirements. See also the response to Comment Number 3-10 regarding the use of OCPI.

19-12. Comment noted. No method exists currently in state law for recovering the full cost of water. As noted in Section 2.4.1, Ecology intends to recover transactions costs where appropriate.

19-13. Your comment regarding the payment of costs associated with water use is noted.

19-14. The one-mile corridor was chosen as a surrogate for ground water rights that may be close enough to the Columbia and Snake Rivers for the mitigation water released from Lake Roosevelt to be effective. Additionally, because this is the area defined for the Columbia River Water Resources Information System required in RCW 90.90.050, Ecology has considerable knowledge of water rights and water use in that area. Ecology agrees that the "one-mile zone" for ground water adjacent to the Columbia River mainstem was not scientifically derived. It is a delineation made by the legislature when it enacted RCW 90.90.030(12)(a), the definition of the mainstem of the Columbia River, and it only applies to Voluntary Regional Agreements and the Columbia River Water Information System.

19-15. See the response to your Comment Number 19-8.

19-16. Your comment regarding a temporary program is noted. This subject is addressed in Section 2.4.3 of the Supplemental EIS. The water that will be provided through the Trust Water Rights Program for municipal supply and stream flows for fish in all years, and for interruptible water rights and additional water for fish in drought years, will be supplied from Reclamation's storage water right. The water for municipal supply and stream flows for fish in non-drought years is necessarily temporary due to the limitation on the duration of contracts under federal law. The additional water in drought years is dependent upon a similar contract with Reclamation and reauthorization of the Federal Drought Relief Act, currently authorized until 2010. Both of the contracts will have options to renew. If the water supply for storage in Lake Roosevelt is reduced in the future, water rights from the lake would be regulated based on priority dates of each right. Based on the 2004 MOU, this supply will not end until Ecology develops an alternative long-term supply of water. The instream flow rights in the Trust Water Right Program will have the same priority date as Reclamation's secondary use permit—1938.

The water rights for municipal and industrial uses and the standby-reserve permits will have a priority date based on the date the application is filed with Ecology. Water availability will be based upon the 1938 Trust Water Right from which the municipal and industrial and standby-reserve permits will be issued.

The incentive for Ecology to find long-term options to replace the water released from Lake Roosevelt is found in the 2004 MOU between the state, Reclamation and the three Columbia Basin irrigation districts. The MOU directs Ecology to find a long-term source of replacement water. The Water Resource Management Agreements between the State of Washington and the CCT and STI also commit Ecology to seeking a long-term water supply to reduce the incremental storage releases from Lake Roosevelt and prevent them from becoming permanent.

19-17. It is not expected that the Lake Roosevelt Incremental Storage Releases Project will affect any future renegotiation of the Columbia River Treaty. At this time it is not known if the Columbia River Treaty will be renegotiated or what provisions it will contain if it is renegotiated. The Lake Roosevelt Incremental Storage Releases Project is within Reclamation's existing storage right for water stored in Lake Roosevelt. This water right was established in 1938 and was included in the negotiations for the Columbia River Treaty which were completed in 1964. As noted in the Supplemental EIS, if the Columbia River Treaty with Canada is renegotiated in the future and the renegotiations affect Lake Roosevelt operations, Ecology and Reclamation will adapt to those changes.

19-18. See the response to your Comment Number 19-3 regarding climate change.

19-19. Ecology is not pursuing market solutions as part of the Lake Roosevelt Incremental Storage Releases Project because the parameters of that project were established in the Memorandum of Understanding between the state, Reclamation, and the three Columbia Basin irrigation districts. Ecology is pursuing market solutions in the Columbia River Basin as part of other projects, and has incorporated a market allocation strategy in its Preferred Alternative for allocating water to holders of interruptible water rights (Section 2.4.2.2).

19-20. As stated in Section 4.2.2.6, the increase in flows will be relatively minor. However, it is intended to help meet instream flow targets, and the timing of the flows is expected to benefit fish migration. Given the natural dynamics of biological populations and myriad potential effects at any point in the Columbia River system, it is not possible to quantify the actual benefits to fish species of the 27,500 acre-feet flow release. What can be said on a relative basis is that the additional flow release would provide more water to downstream reaches in the Columbia River mainstem during periods when the available water is currently limited with respect to meeting FCRPS Biological Opinion flows. This water should provide a corollary, cumulative benefit to fish. The relative differences of the various program alternatives have been compared in this regard.

19-21. The intent is for stream flows for fish to be protected to the mouth of the Columbia River. The rights would be protected based upon priority date. See the responses to Comment Numbers 3-11 and 19-16.

19-22. Comment noted. See the response to your Comment Number 19-7.

19-23. Comment noted.

P.O. Box 331
Moab, UT 84532
Phone: 541-377-0960
Fax: 435-259-0708
waterlaw@uci.net
www.wateradvocacy.org

June 30, 2008

Derek I. Sandison
Department of Ecology
15 West Yakima Ave. Suite 200
Yakima, WA 98902-3452
Emailed to dsan461@ecy.wa.gov

RE: Lake Roosevelt Comments

Dear Mr. Sandison,

20-1 On behalf of Visions For Our Future (VFOF), please accept these comments on the Draft Supplemental Environmental Impact Statement (SSEIS) for the Lake Roosevelt Incremental Storage Releases Project (Drawdowns) which was drafted by the Department of Ecology (Ecology) in accordance with the State Environmental Policy Act (SEPA). VFOF is an Indigenous Environmental Group, made up of members of the Confederated Tribes of the Colville Reservation located in North Central Washington state. VFOFrecognizes their inherent rights to preserve and protect L.A.W.S. (land, air, water, and spirits) for our unborn future generations.

VFOF believes that Ecology must address specific issues regarding the analysis in the SSEIS and consider the SSEIS's impacts on aquatic resources, environmental justice, native fish habitat and the overall health of the Columbia River. In general we are concerned that the SSEIS fails to balance decisions to permit water withdrawals associated with the Drawdown with its obligation to protect and enhance the quality of the natural environment.

I. The SSEIS ignores the impact of the Drawdowns on Instream Flows

20-2 According to SSEIS, the Drawdows are a component of the Columbia River Water Management Program (CWRMP) which is intended to improve water management in the Columbia River Basin. Specifically, the purpose of the Drawdown is to "release additional water from Lake Roosevelt to improve municipal and industrial water supply, provide water to replace some ground water use in the Odessa Subarea, enhance stream flows in the Columbia River to benefit fish, and provide water to interruptible water rights holders in drought years." SSEIS at S-1.

Comment Letter No. 20

20-2 This SSEIS, however, fails to recognize that protecting instream flows is one of the main purposes of the CRWMP which provides that "One-third of active storage shall be available to augment instream flows and shall be managed by the department of ecology." RCW 90.90.020(1)(ii). During non-drought years, an additional 25,000 acre-feet would be released from Lake Roosevelt for a municipal/industrial water supply and 30,000 acre-feet would be released for replacement of some ground water supplies in the Odessa Subarea, and, during drought years, 33,000 acre-feet of water for Columbia River mainstem interruptible water right holders, would be released from Lake Roosevelt in addition to the non-drought diversion of 55,500 acre-feet. *Id.* Yet, while 17,000 additional acre-feet for flow augmentation to benefit fish downstream, would be released from Ground Coulee Dam, during droubt years and 25,700 acre-feet for stream flow enhancement to benefit fish downstream of Ground Coulee Dam, during non-drought years, *Id*, there is no certainty that this water will directly offset irrigation water diversion authorized by the drawdown or the CWRMP.

In fact, instead of immediately prohibiting irrigation diversions and release of water that would impact aquatic resources, the CWRMP, illegally defers the decision of how to mitigate for the water diversions including the Drawdown to state agencies. The timing of releases of this water shall be determined by the department of ecology, in cooperation with the department of fish and wildlife and fisheries comanagers, to maximize benefits to salmon and steelhead populations." RCW 90.90.020(1)(ii).

20-3 Indeed, the fact that even the 68,000 acre feet of water identified in the SSEIS will go towards mitigation is illustrated by the SSEIS's determination no "mitigation measures are proposed for surface water impacts because the drawdowns would be within the normal operating levels of Lake Roosevelt." SSEIS at 4-9. Instream flows, however, are critical for migrating salmon and steelhead populations and vital for long-term watershed health.

Moreover, the existing instream flow targets set out to protect salmon and steelhead are often not met under the current system, yet the demand will only increase in the future. As a result, the Drawdown only serves out-of-stream uses without adequate consideration of instream flows.

That the Drawdown is focused primarily on the economical considerations of irrigation interests is illustrated by the listing of negatives of not implementing the Drawdown including:

20-4
- Ground water levels in the Odessa Subarea would continue to decrease at approximately the same rate that they do today.
- There would be less water available for pending municipal/industrial users, and no water would be available for interruptible water rights during drought years.
- Farmers in the Odessa Subarea would continue to experience rising costs of pumping ground water, which would diminish the feasibility of irrigation. Some irrigators may shift to crops that require less water or cease operations. This could result in a loss of sales, jobs, and income in the area.

Id. at S-1.

20-4 Moreover, even though the SSEIS indicates that without the preferred alternative, "[n]o additional water would be available to supplement stream flows to benefit fish in the mainstem of the Columbia River", *Id*, nothing in the SSEIS indicates how Ecology plans to measure a reduction of instream flows as a result of the Drawdown or specifically, how such flows will be restored.

II. **The Drawdowns Violates the Normal Processing for Issuance of water right Applications.**

Based on the fact, that there is no legislative mandate that requires Ecology to pursue Drawdowns, these are nothing more than an effort to avoid cutting off water supplies to the Odessa water right holders, the Columbia Snake River Irrigation Association (CSRIA) and other irrigation interests no matter what the costs. That, Drawdowns are simply a mechanism that allows such irrigation interests to go outside of the standard water right permitting application process in order to receive "special" rights to water is illustrated by the SSEIS itself which provides that "Reclamation has water rights for 6.4 million acre-feet of live storage in the reservoir and water rights to release approximately 3 million acre-feet for downstream consumptive beneficial use. Any additional releases from the reservoir will be authorized under secondary use permits issued by Ecology." *Id.* at 4-23-24.

As a result, without even requiring the beneficiaries to go through the normal permitting process new water rights, the Drawdown simply creates new water rights for the Odessa subarea due to diminishing supplies of ground water and for the interruptible water interests who are, otherwise, not authorized to take critical flows needed by ESA listed species during drought years. Worse, the Drawdown conflicts with current laws for protecting instream flows and
20-5 salmonid species by eliminating existing protections of such resources and replacing these with the promise that Ecology will undertake "mitigation measures," that are not clearly defined within the SSEIS. Similarly, the SSEIS does not sufficiently explain water flow and quality mitigation efforts, or the methods or means to measure whether or not the conservation efforts will actually work.

In fact, in regards to the Impacts to fish, the SSEIS states "[b]ecause no negative impacts to fish are anticipated in the Columbia River downstream of Grand Coulee Dam, no mitigation is proposed." *Id.* at 4-65. the SSEIS reaches this conclusion, however, without providing what process Ecology will use to determine whether a new water permit results in no negative impact and whether new permits are conditioned on mitigation water being present instream. In addition to failing to explain the methods and measurements, the SSEIS does not fully disclose all impacts to instream flows as a result of the Drawdowns.

Further, the SSEIS fails to define what is intended by the term "no negative impacts." Without establishing this as a goal and an adequate definition, Ecology cannot ensure the standard is met under the Drawdown. Moreover, the SSEIS fails to establish minimum standards and guidelines for determining "no negative impact" before Ecology proceeds with the Drawdown.

Finally, in relation to water quality, the SSEIS provides that "No mitigation measures are necessary because no impacts are anticipated." *Id.* at 4-9. This is regardless of the fact that "Water temperatures within and downstream of Lake Roosevelt are affected by the balance of inflows and outflows and the total surface area of the lake.Total dissolved as (TDG) levels below Lake Roosevelt are affected by the volume of water released from Grand Coulee Dam." *Id.*

Specifically, "Additional drawdown would reduce the total depth or thickness of the water column" and "[i]mpacts, if any, would be related to a slight shift in the timing and duration of a given water column thickness." *Id*. It is commonly accepted that the critical factor in impacts to the Columbia River salmon fishery is temperature which will raise as a result of the Drawdowns and negatively impact the salmon fishery. In fact, the SSEIS, itself admits that the maximum additional drawdown…will occur during the summer when lake level is highest." *Id.* This will negatively impact rainbow trout, kokanee salmon and other fisheries salmon which will be using the Columbia River for migration during the summer months.

20-5 Instead, the existing state water application is more specific about the location of use and timing of impacts, providing more transparency for the public to assess whether the use is within the public interest. Because the SSEIS, however, does not address the individual permits issued under the Drawdown, it does not address the specific timing or location of impacts.

In addition, the Drawdown fails to address important details such as, places of use and amount of water that is returned to the river. Without the details of these permits, therefore, the SSEIS cannot fully comment or measure the impacts of the Drawdowns. The SSEIS, itself, acknowledges the failure to follow existing procedures for the issuance of water right permits in this case by noting that one "potential for impacts on other water rights is in drought years when Reclamation has agreed to release additional water for interruptible water right holders and to augment stream flow." *Id*.at 4-24.

In addition, the fact that the Drawdowns will create special rights for a certain class of irrigation interests and will likely conflict with existing water rights is illustrated by the SSEIS's recognition that mitigation "would be required if the additional releases would adversely affect water right holders who divert from Lake Roosevelt." *Id.* In fact, if senior water rights are impacted by the Drawdowns, the SSEIS violates existing state procedures for protecting such water rights water rights by delegating the authority to Ecology to determine what action will be taken. In relation to Drawdowns, "[m]itigation would be required if the additional releases would adversely affect water right holders who divert from Lake Roosevelt. Any required mitigation would be determined by Ecology as the water right applications are processed." *Id*.

III. The Consideration of the Drawdown is improper within the SSEIS

20-6 (A) THERE IS NO MEANS FOR MEASURING A DRAWDOWN'S INSTREAM FLOW IMPACTS, MAKING THE DATA UNACCEPTABLY INCOMPLETE UNDER SEPA

1) The SSEIS provides no set means for measuring a Drawdown's impacts to

instream flows making the "no negative impact" pre-requisite for approval of a specific plan impossible to determine. Regardless of this lack of analysis, in regards to the Impacts to fish, the SSEIS states "[b]ecause no negative impacts to fish are anticipated in the Columbia River downstream of Grand Coulee Dam, no mitigation is proposed." *Id.* at 4-65. The SSEIS fails, therefore, to demonstrate how the "no negative impact" standard will be met by Drawdowns in general because it does not propose a meaningful means for measuring water conserved through mitigation measures.

In addition, based on the fact that there is no existing policy on how or where to measure whether a withdrawal of water pursuant to the Drawdowns would result in a net reduction in stream flow, a specific proposal for Drawdown cannot evaluate the primary prerequisite for approval of the Drawdowns that it (1) have "no negative impact" on instream flows and (2) not impair or diminish other water rights or ESA habitat plans.

Under SEPA WAC 197-11-080, this gap in data is unacceptably incomplete for consideration of a specific proposal such as the Drawdowns. Under this section, Ecology may only proceed without such vital information if the costs of obtaining it are exorbitant (WAC 197-11-080(3(a)) or the means of gathering it are speculative or unknown (b). Ecology, however, has not proven that the costs would be exorbitant to find out how the impacts of the Drawdowns will be measured to know if they have an impact on stream flows. Neither does the SSEIS illustrate
20-6 that the means of obtaining such information are speculative or unknown.

In fact, the evidence on this issue suggests the opposite. Ecology does know how to obtain such information, but if it has the capability to obtain the information needed to determine how and where to measure instream flow for Drawdowns, the agency must do so before removing storage from the system. WAC 197-11-080(3)(b) provides that if Ecology does choose to proceed without the vital information, the agency "shall weigh the need for the action with the severity of possible adverse impacts which would occur if the agency were to decide to proceed in the face of uncertainty." In this case if Ecology proceeds in the face of uncertainty - without an adequate or set means of measuring the impact to instream flows from the Drawdown - it will most likely not be able to achieve its own objective of "no negative impact." The agency cannot know whether the entire concept of Drawdowns actually meets its requirements without first having a functioning measuring mechanism in place to meet the conditions for approval.

(B) PROCEEDING WITH THE EVALUATION OF A SPECIFIC PLAN FOR A DRAWDOWN UNDER THIS SSEIS IS IN VIOLATION OF STATE WATER LAW.

Proceeding without the necessary information on how to measure the impact on instream flows from Drawdowns in general yet agreeing to evaluate a specific plan for a Drawdown is in violation of WAC 197-11-402(10). Proceeding with the Drawdowns with the planning process without having a set policy for how to measure whether these actions would result in a net reduction of instream flow would violate WAC 197-11-402(10). This section of the regulation provides the general requirements of an SEIS and requires that "SEIS's shall serve as the means of assessing the environmental impact of proposed agency action, rather than justifying decisions already made."

Ecology, however, has no means of measuring the effect of Drawdowns on instream flow, therefore it cannot assess the environmental impact on either instream flows, habitat for ESA species, or senior water rights. By proceeding with the specific plan outlined in the early action Drawdowns without a means to know whether the conditions of (1) no negative impact and (2) no impairment to ESA habitat or vested water rights are met, suggests that Ecology has already decided to implement Drawdowns in any manner it chooses at the time, and that the inadequate "lip service" treatment given in the SSEIS will simply be used as an excuse to justify any future deal or decision that Ecology chooses to make on a given Drawdown – regardless of how broad or how potentially damaging the environmental or policy ramifications may be. Critical data and critical definitions of terms are missing to meaningfully assess the environmental impact of Drawdowns. Proceeding without this information is a violation of both WAC 197-11-080 and WAC 197-11-402.

(C) WAC 197-11-055, WHEN READ IN ITS ENTIRETY, SUPPORTS THE ARGUMENT THAT THE CONSIDERATION OF THE DRAWDOWN IS INAPPROPRIATE
20-6 WITHIN THIS SSEIS.

Under WAC 197-11-055 (2):

> The lead agency shall prepare its threshold determination and environmental impact statement (SEIS), if required, at the earliest possible point in the planning and decision-making process, when the principal features of a proposal and its environmental impacts can be reasonably identified. (Emphasis added). (a) A proposal exists when an agency is presented with an application or has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal *and* the environmental effects can be meaningfully evaluated.

(Emphasis in the original).

The inappropriateness of considering the early action Drawdowns is a concern about timing in the review of proposals. WAC 197-11-055 (2), therefore, requires that the "environmental impacts be reasonably identified" and "meaningfully evaluated" in order for a determination to be made. With the acknowledged gaps in data by Ecology as to the means for measuring the impacts of Drawdowns on instream flows, these regulatory sections are not satisfied. Proceeding with a specific proposal for the Drawdowns when the general pre-requisites for an individual Drawdown's approval cannot be measured in order to know its impact violates the regulatory section as a whole. Early incorporation does not mean that the impacts have been reasonably identified or meaningfully evaluated**.**

20-7 **IV. The Consideration within the Columbia River Water Management Plan SEIS of the CSRIA Early Action Drawdown is an Improper Application of the SEPA Phasing Requirement Under WAS 197-11-060(5)**

By providing that "[m]itigation would be required if the additional releases would adversely affect water right holders who divert from Lake Roosevelt. Any required mitigation would be determined by Ecology as the water right applications are processed", SSEIS at 4-24, the SSEIS apparently presents itself as a phased review. SEPA WAC 197-11-060(5)) mandates under subpart (e) that "[w]hen a lead agency knows it is using phased review, it shall so state in its environmental document."

A phased review, however, is meant to "assist agencies and the public to focus on issues that are ready for decision and exclude from consideration issues already decided or not yet ready. Broader environmental documents may be followed by narrow documents…" WAC 197-11-060(5)(b). Phased review is appropriate when: "the sequence is from a nonproject document
20-7 to document of narrower scope such as site specific analysis (see, for example WAC 197-11-443)" WAC 197-11-060(5)(c)(i). WAC 197-11-443(2)'s example of this states: " (2) A nonproject proposal may be approved based on an SEIS assessing its broad impacts. When a project is then proposed that is consistent with the approved nonproject action, the SEIS on such a project shall focus on the impacts and alternatives including mitigation measures specific to the subsequent project and not analyzed in the nonproject SEIS." (emphasis added).

By proposing the specific early actions in this SSEIS, Ecology is not following the order for consideration of a phased review SEIS. The purpose of the phased review is to consider the broad aspects of the projects first and then the specific projects within the findings of the broad, preliminary findings. Here the SSEIS is considering both the broad and specific proposals in the SEIS simultaneously in violation of SEPA's phased review regulations.

V. The SSEIS Improperly Presupposes That Storage Creates "New Water" That Will Serve The Dual Purposes Of The Statute: That Is, For Instream And Out Of Stream Benefits.

The SEIS fails to examine whether there is any conceivable storage management regime
20-8 that could result in benefits to instream aquatic values. Given that the SEIS does not analyze how or whether "new" water supplies can be obtained through storage, the only alternative in the public interest at this time is the preferred alternative. Ecology should not pursue projects without first developing data and evidence that storage can indeed equate to a "new water supply". The initial burden of providing this evidence should be on the proponent of the Drawdowns and not the public through the payment of taxes.

VI. The SSEIP Fails to Provide Funding criteria for Conservation Projects.

The SSEIS fails to provide the development criteria for funding conservation projects
20-9 as mitigation for the Drawdowns. Funding projects to benefit instream flows and water quality would meet the intent of the statute, especially given the amount of water to be diverted out of the mainstem into the Odessa subarea, and the arbitrary and unbalanced requirement to allocate 2/3 of "new" water from new storage facilities to out of stream uses.

In addition, Ecology should spend NO conservation or storage money to assist in
20-9 providing mitigation water for Drawdowns that intend to cover out of stream water uses. The proponents of Drawdowns should provide their own mitigation water. Ecology's expenditures should be solely for providing water to improve instream flows for fish – the otherwise forgotten-in-this-SSEIS dual beneficiary of the supposedly balanced CRWMP.

VII. The SSEIS Fails to Define Acquisition and Transfer

Acquisition can only be interpreted to mean direct, permanent purchase of water rights. Anything less, such as leases, temporary contracts for drawing down reservoirs, and conservation savings are indefinite in duration and scope. Issuing permanent out-of-stream consumptive water
20-10 rights based upon time-limited "mitigation" does not meet the test of adequate mitigation. Transfers of ownership can already occur under existing statutes without Ecology intervention or involvement as part of the CRWMP. These provisions should not be modified as a result of the CRWMP.

VIII. The SSEIS Fails to Condition Water Rights on Instream Flows

The analysis and alternatives provided in the SSEIS in relation to conditioning the Drawdowns or issuance of the new water rights authorized are flawed, and point out the greater deficiencies throughout the SSEIS. The 1980 instream flow rules must be upheld and not waived; nor should interruptibility or individual permit mitigation conditioned upon the FCRPS Bi-Op
20-11 Target Flows (as in the 2003 Quad Cities permit S4-30976, giving them access to 178 cfs and 96,619 acre feet/year) be waived or changed as a result of the CRWMP. There are absolutely no facts or circumstances shown in the SSEIS or the Water Supply and Demand Inventory Report to justify a consideration of OCPI --- particularly given the dearth of evidence that there is likely to be <u>any</u> appreciable increased demand for municipal water supplies in the foreseeable future.

IX. The Drawdown will Violate the Endangered Species Act

The SSEIS provides that the drawdown:

> is not expected to negatively affect water rights, the Biological Opinion… Ecology would determine appropriate mitigation measures when processing water rights. The Proposal will not reduce flows during the Biological Opinion 'salmon flow objective period.'

20-12 Id. at S-3.

The SSEIS, further, provides that:

> This section…evaluates the influence of the anticipated drawdown on: (1) exposure of shallow lakeshore (littoral) habitats; (2) access of adfluvial stocks of fish to tributary waters of the lake; (3) hatchery enhancement programs in the lake via changes in reservoir residence time and fish

> entrainment; and (4) aquatic habitats in the Spokane River/Chamokane Creek area of the lake.

Id. at 4-25.

This statement sums up a major flaw of the entire SSEIS: insufficient identification and analysis of various potential alternatives and the environmental impacts of those alternatives. Conspicuously absent, for example, are discussions of the impacts to endangered species, and the ESA ramifications of various policy alternatives. ESA implications are especially crucial factors in analyzing how to apply the arbitrary "no negative impact" standard, and the environmental impacts of diverting water from instream flows in order to fill off-channel storage reservoirs.

That the Drawdown will have impacts on rainbow trout, kokanee salmon and other fisheries salmon during this critical migration period is illustrated by the fact that:

20-12

> The annual volume of water released under each of the scenarios is fixed. Spreading the timing of the releases across a number of months under the alternatives decreases the relative level of drawdown, but extends the period of exposure. The worst-case drawdown of 1 foot under non-drought conditions (96 percent of the time) is anticipated to occur annually at the end of August under Alternative 1A.Drawdowns during the balance of the months for non-drought years range between 0.0 and 0.9 feet depending upon the alternative. Worst-case drawdown under drought conditions (Alternative 1D) is 1.5 feet during the end of August.

Id.

The only significant reference to the impacts on the salmon fishery in the SEIS, however, is that:

> RPA Action 4 in the 2007 Biological Assessment addresses Storage Project Operations, including Grand Coulee operations. Operations include releasing flows from the reservoir to support salmon flow objectives during July and August as described in Section 3.6. The drawdown expected with the incremental releases from the reservoir ranges from 1,276.91 to 1,279.63 msl. With these releases, the reservoir would be drafted below the target in the Biological Assessment—1,278 feet msl in dry years and 1,280 feet msl in normal water years.

Id. at 4-24.

Neither the SSEIS nor the CRWMP, however, contain instream flow protection provisions that are necessary to protect needed flows for the Columbia River fishery. The NAS/NRC Report – MANAGING THE COLUMBIA RIVER, INSTREAM FLOWS, WATER WITHDRAWALS, AND SALMON SURVIVAL - commissioned by Washington State and published by the NAS in March, 2004, for example, warns river managers that eliminating the instream flow

requirment under state law could place the Columbia's River's already taxed fishery resources in further jeopardy. The NAS report represents sound science and policy advice, and should serve as the foundation for state actions. Among other reasons, the report's credibility will carry great weight in the event of court challenges over future water allocations. *See,* for example, the law review article entitled *"'The Supreme Court of Science'" Speaks on Water Rights: The National Academy of Sciences Columbia River Report and its Water Policy Implications*", author Reed Benson, Lewis & Clark Law School Journal of Environmental Law, Volume 35, p. 85 (2005).

20-12

Finally, that the Drawdown is in violation of the ESA is illustrated by the Ninth Circuit Court of Appeals recent decision to uphold Judge Redding's decision that the National Marine Fisheries Service's (NMFS) management of the four Columbia River Dams is illegal. In that case, the Court of appeals provided that NMFS may not use a hypothetical "reference operation" in its jeopardy analysis to exclude from the proposed action's impacts the effects of related operations NMFS deems "nondiscretionary." The ESA does not permit agencies to ignore potential jeopardy risks by labeling parts of an action "nondiscretionary." Because NMF's approach was a novel one, completely at odds with NMF's prior scientific approaches, it merited little deference. *National Wildlife Federation v. National Marine Fisheries Service*, No. 06-35011, D.C. Nos. CV-01-00640-JAR; 05-00023-JAR (April 9, 2007).

XII. Mitigation Agreement With Colville Tribe

The SSEIS provides that "[i]n December 2007, the state announced agreements with the [Confederated Tribes of the Colville Reservation] CCT…in support of the incremental storage releases from Lake Roosevelt. The state agreed to provide annual payments to the tribes to mitigate the damage to fish and wildlife, recreation and cultural activities resulting from the release of water from Lake Roosevelt…" SSEIS at 1-3.

20-13

In addition, the SSEIS states "No negative impacts to fish are expected in Banks Lake. The agreements between the State of Washington and the …CCT … provide mitigation for any potential impacts to fish and aquatic resources in Lake Roosevelt." *Id.* at S-4. Yet, the CCT Agreement (Agreement) appears to be little more than a promise by the tribe to support Drawdown in exchange for monetary payment. This is illustrated by the fact that, in addition to providing for funding, ostensibly, for mitigation, the state must provide annual payments "for economic development investments to benefit the local economy." *Id.* at 1-3. This will be accomplished by the allocation of funds annually from the Columbia River Basin Water Supply Development Account to the CCT….

Illustrative of the primary problem with the Drawdowns and the CWRMP, while the Agreement, insures that irrigation interests will receive the water they demand with its associated impacts on aquatic habitat, it does nothing more than provide for further study of the impacts to the fishery in the Columbia River. The SSEIS, itself admits that the Agreement merely calls for:

> a study to evaluate lowering Lake Roosevelt to 1,278 feet msl only in the lowest 20 percent of water years and to 1,280 feet msl in all other water years. The Draft MOA also calls for an investigation of Dry Water Year

> Operations other than summer drafting. Section A.1.e(ii)(4) of the Draft MOA acknowledges the stream flow enhancement component of the Lake Roosevelt Incremental Storage Releases Project and calls for an investigation to evaluate the proposed release of water in April through June (rather than July and August) in the driest 20 percent of years to benefit Upper Columbia River outmigrants.

SSEIS at 4-24.

The lack of any meaningful mitigation, in the Agreement, to offset the immediate impacts of water diverted as a result of the Drawdowns is illustrated by the SSEIS's so called "Mitigation" section in relation to the Agreement which provides only that there "will need to be on-going discussions and communication between the State of Washington, the Action Agencies, and the Tribes so that actions under all agreements and plans that relate to the operation of Lake Roosevelt are coordinated." *Id.*

20-13

In fact, as illustrated by the attached letter from Yvonne Swann (Appendix A) who is a member of VFOF, the CCT Agreement is not supported by VFOF due to the negative impacts on the salmon fishery in exchange for monetary payments to the Tribe and because the membership of CCT was not informed about the contents of the agreement or that the Tribe intended to enter into it. The SSEIS reliance on the CCT Agreement, therefore, violates the United Nations Declaration on the Rights of Indigenous Peoples which repeatedly affirms the Right to Free, Prior and Informed Consent for Indigenous Peoples in a variety of contexts. "These include redress, restitution, settlement and dispute resolution affecting lands and resources, as well as in development activities, judicial and legislative processes which may impact them…" New York, April 21 to May 2, 2008, Joint Intervention Submitted by the International Indian Treaty Council Agenda Item 8, Ongoing Priorities, Themes and Follow-up (b) 2nd International Decade of the World's Indigenous Peoples.

XIII. The SEIS does not Adequately address the Potential for the Draw Down to Exacerbate the Effects of Climate Change on Water Supply

According to the SEIS, "No additional water would be available to supplement stream flows to benefit fish in the mainstem of the Columbia River. SSEIS at S-3. In addition, in regards to short term impacts, the SEIS provides that the "Proposal is not expected to increase emissions that would affect climate change since there would be no construction involved and there would be no increase in transportation emissions." SSEIS at 4-3. In addition, in relation to long-term/operational impacts, the SSEIS provides that the "impacts of climate change could affect water management at Lake Roosevelt by altering the amount and timing of water available in the reservoir." Id at 4-4.

20-14

The SSEIS, however, entirely ignores the impacts to water resources of relying on ever increasing storage releases rather than conservation and applicable water law to offset the effects of Climate change. Instead of not issuing or limiting water right permits when flows are affected as required in existing state water laws, for example, the Drawdown continues the dependence of irrigation interests on ever diminishing sources of water by authorizing interruptable water users

to circumventing the Endangered Species Act (ESA) during critical years needed for salmon, instream flow laws and allowing the Odessa subarea water users to transfer water rights from one source to another simply because the existing sources has been depleted. In addition, while the Drawdowns, may temporarily provide sufficient water for both irrigation interests and instream flows, these actions merely prolong the inevitable lack of water availability that water users will face as climate change worsens and perpetuates the illegal use of limited water resources by irrigation interests. This will eventually result in severe impacts to aquatic habitat when the effects of climate change result in even less available water in the near future.

Moreover, the only mitigation for the impacts to Climate Change provided in the SSEIS includes the statement that:

> Changes in water availability in the Columbia River Basin will require the managing agencies to adaptively manage the river to respond to changing conditions. If conditions change, Ecology will coordinate with Reclamation and other Columbia River managing agencies to adapt to climate changes. Possible mitigation actions include changes to Reclamation service contracts and an adaptive management plan for recreation impacts.

20-14

Id.

By putting in practice the circumvention of existing water supply and instream flow protection laws, however, the Drawdowns significantly diminishes Ecology's ability to "adapt" to changes in climate by removing any that may impact the newly created "rights" of irrigators to water. As a result, any "adaption" to climate change by Ecology will result in the protection of water supply for irrigation or the creation of yet more "rights" of irrigators to water at the expense of instream flows.

Further, as with other water systems, the Drawdowns should be designed to meet current demand under the worst historical hydrology with an additional arbitrary "safety factor" to provide for unprecedented conditions. It is likely that most water users will, at least initially, respond to global warming induced supply and demand changes by adapting rather than by taking pre-emptive action. The SSEIS, however, fails to discuss Integrated Water Resource Management – a process consisting of explicit consideration of all supply-side and demand-side issues, involvement of all stakeholders, and continual monitoring and review which is often regarded as the best way to manage resources and seems well suited to climate change issues. Brad Udall, Global Warming, The Hydrological Cycle, and Water Management, The Water Report, Issue #28, 21 (June 16, 2006).

Several municipalities in the West, including Boulder, Denver, Seattle and Portland have completed or are undergoing planning studies relating, at least in part, to climate change. California recently completed its normal five year planning effort and the new document, Bulletin 160, considers climate change in a qualitative way.

The SSEIS, however, fails to follow the example of these municipalities in planning for the future by using climate models to evaluate outcomes. This is regardless of the fact that numerous scientifically model-based climate change studies for Western river basins are available and such models may be properly applied to the Drawdowns by: 1) understanding model limitations; 2) being aware how different models respond; and 3) understanding emissions scenarios.

Similarly, the SSEIS fails to include the most defensible scientific studies which have been conducted with multiple models and selected emission scenarios. In its Third Assessment Report, for example, the Intergovernmental Panel on Climate Change (IPCC) devised 40 different future scenarios. These scenarios come out of four main groups, economic growth, and technological progress. The IPCC created the scenarios because they believed it was impossible to predict the most likely future and instead they wanted to have a range of possible futures. The IPCC says,

20-14

> It is recommended that a range of SRES scenarios with a variety of assumptions regarding driving forces be use in any analysis. The different scenarios result in greenhouse gas concentrations that vary by a factor of two, and the resulting energy imbalances also vary by about two. These differences have large impacts on predicted warming, precipitation changes and all other hydrological cycle impacts.

Id.

Finally, the SSEIS fails to adequately address water use related to the Drawdowns, that will result in a large amount of energy use as illustrated by recent studies funded by the U.S. Department of Energy and the California Energy Commission. Energy to lift and pressurize water is in fact just the opposite of hydropower and because of the high heat capacity of water, substantial energy must be used to heat water. Projects which operate in a similar capacity to the Drawdowns, including the California State Water Project, the Metropolitan Water District's Colorado River Aqueduct and the Arizona Central Project all use massive amounts of electricity to pump water literally thousands of vertical feet. The California Energy Commission estimates that water use in California accounts for 20% of all electricity use in the state and also uses substantial amounts of petroleum. *Id.*

XIV. Cumulative Impacts

20-15

The SSEIS does not address the impact of multiple permits issued using the Drawdowns. As mentioned earlier, the SSEIS is not specific regarding the number of permits (or volume of water within those permits) that Ecology will issue under the Drawdowns. How is it possible to consider the impact on the river —including whether or not it is meeting the "no negative impact" standard—without knowing this information beforehand? Without this, the SSEIS does not adequately consider the cumulative impacts of permits under the Drawdowns, not to mention the impact of the Drawdowns coupled with the many water withdrawal permits currently pending with Ecology.

20-15

In addition, the SSEIS fails to consider the cumulative impacts of this Drawdown (along with other pending permits) on the survival of salmon and other native species within the Columbia Basin. The survival of this species is directly dependent on adequate river flows. Even though the SSEIS requires "no negative impact" during critical periods of the summer, we would like to remind Ecology that its duty to protect native salmon runs equally with goal of issuing new water rights permits.

CONCLUSION & RECOMMENDATIONS

The SSEIS fails to recognize that protecting instream flows is one of the main purposes of the CRWMP and creates special rights to a guaranteed sources of water that are outside of the normal permitting process that will violate existing senior water rights and impact instream flows. In addition, the SSEIS circumvents instream and habitat protection standards written into current state water law that will combine with the Drawdowns' effect on water temperature standards which are heavily dependent on flows necessary to maintain low temperatures needed by salmonids and other species. The resulting impacts to the fishery will violate the Endangered Species Act and state water law and will exacerbate the effects of climate change on the fishery by perpetuating a system that emphasizes the delivery of water to irrigation interests at the expense of instream flows and water quality even as water resources become more and more scarce.

20-16

Further, The SEPA process is an important venue for examining the potential alternatives for implementing the Columbia River legislation. We therefore urge Ecology to delay further action on the Drawdowns until definitions of crucial terms are agreed-upon, weak or missing portions of the SSEIS can be filled-out, inaccuracies corrected, and sufficient data can be gathered to form a proper foundation for implementing the Columbia River law.

In addition, we urge Ecology to adequately consider the impacts of the Drawdown on aquatic resources and the purpose of protecting instream flows in the Columbia River. Moreover, we ask you to fully define "no negative impact," as well as minimum standards and guidelines for measuring "no negative impact" prior to proceeding with these Drawdowns. Finally, we ask you to balance water withdrawals associated with these Drawdowns with your obligation to protect and enhance the quality of the natural environment.

Thank you for your consideration.

Sincerely,

s/Harold Shepherd
Harold Shepherd, Staff Attorney

APPENDIX A

My aforementioned introduction gives me the right to be heard in the matter of protecting the non-renewable resource—water:

As a Sinixt -through inheritance, the Creator made me one of the Caretakers of the land originally assigned to my relatives and I take the responsibility as such very seriously. My traditional teachings make me a relative of my natural environment and I have no choice but to carry out my inherent duty to ensure cleanliness, preservation, and balance thereof. I am related to the air, plant life, and the animal people and water is to whom each of us owe our allegiance because it is the lifeblood of our mother, the Earth, and a common need for our existence. This life is not for me to partake in consuming or depleting natural resources because they belong, not to me, but to the future generations of my relatives as long as the Creator determines;

As a Sinixt/Colville -I cannot passively ignore the 100 years of contamination to the Columbia River by the overly consuming corporation called Teck Cominco in British Columbia. I am appalled that recent carelessness on the corporation's part further caused pollutant spills into the water. The water must be restored to its natural state and, in my opinion this restoration can begin only if Teck Cominco is shut down. Rather than shutting it down, too much governmental attention and money toward assessment of the actual 100-year damage has been, and is still being, spent. I cannot understand why the state and tribes want to irrigate farms with this water at this time when it might spread the contamination to the world through their products;

-I cannot passively accept the fact that at the onset of this investigation the CCT representatives were denied the sovereign right to a seat at the negotiations table when corporate and governmental officials discussed this 100-year history of pollution to the Columbia River. What were they hiding from the Colville tribal members and why did CCT representatives allow the doors to be closed to them? If I was informed of this at the time, I would have pointed out as a Colville tribal member that the Columbia River water begins in my territory to the north at Upper Arrow Lake in British Columbia, and it flows southward into the U.S. along the eastern and southern borders of our Colville Reservation. As it were, I did not have a voice;

-I cannot ignore the fact that less than 100 years ago the Grand Coulee Dam was built into the Columbia River by U.S. authority and grossly impeded the natural habitat and customary run of salmon, the original mainstay of my people. I believe this contributed to the deterioration of the health of the Colville tribal members;

-Teck Cominco polluted the river, yet to my knowledge no studies on its impact toward the health of our members have been made; however, I just received a publication called the Lake Roosevelt Community Health Centers (San Poil and Inchelium). One paragraph states "Eat more fish. Fish is a good source of protein and other nutrients. It also contains omega-3 fatty acids, which may help reduce the risk of heart disease and stroke".

Comment Letter No. 20

-Ironically, the backwaters created by the Dam are now targeted for more depletion by this proposed state-tribal partnership;

-I cannot passively accept the hasty decision by the Colville Business Council (CBC) to agree to the Grand Coulee Dam Claims Settlement over 10 years ago because I did not have the right to give input or full informed consent to the final agreement. I do not feel the Colville tribal members were fully compensated for loss of our salmon;

I was not fully informed by the CBC prior to its decision to enter into partnership with the State to sell Columbia River water to boost the economy of corporate agricultural entities neighboring the exterior boundaries of my Reservation. The purpose of the CBC "shall be to promote and protect the interests of the Colville Indians…" (Article I, CCT Constitution and By-Laws) and I cannot see how entering into this partnership is protecting my interests. Our forests draw water to stabilize the environment of our Reservation. I cannot see how this proposed change in our water system will guarantee the right of our forests;

This "partnership", an erosion of our sovereignty, is in violation of CBC's sworn duty "to protect and preserve the Tribal property, wildlife and natural resources of the Confederated Tribes, to cultivate Indian arts, crafts, and culture; to administer charity, to protect the health, security, and general welfare of the Confederated Tribes…" [Article V, CCT Constitution and By-Laws (a)] and I see no guarantee of protection to the health of the people, the salmon, other wildlife, or our natural resources. The powers of the CBC are limited and restricted to our Constitution. The above-mentioned unilateral CBC decision ignored our Constitution. This is a breach of CBC's Oath of Office and, in my opinion, neglect of duty;

The Department of the Interior/Bureau of Indian Affairs has fiduciary responsibility to oversee activities on the Colville Reservation to ensure that our inherent rights are protected yet lack of its intervention in this instance leaves me with no voice or protection. Therefore, I am appealing to others to, hopefully, understand my concerns;

My immediate request regarding the proposed Columbia River Agreement is No Action until such time that the Colville tribal members become fully informed.

Comment Letter No. 20 – Center for Water Advocacy – Harold Shepherd

20-1. Comment noted.

20-2. See the response to Comment Number 9-1 regarding the one-third/two-thirds allocation.

20-3. The section of the Columbia River Water Management Act that you cite, RCW 90.90.020 (1)(ii), applies to new storage facilities that could be developed with funding from the Columbia River Basin Water Supply Development Account. The section does not apply to the Lake Roosevelt Incremental Storage Releases Project, which is not a new storage facility. The provision in RCW 90.90.020(1)(ii) that the timing of releases of water from new storage facilities will be determined by Ecology in cooperation with WDFW and other fisheries managers is intended to provide the maximum benefits to fish populations.

It is unclear how you concluded that 68,000 acre-feet of water will go toward mitigation. None of the incremental flow releases are mitigation, but are part of the project. In all years, 27,500 acre-feet of the water releases will go specifically to augment stream flows with an additional 17,000 acre-feet released for stream flows during drought years.

The Columbia River Water Management Act establishes two goals for the Management Program—developing new water supplies "in order to meet the economic and community development needs and to meet instream flow needs of fish" (RCW 90.90.005(1)). The Lake Roosevelt Incremental Storage Releases Project includes flow releases to meet both goals. Implementing the Management Program is not in itself expected to significantly reduce or eliminate existing threats to ESA-listed species, but modest improvements in conditions could occur. This project includes flow releases that are designated for instream flow augmentation. Ecology has coordinated with WDFW and other resource managers to develop options for the timing of the flow releases that will most benefit fish migration. The Preferred Alternative is an adaptive management approach that will include continued coordination with resource managers. The adaptive management strategy is intended to provide maximum benefits to fish.

20-4. See the response to your Comment Number 20-3 regarding the purpose of the Columbia River Basin Water Management Program. See Sections 4.2.2.3, 4.2.2.5, and 4.2.2.6 regarding the impact of the Proposal on flows in the Columbia River. See also the response to Comment Number 3-8.

20-5. See the response to your Comment Number 20-3 regarding the purpose of the Columbia River Basin Water Management Program. The Lake Roosevelt Incremental Storage Releases Project is implemented under the authority of the Columbia River Water Management Act (RCW 90.90) and the Memorandum of Understanding between the State of Washington, the Bureau of Reclamation, and the three Columbia Basin irrigation Districts (Appendix A of the Supplemental EIS).

State law requires that Ecology issue a water right permit only if:

1) it finds there is water available,
2) it will be used for a beneficial use,
3) the new use will not adversely impact existing water rights, and
4) the new use will not be detrimental to the public welfare.

Any permit issued by Ecology under the Columbia River Water Management Program, including permits related to releases from Lake Roosevelt, must meet this statutory four-part test. In addition, the statute provides for the opportunity to protest a water right application and appeal Ecology's decision (RCW 90.03.250 to 90.03.340).

20-6. Your comment regarding the effects of the incremental storage releases on instream flow is noted. The effect of the Proposal on downstream flows is described in Section 4.2.2.3, 4.2.2.5, and 4.2.2.6. The Proposal is not expected to negatively impact downstream flows. The impact of the Proposal on salmon flows established under the Biological opinions has been evaluated as part of the development of the Biological Opinions. Both the 2008 Biological Opinion, Table 1, and the 2007 Federal Columbia River Power System Biological Assessment, Table B.2.1-1, conclude that if the Lake Roosevelt drawdown is implemented, it will not reduce flows during the salmon flow objective period (April-August). See the response to Comment Number 4-12.

Ecology will use a combination of direct measurement and demand-side controls to measure the impact of the project on instream flows. First, Reclamation will monitor the releases of water from Lake Roosevelt through lake level elevations. Specific lake elevations (e.g., at the end of August) will be met to ensure releases occurred. Although the incremental releases are small compared to the overall releases, over time, the change in release behavior will be more evident through comparison of historic lake elevations before and after 2009. Second, depending on the adaptive management strategy releases for a given year, the releases may be observed in specific gages downstream. Because the flow releases are small relative to the overall volume of water in the river, in some years the amount of flow releases may fall within the gage accuracy tolerances at some gages. However, it is expected that the flows can be detected in some years. Because the Lake Roosevelt Incremental Storage Releases Project is one of several projects that Ecology is using to benefit water supply in the Columbia River Basin, there will be additional sources of water to benefit instream flows. Those flows will be measured and managed cumulatively to meet the goals of the Columbia River Basin Water Management Act. Ecology will use the Columbia River webmap (http://www.ecy.wa.gov/programs/wr/cwp/cr_webmap.html) and its annual legislative reports to make this process transparent. Third, Ecology will employ demand side controls such as water measurement, aerial photography review and water masters to ensure that the water that is released stays in the river. Ecology plans to measure 90 percent of the water use in the Columbia River and report this data on its Columbia River webmap (see the response to Comment Number 4-11). Ecology will investigate aerial photography and satellite imagery to determine if water users are maintaining their authorized diversion limits. Ecology will use water masters to provide technical assistance to water users not in compliance with water right diversion limits, followed by enforcement to ensure water that is released under this project stays in the river for intended uses.

See the response to your Comment Number 20-7 regarding timing of the environmental review.

20-7. Ecology is following SEPA regulations regarding phased review (WAC 197-11-060). The Lake Roosevelt Incremental Storage Releases were evaluated at a programmatic level in the Final Programmatic EIS for the Columbia River Water Management Program

(Ecology, 2007). At the time the Programmatic EIS was issued, the storage releases were proposed as an early action under the Management Program. Since the Programmatic EIS was finalized, Ecology and Reclamation have worked together to refine the alternatives for the amount and timing of the storage releases. Those alternatives are evaluated in this EIS which supplements the Programmatic EIS. This Supplemental EIS evaluates the impacts associated with releasing additional flows from Lake Roosevelt. See the response to your Comment Number 20-5 regarding state processing of water rights.

20-8. The Lake Roosevelt Incremental Storage Releases Project is one of several projects that Ecology is pursuing under the authority of the Columbia River Water Management Program. Other projects will be undertaken in the future that will evaluate whether new water supplies can be obtained from storage. The proposed project would use water that is already stored behind Grand Coulee Dam to meet the multiple purposes of improved water supply for municipal/industrial uses, agriculture, and improved stream flows for fish.

20-9. See the response to your Comment Number 20-3 regarding the purpose of the Columbia River Water Management Program. The Lake Roosevelt Incremental Storage Releases Project meets the Management Program's requirement to provide water for both out-of-stream and instream uses. See Section 2.1.2.2 of the Programmatic EIS (Ecology, 2007) regarding implementation of conservation programs under the Columbia River Water Management Program.

20-10. Your comments regarding acquisition and transfer are noted. See the response to your Comment Number 20-5 regarding the process for issuing water rights. See the response to Comment Number 19-6 regarding the temporary program.

20-11. See the response to Comment Number 3-10 regarding OCPI.

20-12. Your comment regarding the drawdown of the reservoir below targets in the Biological Assessment is noted. See the response to Comment Number 4-12. The targets are the subject of review (Table 1, 2008 Biological Opinion). Further, RPA Action 14 in the 2008 Biological Opinion states that "flexibility will be exercised in a dry water year" with respect to the reservoir draft limits in RPA Action 4. See Section 4.2.1.5 of the Supplemental EIS.

Impacts to listed species are described in Sections 4.2.1.6, 4.2.1.7, 4.2.2.6, 4.2.2.7, 4.2.3.6, and 4.2.3.7. Background information on listed species and general impacts were described in the Programmatic EIS (Ecology, 2007).

20-13. Your comments regarding the agreement between the State of Washington and the CCT are noted. The letter from Yvonne Swann is attached to your comment letter.

20-14. See the response to Comment Number 19-3 regarding climate change. Ecology has made every attempt to incorporate relevant current research on climate change into its evaluation and will continue to do so as new studies are completed.

20-15. See the response to your Comment Number 20-7 regarding phased review and the evaluation of impacts of specific water rights. Although Ecology does not know at this time where specific water rights will be issued, it does know the total amount of the water that will be issued for out-of-stream uses. Withdrawals from the Columbia River will be limited to the amount of water specified in the MOU between the state, Reclamation, and the three Columbia Basin irrigation districts. The information on the amount of water that would be released was adequate to document the potential impacts to the Columbia River.

Specific impacts from each water right issued will be evaluated under Ecology's normal process for issuing water rights. See the response to your Comment Number 20-5. Cumulative impacts are described in Section 4.3. See the response to Comment Number 19-5.

20-16. Your comments regarding the Lake Roosevelt Incremental Storage Releases Project are noted. As noted in the response to your Comment Number 20-3, improving instream flows is one of the purposes of the Management Program along with providing water for out-of-stream uses. As stated in the response to your Comment Number 20-5, the impacts of issuing specific water rights under the project will be evaluated under the state's normal water rights process, and no impacts will be permitted to senior water rights. As stated in Section 4.2.2.3, no impacts to Columbia River water temperature are anticipated. See the response to your Comment Number 20-12 regarding the Endangered Species Act.

Ecology believes that this Supplemental EIS adequately evaluates the potential impacts of the Lake Roosevelt Incremental Storages Releases Project. Ecology has used the guidance in WAC 197-11-794 to determine if the Proposal would cause any significant impacts. An Impact is significant if there is "a reasonable likelihood of more than a moderate adverse impact on environmental quality." The only significant adverse impacts identified in the Supplemental EIS are to some recreational facilities on Lake Roosevelt and Ecology is working with NPS to mitigate those impacts.

teckcominco

June 30, 2008

File No.: 1-773180-000

Derek I. Sandison
Central Regional Director
State of Washington, Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902-3452

VIA ELECTRONIC MAIL

Subject: Lake Roosevelt Comments – Draft Supplemental Environmental Impact Statement (SEIS)

Dear Mr. Sandison:

21-1 I would like to take this opportunity to thank the Washington State Department of Ecology (Ecology) for allowing interested parties to review and comment on the above referenced Draft SEIS. On behalf of Teck Cominco American Incorporated (TCAI), please find listed below a limited number of comments and suggestions intended to clarify misconceptions or incorrect statements presently within the draft SEIS. For your convenience and to aid in your review, page numbers and respective report sections and subsections have been identified.

21-2

- Page S-4; "Environmental Health"; 1st sentence - "*The Proposal would slightly increase the exposure of contaminated sediments during peak recreation periods*". Please note that although written as being definitive (i.e., *would*) this statement is not supported by facts and is speculative at best. As the draft SEIS correctly identifies on pages 3-51 and 3-52, the U.S. Environmental Protection Agency (EPA) identified that 12 of the 15 beaches sampled in 2005 "*...were below detection limits for all contaminants, and were designated as safe for use. Three sites (Black Sand, Northport, and Dalles) had arsenic and/or lead concentrations slightly above screening levels; these beaches were designated as safe for seasonal recreation (EPA, 2006).*" It is important to note that with the exception of the Dalles Orchard (Dalles) which lies at the northern fringes of the Lake Roosevelt National Recreation Area (LRNRA); the aforementioned beaches (Northport and Black Sand) are not located within LRNRA boundaries. As such, they are not typically affected by reservoir water management operations. In other words, exposure of sediments at Northport and Black Sand beaches are not

Teck Cominco American Incorporated
501 North Riverpoint Boulevard, Suite 300, Spokane, WA 99202
PO Box 3087, Spokane, WA 99220 ▪ telephone: (509) 747-6111 ▪ fax: (509) 922-8767

21-2 influenced by water management activities but rather, are linked to upstream flows and would therefore not likely be affected by the Proposal. Based on the data collected to date and as identified within the draft SEIS, contaminant concentrations for beaches located within the LRNRA "*...were below detection limits for all contaminants, and were designated as safe for use...*" Therefore, it appears premature and inappropriate to state that the Proposal would increase exposure to potentially contaminated sediments. It is recognized that additional beach sediment data is likely required to perform a comprehensive risk assessment (human health and ecological) for the upper Columbia River which includes Lake Roosevelt; and as such, for the purposes of the SEIS it would be more appropriate and correct to substitute "*would slightly*" with "could potentially".

21-3

- Page S-5; "Areas of Significant Controversy and Uncertainty"; 1st sentence – "*Potential impacts associated with the Teck Cominco contamination of Lake Roosevelt is an area of uncertainty*". It is completely inappropriate and irresponsible to infer that contamination within Lake Roosevelt is due solely to Teck Cominco. As the draft SEIS correctly identifies on pages 1-13 and 3-51, there have been and continue to be a number of potential sources of contamination to Lake Roosevelt (e.g., pulp and paper industries, mining and smelting operations, municipalities, and agriculture). Although Teck Cominco has voluntarily agreed to investigate the nature and extent of contamination and perform risks assessments in conjunction with the EPA, under no circumstance is it appropriate to infer ownership of contamination within Lake Roosevelt. Therefore, it is recommended that the aforementioned sentence be replaced to read "Potential impacts associated with contamination of Lake Roosevelt is an area of uncertainty".

21-4

- Page 1-13; Section 1.6.6 "Lake Roosevelt Remedial Investigation and Feasibility Study" – Presently this section states "*The source of the contaminants is upstream smelting and pulp operations.*" As previously mentioned and acknowledged within the draft SEIS, there are a number of historic and/or existing potential contaminant sources to Lake Roosevelt located upstream and adjacent to the reservoir. As a result, it would be more appropriate and correct to simply state that "the source of the contaminants includes, but is not limited, to upstream smelting and pulp operations."

  Within the next sentence of this section it states that "*The primary source is a smelter currently owned by Teck Cominco located...Canadian border.*" Without providing the necessary and appropriate supporting information it is unclear how Ecology has identified the Trail smelter as the "*primary source*" of contamination. Any discussion or inference to source allocation is premature and speculative; and should be removed from the document. Furthermore, the SEIS should focus on science and how the Proposal will affect or potentially affect existing and future

21-4 conditions. As a result, the SEIS's focus and discussion relative to the Remedial Investigation/Feasibility Study should be on the assessment of contamination (type, concentrations ranges and relative location), not potential responsible parties.

21-5 Furthermore within this paragraph Ecology states that "*…discharges were prohibited in 1995*", referring to the discharge of granulated fumed slag. This statement is simply not true. Discharge of granulated fumed slag was not prohibited but rather, Teck Cominco and the Provincial government cooperatively worked together to discontinue discharge of granulated fumed slag into the Columbia River in 1995. As a result, the text should be edited to read "…discharges were discontinued in 1995".

21-6 Within the last sentence of this paragraph it states that "*...there is evidence that the contaminants are having long-term effects on organisms.*" We are unaware of this "*evidence*" and unfortunately Ecology has not provided a reference to substantiate such a definitive statement. On the contrary, based on work completed by Ecology during the 1980's it was concluded that "surveys in Lake Roosevelt did not find evidence that the current levels of metals in this system pose a serious threat to the aquatic life or human health" (Johnson et al., 1989[1]). It is important to note that the above-referenced survey was completed during that period of time when discharges of granulated fumed slag from the Trail facility were active. As a result, it remains unclear how Ecology can infer evidence when previously published information from Ecology does not support, but rather, contradicts this evidence.

21-7
- Page 3-50; Sub-section 3.10.1.1 "Hazardous and Toxic Materials" – the use of the word "toxic" is inappropriate and should be deleted. We are not aware that any toxic materials have been identified within the reservoir. Any contamination within the reservoir is more appropriately labeled as a hazardous substance as defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

21-8
- Page 3-51; header "Metal Contamination"; 2nd paragraph – "*Downstream accumulations of water-granulated fumed slag were not identified, but are possible based on historical quantities discharged into the Columbia River. Downstream sources are most likely related to effluent discharges, fine-grained water-granulated fumed slag, or weathering of more coarse-grained slag particles.*" It remains unclear to this reviewer how, based on "*historical quantities*", Ecology can without any supporting information and/or calculations suggest that downstream accumulations of granulated slag are possible; while acknowledging that sampling activities completed to date have not identified any

[1] Johnson, A.; D. Norton; and B. Yake. 1989. An Assessment of Metals Contamination in Lake Roosevelt. Washington State Department of Ecology Report No. 89-e26. June.

21-8 such accumulations. It is recommended that speculative comments be removed from the SEIS and focus on actual data.

21-9 Furthermore, Ecology appropriately acknowledges that there are a number of historic and/or active pollutant sources to Lake Roosevelt and yet, goes on to infer that the resulting contamination is solely due to Teck Cominco. This is contradictory, speculative, and does not aid in assessing the Proposal. As previously noted, with the exception of discussing the nature and extent of contamination as it may exist within Lake Roosevelt, and how the Proposal may affect this aspect of the project, it is unclear to this reviewer why the draft SEIS chooses to introduce speculative comments that clearly do not inform the Proposal and any associated decisions. As a result, we strongly encourage Ecology to remove such speculative comments and rely on the existing information to inform its decision and Proposal.

21-10
- Page 4-39; Section 4.2.1.9 "Environmental Health"; header "Contaminated Sediments" – The draft SEIS identifies that there is a concern that dry sediments could become airborne, "carrying toxic metals and organic compounds". We would like to draw your attention to work completed by the U.S. Geological Survey (USGS) which measured trace element concentrations in dust samples at several locations along Lake Roosevelt. This work initiated in early 2000 and conducted over several years was designed to assess the occurrence, concentrations, distribution, and seasonal variability of select trace elements on airborne dust particles. Based on this work, the USGS concluded that trace element air concentrations "were below established chronic inhalation risk levels", and that particulate matter concentrations up to 10 microns (PM_{10}) "did not exceed EPA short- or long-term standards" (results presented at the 5th Symposium on the Hydrogeology of Washington State, April 2005). Therefore, although Ecology has correctly identified a potential exposure pathway, the draft SEIS fails to report all the information such that readers can make an appropriate assessment as it may relate to the Proposal.

21-11 We would like to thank you in advance for your time and consideration on the above listed comments. Should you have any questions or require any additional information at this time, please do not hesitate to contact the undersigned.

21-11 Sincerely,
Teck Cominco American Incorporated

Marko E. Adzic
Manager, Environmental Engineering

cc. Senator Bob Morton, Olympia , WA
Representative Joel Kretz, Olympia, WA
Representative Bob Sump, Olympia, WA
David W. Godlewski – TCAI, Spokane, WA
Andy Dunau – Lake Roosevelt Forum, Spokane, WA

Comment Letter No. 21 – Teck Cominco – Marko Adzic

21-1. Comment noted.

21-2. Ecology concurs that some of the shoreline recreational areas upstream of Grand Coulee Dam, nearer the international border, are not directly influenced by dam operations and reservoir levels. Some backwater effects from the dam are recognized, however, and produce small but measurable changes in river stage up to and beyond the U.S.-Canadian border (see for example, the International Joint Commission website http://www.ijc.org/php/publications/pdf/ID1600.pdf). Of the numerous public-use areas within Lake Roosevelt under reservoir influence the following clarifications are provided:

- Metals contaminant concentrations established by the Environmental Protection Agency (EPA) Phase 1 study were not below detection limits as stated. Most of the major metal contaminants were detected at concentrations exceeding their respective method reporting limit.

- The 2007 Washington Department of Health (DOH) Health Consultation (Washington DOH, 2007a) was for recreation use of short duration only. Other exposure scenarios (e.g., seasonal and year-round recreational visitors, contact intensive and non-contact intensive worker, traditional and modern subsistence, and residential) were not addressed by this initial health consultation. These additional scenarios will be evaluated as part of EPA's proposed human health risk assessment (HHRA) that will be completed in conjunction with the Upper Columbia River (UCR) Remedial Investigation/Feasibility Study (RI/FS). Information from the HHRA will be required to make any definitive conclusions regarding potential risk.

- The 2005 EPA Phase I sediment sampling included several high-use beach areas from throughout Lake Roosevelt. This sampling effort, however, was not sufficiently comprehensive to support the development of definitive statements regarding potential risk to human health or ecological receptors. Other recreational sites and beaches of interest have been identified and recommended for additional sampling and study to further assess potential risk. Teck Cominco rightly acknowledges the need to collect additional beach sediment data in support of the HHRA.

- Depending on year-to-year management practices, the proposal will expose, to varying degrees, additional shoreline around the perimeter of the Lake Roosevelt National Recreation Area during the peak-use recreational season. As a result, the potential for slightly greater exposure to contaminated sediments by users does exist.

The text on page S-4 of the Supplemental EIS has been revised to state: "The Proposal would slightly increase the potential for exposure of contaminated sediments during peak recreation periods."

21-3. Considerable documentation exists to support the conclusion that the smelter facility in

Trail, British Columbia has been the primary source—volumetrically and from a loading perspective—of legacy metals pollution to the Upper Columbia River. The June 2006 settlement agreement between EPA, Teck Cominco Metals Ltd, and Teck Cominco American Incorporated expresses the United States' position regarding past and ongoing discharges by stating: "The United States contends that discharges from the Trail Smelter…have contributed to releases of hazardous substances, as defined in CERCLA." Legacy metals pollution from the Trail smelter facility is a central focus of the current EPA-directed Remedial Investigation and Feasibility Study from both a site characterization and risk assessment perspective. Secondary sources of metals pollution, other hazardous substances, and localized impacts caused by redistribution and/or remobilization of inorganic and organic contaminants exist or may exist as well. The Remedial Investigation and Feasibility Study will need to consider whether and to what extent secondary sources may affect remedial action decisions. Quantification of human health and ecological risks from existing and historical contamination to the Upper Columbia River is ongoing.

The following text has been added to the Areas of Significant Controversy section of the Supplemental EIS to reflect these points: "Data collection and monitoring is ongoing to better assess and quantify potential adverse impacts to human health and the environment from known sources of contamination; this includes, but is not limited to, contaminants discharged to the Upper Columbia River from the Teck Cominco Trail smelter facility. The Trail smelter facility is considered the primary source of metals contamination, and potentially other hazardous substances, to the Upper Columbia River."

21-4. Existing records (e.g., Canadian National Pollutant Release Inventory (NPRI), British Columbia Ministry of Environment discharge permit information) demonstrate that historical discharges of metal contaminants to the Columbia River from the Trail smelter facility have been substantial. For example, the Colville Confederated Tribes conducted an evaluation of discharge data from the Trail smelter facility for the years 1994 through 1997 (CCT, 2004). This analysis showed that the smelter discharged more arsenic (a known carcinogen), cadmium, and lead than all U.S. sources reporting to EPA's toxic release inventory to all waters of the United States in all years, except 1996. Additional documentation of historical discharges is available from Environment Canada's NPRI website:
http://www.ec.gc.ca/pdb/querysite/facility_history_e.cfm?opt_npri_id=0000003802&opt_report_year=2006.

This same distinction also may pertain to certain other non-metallic inorganic and certain types of organic chemicals. Recent Phase 1 Remedial Investigation studies of the Upper Columbia River (EPA, 2006a) and studies by the USGS (Bortleson et al., 2001; Paulson, 2006) also have concluded that the Trail facility is the primary source of metal contamination to the Upper Columbia River. The pulp mill facility near Castlegar, British Columbia (currently doing business as Zellstoff Celgar Ltd) historically was recognized as a primary source of organochlorine compounds (i.e., dioxins and dibenzofurans) which were detected in Columbia River surface water and aquatic organisms. Additional study and data review conducted as part of the ongoing Remedial Investigation and Feasibility Study will help to further refine and resolve any outstanding

questions regarding the magnitude of legacy pollution that was discharged to the Columbia River by smelter and pulp operations located in, and upstream of, Trail, British Columbia. The Remedial Investigation and Feasibility Study also will reduce uncertainty on the nature and extent of contamination and how the Lake Roosevelt Incremental Flow Releases Project could affect remobilization, transport or receptor exposure in areas where contaminants may be present.

The statement in the Supplemental EIS does not intend to single out a responsible party under the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or the Washington State Model Toxics Control Act (MTCA). Some context to the pollution is necessary and appropriate to the Supplemental EIS. See also the response to your Comment Number 21-3.

Section 1.6.6 of the Supplemental EIS has been revised to include the following language to clarify these points: "Smelting operations in Trail, British Columbia are recognized as the primary source of legacy metals contamination to the Upper Columbia River. This metal contamination is considered relevant to the Lake Roosevelt Incremental Storage Project; other secondary point sources of legacy metals pollution of lesser magnitude also may remain, but have yet to be fully documented and characterized. Pulp mill operations near Castlegar, British Columbia, while recognized as a primary source of organochlorine compounds to the Upper Columbia River, may be less relevant to the Proposal."

21-5. The text has been revised as recommended.

21-6. Numerous detailed contaminant assessment studies and monitoring activities have been conducted in Lake Roosevelt, the Upper Columbia River in the United States, and the Lower Columbia River of British Columbia since the late 1980s. These more recent and ongoing studies and monitoring efforts by a number of state, federal, tribal and provincial agencies have advanced the overall understanding and assessment of potential adverse impacts to human health and the environment due to contaminants in the Columbia River and Lake Roosevelt. Important advancements have occurred in the fields of aquatic toxicology, chemical fate and transport, contaminant bioavailability and analytical measurement techniques over the past 20 years. These advancements have provided important new knowledge and conclusions regarding the potential for acute or sub-lethal impacts to aquatic receptors in Lake Roosevelt.

Several studies have identified the potential for lethal and/or sub-lethal effects from contaminants in Lake Roosevelt sediment. The 1992 USGS study of Lake Roosevelt included laboratory sediment bioassays (Bortelson et al., 2001). Lethal and sub-lethal effects were observed in laboratory toxicity tests with two aquatic organisms exposed to bed sediments collected from near the international boundary and from some sites in Lake Roosevelt. Besser et al. (2007) characterized chronic sediment toxicity, metal bioaccumulation, and metal concentrations in sediment and pore water from eight study sites in Lake Roosevelt. Their study determined that chronic toxic effects on amphipods (*Hyalella azteca*; reduced survival) and midge larvae (*Chironomus dilutus*; reduced growth) in whole-sediment exposures were generally consistent with predictions of metal toxicity based on empirical and equilibrium partitioning-based sediment quality

guidelines. Bioassay tests also were conducted by the EPA during the Phase I Remedial Investigation sediment investigation of the Upper Columbia River (EPA, 2007). These tests indicated that sediment from selected Upper Columbia River locations had the potential to produce adverse effects to aquatic organisms (reduced growth, increased mortality, reduced fecundity).

Similarly, fish advisories both in British Columbia and in Washington State attest to the fact that contaminants have been and currently are present in the Columbia River system. These contaminants become concentrated in fish tissue at levels that warrant concern for human consumption. Referencing a single study from the late 1980s is not a basis for excluding the findings and conclusions from more recent, updated, and arguably more comprehensive studies and monitoring efforts conducted since then. Several lines of evidence, including sediment contaminant levels, bioassay results, and fish tissue data all support the conclusion that contaminants in the river system have the potential to adversely impact aquatic organisms and human health. Given this existing evidence, Ecology has noted that an important focus area of the current Remedial Investigation will be to assess not if contaminants have affected aquatic organisms, but instead how severe and wide-spread the impacts are under current conditions. In consideration of these points, no changes have been made to the Supplemental EIS.

21-7. As noted in response to your Comment Number 21-6, lethal and sub-lethal toxic effects have been documented via bioassay testing using Lake Roosevelt sediments. The following excerpt (www.answers.com) helps to distinguish between hazardous substances and toxic pollutants:

> Regulation of hazardous and toxic materials is marked by its nomenclature. **Hazardous substances** are defined by federal law as "solid wastes" that "cause, or significantly contribute to an increase in mortality or illness" or "pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed" (42 U.S.C.A. § 6903). **Toxic pollutants**, a subset of hazardous substances, include pollutants that "after discharge and upon exposure, ingestion or inhalation … [by] any organism" will "cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, … or physical deformations in such organisms or their offspring" (33 U.S.C.A. §1362).
>
> Because toxic pollutants are a subset of hazardous materials, a pollutant may be hazardous without being toxic, but not vice versa. The EPA has published a list of pollutants it deems toxic, including arsenic, asbestos, benzene, cyanide, DDT, lead, mercury, nickel, and silver. Pollutants not included on this list …may still be considered hazardous if they pose a substantial threat to human health or the environment.
>
> The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C.A. § 9622, is [a] major piece of federal legislation governing <u>hazardous and toxic materials</u>. Congress established CERCLA in 1980 to deal with thousands of inactive and abandoned hazardous waste sites in the United States. CERCLA directs the EPA to identify sites at which <u>hazardous or toxic substances</u>

may have been released, and ascertain the parties potentially responsible for cleaning up these sites.

In view of this definition, Ecology believes the current sub-section title in the Supplemental EIS is appropriate for the existing content.

21-8. According to various sources, considerable quantities of granular slag have been discharged to the Columbia River over the past 70 to 80 years. Teck Cominco has estimated that as much as 13 million tons of slag were discharged to the Columbia River through 1995. Slag was identified in the U.S. portion of the Columbia River as early as the 1930s, based on documents generated in conjunction with the 1937 Trail Smelter Case (Griffin and Potter, 1936). A 1991 Cominco document states that "[t]he slurry of granulated slag is discharged to the Columbia River, a practice that has been employed since the inception of slag fuming back in 1930" (Cominco, 1991). Grand Coulee Dam became operational in the early 1940s. Therefore, slag mobilization and transport under free-flowing, pre-dam conditions occurred for nearly a decade. During this period, slag likely was transported downstream of Marcus Flats and accumulated both in the thalweg (coarser grained fraction) and former floodplain areas (finer grained fraction).

Considerable quantities of granular slag were identified in core samples from the Marcus Flats area during EPA's 2005 Phase I sediment investigation (EPA, 2006a). It is not known if the bulk of this material was transported prior to, or following, dam construction. Fine particles of slag (silt to clay-sized) likely contribute, in part, to the elevated concentrations of metal contaminants detected in sediment samples collected downstream from Marcus Flats. Cominco (1991) states that "[t]estwork has confirmed that there is a small fines component in the slag discharge which does not settle readily and can be transported by relatively slow moving currents." The Cominco report goes on to state that the small fines component of the granular slag accounts for about 1 percent of the total mass of discharged slag and "exhibits a lower chemical stability (as compared to coarser granular slag)." Bortelson et al. (1994) conclude that the fine slag fraction (i.e., silt and clay size) would be capable of transport over long distances as suspended sediment in the Columbia River. Chemical weathering, hydration and exfoliation of slag particles also have been reported (Cox et al., 2005). Ecology expects that the current Remedial Investigation and Feasibility Study will further define the degree to which slag material in the river/reservoir environment is susceptible to physical abrasion or chemical weathering. In consideration of these points, the Supplemental EIS has not been changed.

21-9. Comment Numbers 21-3, 21-8 and 21-9 center on the issue of whether the drawdowns associated with the Lake Roosevelt Incremental Storage Releases Project may potentially affect existing patterns of contamination that are well documented in Lake Roosevelt and the Upper Columbia River. While, for purposes of fairness and general completeness, Ecology has noted the presence of other historic and/or active pollutant sources, it is well established that the Trail facility has been a significant contributor of regulated pollutants to the river for decades—including both slag and aqueous effluent discharges. Documented contaminant mass loading to the Columbia River from the Trail facility is significantly greater than any other historic or active sources that have been identified between Trail, British Columbia, and Grand Coulee Dam, as noted in the response to

your Comment 21-8. This fact is important to the Proposal in regard to the overall understanding of possible impacts to the current nature and extent of contaminants in Lake Roosevelt and the Upper Columbia River. The Supplemental EIS cannot omit the significance of these pollutant loads in its overall discussion of *Hazardous and Toxic Materials*. The documented source of contaminants, along with the proposed remediation, is an important consideration in the evaluation of potential impacts in the Supplemental EIS.

21-10. Ecology recognizes the unpublished findings from the USGS air quality monitoring work. The monitoring provided an initial assessment of possible health concerns associated with inhalation of trace elements found in dry shoreline and river bed sediments from portions of Lake Roosevelt. We acknowledge the conclusions presented by the USGS researchers stating that no exceedances of EPA short- or long-term air quality standards were recorded during the study. The Washington Department of Health (2007a) also has discussed health concerns of "fugitive dust." A series of somewhat unique climatic and river reservoir level conditions must coincide to allow dry sediments from Lake Roosevelt beaches and side banks to become airborne at concentrations that may exceed recognized inhalation risk levels. The limited USGS monitoring window may not have captured the unique climatic and drawdown conditions that would be necessary to produce an air quality impact event of sufficient magnitude, duration and severity to constitute a reasonable maximum exposure scenario. Ecology expects that this health concern will be further assessed as part of the current Redial Investigation and Feasibility Study to better assist public health officials and cleanup decisions.

21-11. Comment noted.

June 27, 2008

Derek I. Sandison
Central Regional Director
State of Washington
Department of Ecology
15 West Yakima Avenue
Yakima, WA 98902-3452

Dear Mr. Sandison:

22-1 Thank you for taking the time on June 16th at Coulee Dam to introduce us to the process you are completing with the Supplemental Environmental Impact Statement (SEIS) concerning the state's intention to extract water from Lake Roosevelt annually during the month of August.

We wish to submit information on the adverse effect upon the Seven Bays Marina on Lake Roosevelt of an annual extraction of one to two feet of water during the month of August. But first, please accept two suggestions for your consideration in the preparation of this SEIS:

22-2 1. Between Map Folio Figures 11 and 12, your staff has omitted the three bays inside the log boom at the Seven Bays Marina.

22-3 2. As one of four commercial marina operators/owners on Lake Roosevelt, we received no communication of any kind on this proposed draw down of the lake from any county, state, or federal authorities. This marina has only a four month operational period; August is our busiest month; this has the potential to ruin more than one third of our annual business season. The shear luck of having a customer mention your June 16th Coulee Dam meeting is how we heard of your proposal. Following that, an official from Lake Roosevelt National Recreation Area asked us for a letter stating any concerns that we might have for our business with regards to the removal of one to two feet of water from the lake level (no time frame mentioned). It is very important that your organization understand that a one to two foot of lower water has minimal effect upon the Seven Bays Marina EXCEPT for the period of August 20 to September 20. We did not know WHEN your proposed drawdown of the lake would occur until we attended your public open house at Coulee Dam. We are requesting a response as to why we were not included among the 250 other people/organizations on your Chapter 6.0 Distribution List.

ADVERSE EFFECTS UPON THE SEVEN BAYS MARINA
Caused by an Annual August Drawdown
of Lake Roosevelt/Columbia River

22-4 1. See attached National Park Service June 2002 Aerial Photo.
Three of our docks (A Dock, B Dock, and G Dock) will have to be disconnected from the shore, turned 90 degrees to the bank and floated toward the lake, rendering them unavailable for customer usage. Losing the A Dock will mean that the marina will have no free visitor temporary moorage (store/restaurant customers), no short term moorage, and no overnight or weekly moorage for short term visitors after the middle of August. B Dock and G Dock are rented seasonally from June 1 to September 30; this will lose those customers for six of their sixteen week moorage, and many of them will go elsewhere if they can not rent the entire season.

22-5 2. Until we can make year to year comparisons, it will be hard to estimate the extent of the detrimental effect upon our store and restaurant losing the above permanent customers and especially the temporary visitors. A very large percentage of our store and restaurant sales are to short term visitors to the marina, and we will have no place for them to park their boats once A Dock is disconnected from the shore.

22-6 3. C Dock is our greatest concern. See attached Seven Bays Marina Diagram. This is our new Houseboat Dock that replaced the old C and D Docks shown in the NPS Aerial Photo. In a normal year late-August drawdown to 1280 feet MSL, this bay is just big enough to back out the 60 foot long houseboats one length to clear the other houseboats, then pivot and drive out through the log boom. A further draw down below 1280' has a *dramatic* effect on shortening the distance from this dock to the south shoreline, making it impossible to operate our houseboat fleet from that dock. August is, of course, our busiest houseboat month. Here is the important fact of this letter: the houseboat operation carries the economic load for the entire rest of the marina; without the houseboats, the marina is economically unfeasible. If we lose six weeks of our houseboat season, the marina will fail. To prevent losing the last third of our houseboat season, the marina will have to be reconfigured with a different dock system.

22-7 Three years ago, the National Park Service came to us and asked us to rebuild and rejuvenate the Seven Bays Marina. NPS is required to provide our company with "a reasonable expectation to operate the marina at a profit." This August drawdown puts a major limitation on our business plan and draws into question our ability to continue to operate at a profit. You could take two feet of water out of this marina anytime you desire EXCEPT for the last half of August; could you not take the water in June or July when the lake is more full?

Regards,

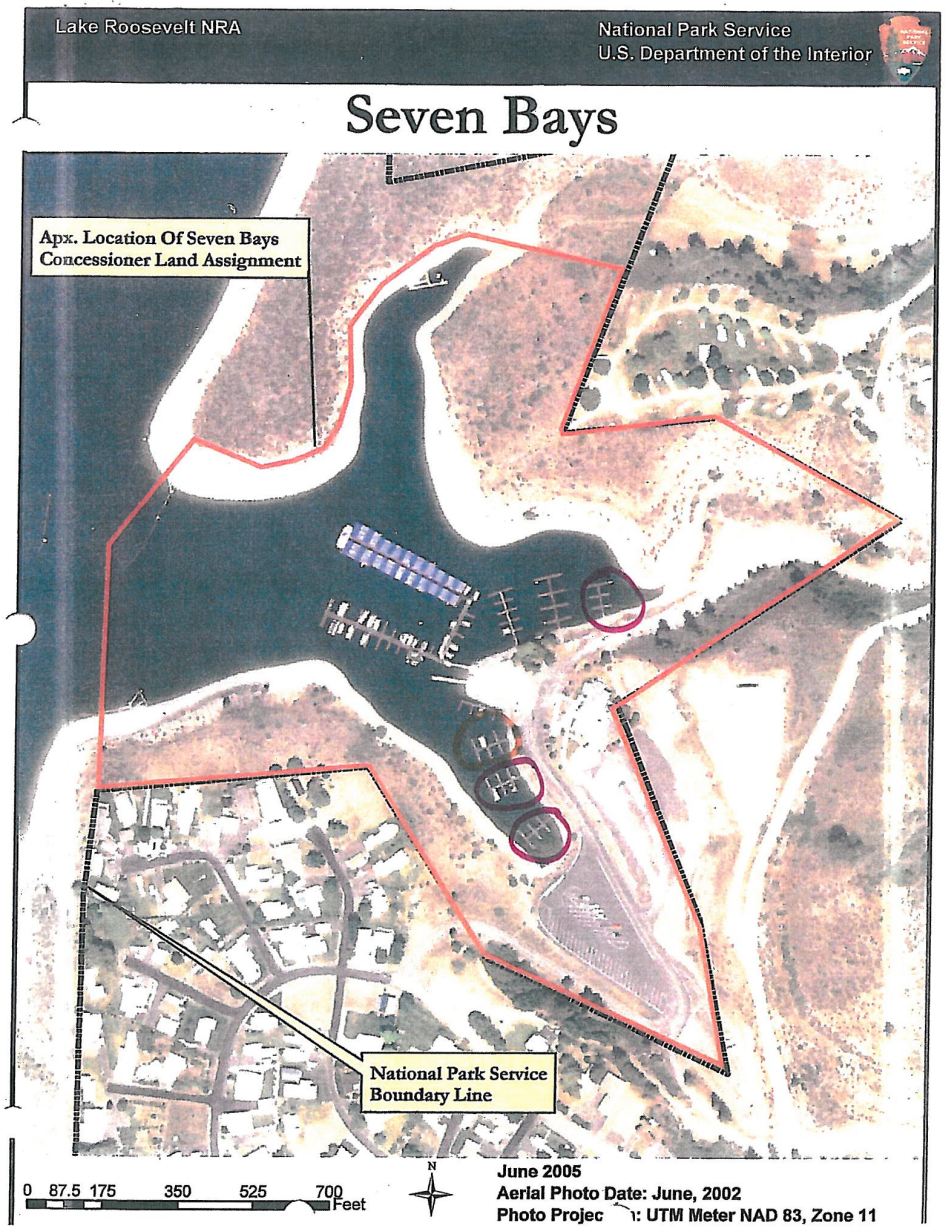
Laurel Parker, Owner Lyle Parker, Owner

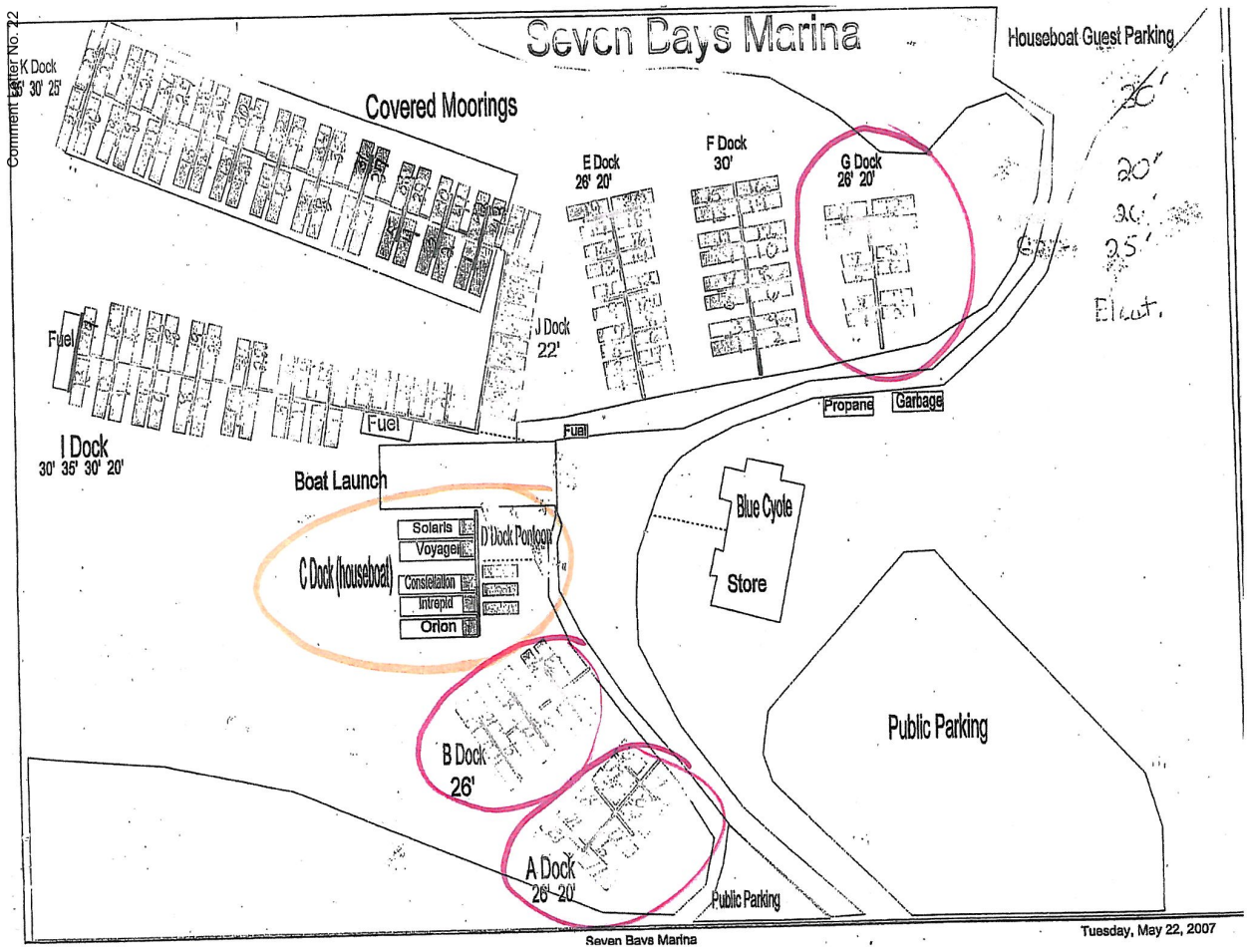
1250 Marina Drive
Seven Bays, WA 99122
P: 509-725-7BAYS (7229)
7baysmarina@centurytel.net

RECEIVED
JUL 0 1 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

MAPS TO ACCOMPANY 7 BAYS MARINA SUBMISSION

Comment Letter No. 22




Comment Letter No. 22
Seven Bays Marina
Houseboat Guest Parking
K Dock
30' 25'
Covered Moorings
E Dock
26' 20'
F Dock
30'
G Dock
26' 20'
J Dock
22'
Fuel
Fuel
Fuel
Propane
Garbage
I Dock
30' 35' 30' 20'
Boat Launch
Solaris
Voyager
Constellation
Intrepid
Orion
D Dock Pontoon
C Dock (houseboat)
Blue Cycle
Store
Public Parking
B Dock
26'
A Dock
26' 20'
Public Parking
Seven Bays Marina
Tuesday, May 22, 2007

Comment Letter No. 22 – Seven Bays Marina – Laurel and Lyle Parker

22-1. Comment noted.

22-2. The Map Folio included in the Supplemental EIS illustrates selected embayments to evaluate potential impacts to fish and aquatic species. The embayments evaluated were selected by WDFW. The Map Folio is not intended to show all bays and embayments on Lake Roosevelt.

22-3. Your comments regarding the effect of the incremental storage releases on your marina are noted. Potential impacts to the marina are acknowledged in Section 4.2.1.10 of the Supplemental EIS.

Ecology attempts to identify interested parties when it provides notification of public meetings and projects, but it is not always possible to identify every individual. In addition to providing notices to the parties listed in Chapter 6, Ecology published notices in local and regional newspapers and issued press releases regarding the availability of the Draft Supplemental EIS and the public open houses. Your name has been added to Ecology's mailing list and you will receive future notices about the project.

22-4. The aerial photograph that you provided is included as part of your letter. Your comments regarding impacts to your docks are noted. This information will be included in the evaluation that NPS and Ecology are undertaking to determine impacts to specific docks and marinas, and to determine appropriate mitigation measures. Since the Draft Supplemental EIS was issued, Ecology has received a report prepared for NPS on site-specific impacts of drawdowns of Lake Roosevelt. This information identifies specific impacts to your marina and has been included in Section 4.2.1.10 and Appendix G of the Final Supplemental EIS.

22-5. Comment noted. As part of the evaluation being done by NPS and Ecology, specific mitigation measures for impacts will be identified.

22-6. The diagram of the marina is attached as part of your letter. Your comments regarding C Dock are noted and will be considered as part of the evaluation of impacts to specific facilities.

22-7. As described in Chapter 2 of the Supplemental EIS, flow releases from Lake Roosevelt will occur from April to September. The drawdown of the lake will be the greatest in July and August because of the cumulative effect of releases throughout the summer. Releases need to occur in July and August to meet the purpose of the project which is to provide water for municipal, industrial and agricultural users, and improve stream flows for fish.

From: Mary Lines [mailto:m.lines@comcast.net]
Sent: Wednesday, June 25, 2008 9:01 AM
To: Sandison, Derek (ECY)
Subject: Lake Roosevelt drawdown

The Department of Ecology is proposing to allocate new water rights from

Lake Roosevelt. This proposal contravenes the 2005 study and recommendations from the National Academies of Science. The proposal will not, despite state pronouncements, provide any significant benefit to Columbia River fish. The increment of water provided for instream flows is so small that it cannot be measured at Grand Coulee Dam (where it allegedly will be released).

Columbia River management at Lake Roosevelt and Grand Coulee Dam will change in coming years due to climate change and expiration of the Columbia River Treaty. (British Columbia residents are not happy with operation of the Canadian reservoirs on the Columbia River!)

23-1 Washington State should strive for flexibility. But the state is achieving just the opposite by locking into a give-away of new water rights. This approach will only exacerbate eastern Washington water supply problems in the future. What is needed is aggressive, mandatory water conservation, appropriate water pricing (including elimination of water and energy subsidies), and a re-focusing on sustainable agriculture in eastern Washington.

As part of the plan, the state is now allocating $5 million per year to the Spokane and Colville Tribes. These payments should come with no strings attached as compensation for the terrible damage done to the Tribes when Grand Coulee floodgates closed in 1940 -- destroying Upper Columbia salmon runs, flooding tribal communities and cultural resources, and drowning Kettle Falls – the Celilo of the Upper Columbia River. Washington State payments to the Tribes should be based on the equities – not continuing damage to eastern Washington waters and wildlife.

I am opposed to this.

Mary Lines

8305 N Valerie

Spokane, WA 99208

Comment Letter No. 23 – Mary Lines

23-1. Your comment in opposition to the project is noted.

-----Original Message-----
From: jaberspo@icehouse.net [mailto:jaberspo@icehouse.net]
Sent: Thursday, June 26, 2008 12:53 PM
To: Sandison, Derek (ECY)
Subject: Lake Roosevelt Drawdown

Mr. Sandison

24-1 I would like to see changes in the allocation of water rights, if any, in the direction of fewer, not more.. Expanding water rights can only cause more and more future water problems - it is a short-sighted approach.
Please advocate to policies which stress mandatory water conservation, and elimination of water and energy subsidies, and encourage (and study methods which support) sustainable agriculture in eastern Washington.

Sincerely,

Jan Treecraft

Comment Letter No. 24 – Jan Treecraft

24-1. Comment noted.

-----Original Message-----
From: Ken and Jocelyn Weeks [mailto:kjweeks@embarqmail.com]
Sent: Wednesday, June 25, 2008 12:06 PM
To: Sandison, Derek (ECY)
Subject: allocating new water rights to Lake Roosevelt

25-1 Greetings, In a word, a bad idea (will three words...) please follow the rational assessment of the national Acadamy of Sciences...this proposal does nothing for fish, does nothing to coax Eastern Washington argi-business to begin moving toward sustainable water us....and continues the dubious tradition of public subsidies for our water.

Sincerely Ken Weeks

Comment Letter No. 25 – Ken Weeks

25-1. Your comment in opposition to the project is noted.

Comment Letter No. 26

Washington State Dept. Of Ecology
Water Resource Devision

RECEIVED
JUN 23 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

Dear Sirs,

26-1 We believe the planned drawdown of Lake Roosevelt and Columbia River to irrigate the Odessa Highland is too expsensive and ill timed.The farms in that area were dry land farmed before they put in deep well irrigation and should be again.

With Global warming and the expected loss of water in the Columbia River drainage,this project is poorly timed at best.

Sincerely,

Chris Esvelt
3174 Esvelt Rd.
Rice,Washington
99167

Christopher D Esvelt
Patty Esvelt 6/22/08

Comment Letter No. 26 – Christopher and Patty Esvelt

26-1. Your comment in opposition to the project is noted.

Sat May 24 2008

DEPT. OF ECOLOGY
Received
MAY 28 2008
CENTRAL REGION OFFICE

Dept of Ecology

I am writing to comment on the release of an additional 82,500 acre feet of water per year from Lake Roosevelt. In reality it is a drop in a bucket. The average flow at Grand Coulee is 219,726 acre feet per day. It only takes 9 hrs. to flow 82,500 acre feet.

Lake Roosevelt has an active capacity of 5,232,000 acre feet. The average yearly flow at Grand Coulee is 80,200,000 acre feet. The proposed
27-1 additional withdrawal is 1/10 of 1% of the average yearly flow at Grand Coulee.

Lake Roosevelt is refilled on average 15 times each year. It was designed to fluctuate up to 80 feet and has been drawn down 40 feet. One foot of water is hardly anything to talk about.

In 1943 Congress authorized the Columbia Basin Project to water 1,029,000 acres. There is no reason the water to irrigate the East High area of the project could be taken from the river.

The average flow of the Columbia

river at the Falls is 146,000,000 acre feet and 187,000,000 acre feet at the mouth. Compare that to the Sacramento's 8,760,000 acre feet
27-1 per year or the Colorado's 16,000,000 acre feet per year.

Surely we could use up to 10% of the tremendous flow of the Columbia for irrigation instead of running it back into the ocean.

Sincerely
Steve J Grant

Comment Letter No. 27 – Rene Grant

27-1. Your comment in support of the project is noted.

Comment Letter No. 28

DEPARTMENT OF ECOLOGY State of Washington

Comment Form

Columbia River Water Management Program **June 2008**

Comment for Lake Roosevelt Supplemental Releases SEIS

Sir or Madam,

28-1 I would like to state my desire to keep as much of the lake roosevelt water allotment available for the Stevens County watershed. This include all usages, private and commercial.

Thanks

Reg Davenport, PE

Name: Reg Davenport, PE **Phone:** 509-684-5359 **Email** regdavenport@distrwi.net

Address:
1433 Evans Cutoff Rd.
Evans, WA, 99126.

Comment Letter No. 28 – Reg Davenport

28-1. Comment noted.

Comment Letter No. 29

DEPARTMENT OF ECOLOGY
State of Washington

Comment Form

Columbia River Water Management Program June 2008

Comment for Lake Roosevelt Supplemental Releases SEIS

29-1 1st a letter notice to the Public would have been appreciated, Having something like this at a time when most of the people are working is inappropriate.
But Do You REALLY CARE.

29-2 2nd Before taking water from the reservoir, Is like a bank. before you take the water out it should be deposited first.
3rd You Ecol have taken our human Rights away in many areas.
4th You People Well need to start Thinking + acting with Common Sense

Name: M Hart
Phone:
Email
Address:
690 8321

Comment Letter No. 29 – M. Hart

29-1. Ecology welcomes public input on the Lake Roosevelt Incremental Storage Releases Project and has attempted to provide timely information on the process and meetings. See additional information on meeting notification in the response to Comment Number 22-3. Ecology has chosen the open house format for public meetings in order to allow a broad range of people with different schedules to attend. The meetings at Coulee Dam and Colville began at 4 p.m. and ended at 7 p.m. People were welcome to arrive at any time during that period.

29-2. Comment noted.

Comment Letter No. 30

DEPARTMENT OF ECOLOGY
State of Washington

Comment Form

Columbia River Water Management Program June 2008

Comment for Lake Roosevelt Supplemental Releases SEIS

30-1 It makes absolutely no sense to allocate water for downstream use when local farmers, businesses + homes must have sufficient water to survive. Declining quality + quantity of water is an international problem. If the Columbia River + Lake Roosevelt continue to be drawn down the aquafirs will also suffer. With the resultant lowering of the water table, only the very wealthy ~~are~~ will be able to afford deeper + deeper wells for agricultural industrial + personal use.

30-2 This open house is not available to those who work full time + was also held with almost no advance notice. This very grave issue certainly demands public input + public hearings not an "open house"

Name: Susanne Waid Phone: 509-738-3113 Email susannewaid@centurytel.net
Address: 1184 C West Old Kettle Rd. Kettle Falls, Wa 99141

Comment Letter No. 30 – Susanne Waid

30-1. As described in Section 4.2.1.4 of the Supplemental EIS, the flow releases and drawdown of Lake Roosevelt are not expected to impact ground water levels.

30-2. See the responses to Comment Numbers 22-3 and 29-1 regarding the public meetings.

Comment Letter No. 31

DEPARTMENT OF ECOLOGY
State of Washington

Comment Form

Columbia River Water Management Program June 2008

Comment for Lake Roosevelt Supplemental Releases SEIS

31-1 Leave our Water alone!
Our present water rights should NOT be effected.

Our resources are being stolen from us.

Name: Don Haecher Phone: 684-4058 Email
Address: 883 Brown Rd
Colville, Wa
June Haecher

5C

Comment Letter No. 31 – Don and June Hoecher

31-1. Your comment in opposition to the project is noted.

Comment Letter No. 32

DEPARTMENT OF ECOLOGY
State of Washington

Comment Form

Columbia River Water Management Program **June 2008**

Comment for Lake Roosevelt Supplemental Releases SEIS

32-1 Make sure in this process of drawing down Columbia River water, that our water needs upshere in the Northern Counties of Wa, are taken care of so we're not left without.

Several years back we had lots of water (snow pack) enough of that floods down the Colville valley area, but even with lots more rain fall etc this spring there has been no extra water running down our valley floors

Name: Laura Johnson Phone: 509-684-3893 Email
Address: 539 Orin Rice Rd
Colville, Wa

Comment Letter No. 32 – Lorna Johnson

32-1. Comment noted.

Comment Letter No. 33

DEPARTMENT OF ECOLOGY
State of Washington

Comment Form

Columbia River Water Management Program June 2008

Comment for Lake Roosevelt Supplemental Releases SEIS

33-1 Lake Roosevelt is the drainage for a large share of the Pacific Northwest therefore control of that lake creates the ability to demand control of all sources of water flowing into it. That would include residential water. It may be that the individuals in the large cities from Tonasket more water than all rural areas. If you and everyone else City resident takes a shower in morning and night where does that water discharge to? Rural use goes immediately back into the aquifer either through their or government approved septic systems. Private systems are created, paid for and maintained by the individual giving them the right to their water without further regulation.

33-2 Take meeting to-day was designed to educate the public with no public input at the meeting!

Name: H. Butler Stephenson Phone: (509) 684-4072 Email N/A.
Address: 677 Hallett Creek Road
Colville, WA 99114

Comment Letter No. 33 – Stephenson (indecipherable first name)

33-1. Your comments about water quality are noted.
33-2. See the responses to Comment Numbers 22-3 and 29-1 regarding the public meetings.

Comment Form

Columbia River Water Management Program **June 2008**

Comment for Lake Roosevelt Supplemental Releases SEIS

34-1

A moratorium on increased use of the river water be called in the Northwest and conservation methods should be instituted.

Development of wetlands should be prohibited and wetlandowners fairly compensated.

Restoration of creek sides of creeks feeding the Columbia should be done by a modern day civilian corp of young people who need hard work in the outdoors.

Hawk Creek should not be used as a storage option

Salmon migration should be top priority in water use decisions.

Mail To:

Derek Sandison
Department of Ecology
15 West Yakima Ave. Suite 200
Yakima, WA 98902-3452

Before June 30, 2008

Comment Letter No. 34 – Unsigned comment form

34-1. Comment noted.

Comment Letter No. 35

DEPARTMENT OF ECOLOGY
State of Washington

Comment Form

Columbia River Water Management Program June 2008

Comment for Lake Roosevelt Supplemental Releases SEIS

35-1 USING INFORMATION ABOUT THIS TYPE OF ACTIVITY FROM DIFFERENT RIVERS THROUGHOUT THE USA, I WOULD HAVE TO SAY THAT SENDING OUR COLUMBIA RIVER WATER ELSEWHERE FOR USAGE IS ABSOLUTELY COUNTER-PRODUCTIVE.

POSING THE ISSUE OF POSSIBLY HAVING "TOO MUCH USAGE" IN THE HEAD WATER AREA, WHILE SIMULTANEOUSLY STATING WE NEED TO DIRECT MORE WATER TO ODESSA IS LIKE SAYING; "THE PEOPLE ARE STARVING, SO LET'S TAKE EVEN MORE OF THEIR FOOD SUPPLY AND GIVE IT TO SOMEBODY ELSE!"

THE PLATTE RIVER IN WYOMING DID THIS, AND NOW ALL THE WYOMING FARMERS HAVE NO WATER. THE IDEA OF PROVIDING ALOT OF WATER TO ANOTHER REGION THAT DOESN'T TYPICALLY HAVE THAT IS NOT NATURAL. WHAT IS NATURAL, IS THAT HEAD WATER AREAS TEND TO PROVIDE ITS AREA WITH SUFFICIENT WATER AND IT SHOULD STAY THAT WAY.

Name: René Holaday Phone: 509-935-8375 E-mail mromantica@earthlink.net
Address:

Comment Letter No. 35 – Rene Holaday

35-1. Comment noted.

United States Department of the Interior
NATIONAL PARK SERVICE
LAKE ROOSEVELT NATIONAL RECREATION AREA
1008 CREST DRIVE
COULEE DAM, WA 99116-1259

IN REPLY REFER TO:
L76

RECEIVED
JUL 10 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

June 26, 2008

Derek I. Sandison, Regional Director
Central Regional Office
Washington State Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, Washington 98902

Dear Mr. Sandison:

The National Park Service (NPS) at Lake Roosevelt National Recreation Area (LRNRA) would like to thank you for the opportunity to comment on the *Lake Roosevelt Incremental Storage Release Project Draft Supplemental EIS* (SEIS) 2008.

36-1 The NPS is pleased that Ecology has incorporated many of our earlier recommendations into this document. For example, acknowledging NPS management authority for approximately 60% of the Upper Columbia River and its tributary watersheds contained within Lake Roosevelt. In addition, throughout the document, Ecology has evaluated the impacts to recreational opportunities from the additional release of water from Lake Roosevelt during a critical recreational period.

While the Draft SEIS provides good information about the key environmental issues, there are some topic areas that are of particular concern to the NPS.

Impacts to Recreational Facilities:

36-2 The NPS will continue to work with Ecology to determine the specific impacts the additional release will have on recreational facilities and identify potential mitigations to resolve these impacts.

Inadequate assessment of effects on Cultural Resources:

36-3 The NPS has identified 89 archeological/historic sites located within the boundaries of the National Recreation Area that will be exposed as a result of the additional release. The NPS will make available at a later date more detailed mitigation measures to protect valuable resources.

Again, we would like to thank you for the opportunity to comment on the Supplemental EIS and we look forward to working with you in the future. Please contact me if you have any questions.

Comment Letter No. 36

Sincerely,

Ray Dasheil

for Debbie Bird
Superintendent

cc:
Bureau of Reclamation
Bureau of Indian Affairs
Colville Confederated tribes
Spokane Tribe of Indians

Comments on *Lake Roosevelt Incremental Storage Release Project Draft Supplemental EIS* 2008.
Prepared by: Jerald Weaver

General Comments:
In September 27, 2007 DOE committed to working with NPS to evaluate impacts to park resources. Impacts to recreation including launch facilities, swim beaches, docks, and exposure of cultural resources were discussed. In particular:

36-4
- Potential impacts to recreation from an 18 inch drawdown
  - Dewatering of boat ramps
  - Impacts to swim beaches and swim areas
  - Impacts to dock facilities
  - Impacts to log-booms
- Potential exposure of an additional 400 acres during high visitor-use season
- Exposure of sensitive cultural resource sites

DOE has evaluated the potential impacts of incremental storage release project in the current *Lake Roosevelt Incremental Storage Release Project Draft Supplemental EIS* 2008.

Specific Comments:

4.2.1.8 Cultural Resources

Mitigation
The State of Washington has entered into agreements with the CCT and the STI to mitigate effects of the storage releases including effects to cultural resources (Washington State and CCT, 2007; Washington State and STI, 2008). These agreements
36-5 provide for full mitigation of potential effects to cultural resources within each tribe's Lake Roosevelt management area therefore no additional mitigation measures are proposed.

An additional 89 sites are located on National Park Service managed lands. Personnel are needed to mitigation potential negative effects to cultural resources on the land outside of tribal jurisdiction.

3.10.1.2 Public Health and Safety, Sanitation,
"….restroom facilities are sparse due to cuts in funding and decreased manpower to
36-6 maintain facilities." NPS has provided restroom facilities based current management zone. Funding and manpower are a small factor. Currently the NPS is educating recreation users on outdoor ethics (Leave No Trace).

36-7 **Chapter 1, Paragraph 3.11.1.2** – The NPS manages 3 (not 4) concessionaire operated marinas at Kettle Falls, Keller Ferry and Seven Bays (none at Crescent Bay)

Table 3-3 Developed Recreation Area on Lake Roosevelt. – Minimum launch elevation for the Lincoln Mill boat launch is 1245 feet.

36-8
The Two Rivers launch ramp is operated by the Spokane Tribe of Indians, not NPS.
Porcupine Bay does not have a marina
Kettle Falls does have a marina

Seven Bays:

The additional drawdown of water in August will adversely effect the operation of three docks at Seven Bays.

"A Dock" and "G Dock" are our most shallow water locations. "A Dock" contains all of our transient or temporary short term moorage and holds twelve (12) slips. Transient moorage is $20/day for potential lost revenue of $7,440 during the month.

36-9 "G Dock" contains eight (8) 26 foot slips and four (4) slips, all of which are rented to seasonal customers. The loss of the revenue for these slips would be $2625 for the month of August.

More significantly, the space between our houseboat dock and the south shoreline already becomes quite tight to operate these boats by mid-August. Lowering the lake one-foot may not seem like a big deal until you witness now greatly it shrinks that arm of the marina inlet. Further reduction of our operations to the launch ramp which is operationally is very undesirable both to us and the visitors.

It is difficult to forecast the negative impact on our marina store and restaurant due to the lost traffic from visitors/customers who would no longer be able to use the parts of the marina that have become non-functional.

Comment Letter No. 36 – National Park Service – Debbie Bird

36-1. Comment noted.
36-2. Comment noted. Ecology will continue to work with NPS to identify specific impacts to recreational facilities and appropriate mitigation for those impacts.
36-3. Ecology will work with NPS to identify appropriate mitigation measures for impacts to archaeological/historic sites.
36-4. Comment noted.
36-5. Language has been added to Section 4.2.1.8 regarding cultural resources on NPS managed lands.
36-6. Section 3.10.1.2 of the Final Supplemental EIS has been revised to reflect your correction.
36-7. The number and location of concessionaire-operated marinas has been corrected in Section 3.11.1.2 of the Final Supplemental EIS.
36-8. Table 3-3 has been revised in the Final Supplemental EIS to reflect these changes.
36-9. Comments noted. See the response to Comment Letter No. 22 from Seven Bays Marina.

EAST COLUMBIA BASIN IRRIGATION DISTRICT

55 North 8th
P.O. Box E

OTHELLO, WASHINGTON 99344

Phone 509 488 9671
Fax 509 488 6433

July 16, 2008

RECEIVED
JUL 17 2008
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

Mr. Derek I. Sandison
Washington State Department of Ecology
12 West Yakima Avenue, Suite 200
Yakima, WA 98902-3452

RE: Washington State Department of Ecology (Ecology). Draft Supplemental Environmental Impact Statement (EIS), Lake Roosevelt Incremental Storage Releases Program, Washington

Dear Mr. Sandison:

Thank you for the opportunity to review the subject document. We apologize for the delay in submitting our comments, but hope you will consider them in preparing the final EIS.

We are supportive of the effort to utilize a portion of the water stored behind Grand Coulee Dam and will continue to work with the State on the Columbia River Management Program.

37-1 In addition, we would like you to recognize our continued support to make 30,000 acre-feet of water available to the Odessa Subarea as stated in the Memorandum of Understanding concerning the State of Washington's Columbia River Initiative, December 2004 (MOU). The potential storage releases, which are analyzed in the draft EIS, were addressed in that MOU. Since entering into the MOU, we have conducted an additional assessment of the proposed storage release for the Odessa Subarea. Depending upon where the water may be needed or most beneficially used to assist the Odessa it would be helpful if additional flexibility were available to address delivery options.

Based on earlier assumptions and analysis we thought that existing infrastructure could be used to deliver the 30,000 acre-feet. However, to deliver any of the water south of I-90, where many of the Odessa groundwater users are located and some of the greatest declines in well water levels have occurred, some minor modifications of the East Low Canal would be necessary. A recent application process for water service contracts in February 2006 indicates a high demand for Project water to the Odessa Subarea south of I-90. Addressing this demand for groundwater replacement would involve connecting the second barrel of the Weber Siphon,
37-2 currently in place under I-90 to the East Low Canal at both ends. Completion of the Weber Siphon complex, without any enlargement of the East Low Canal, would allow another 75-150 cfs of water to be delivered south of I-90. 50% to 80% of that additional capacity would be available for groundwater replacement in the Odessa Subarea where the East Low Canal now operates at peak capacity during mid-summer.

Capacity constraints of the East Low Canal below I-90 require routine interruption of deliveries to agricultural, municipal and industrial water service contracts, making additional deliveries for ground water replacement highly interruptible. Without the ability to deliver south

of the Weber Siphon all 30,000 acre-feet would need to be delivered north of I-90, which would cause significant problems with our management of the East Low Canal. When considering that a large majority of previous water service contracts issued by the District have been above I-90 and result in a large inflow of water during a power failure, additional return flow contracts above I-90 would exacerbate the existing problems in the canal above Weber siphon and place the East Low Canal in jeopardy. Also, as a result of the issuance of these previous contracts, much of the land reasonably available for service from the ELC has been issued a water service
37-2 contract. Larger pumping facilities will be needed to serve lands beyond the 3-mile radius currently served by contracts north of I-90. A significant amount of land lying adjacent to the East Low Canal south of I-90 is eligible for groundwater replacement. Our Board believes that a distribution of the acreage available from the 30KAF above and below the "bottleneck" at the Weber siphons will be more beneficial to the Odessa Subarea Ground Water decline, provide more East Low Canal security and follow the demand requests. Without the ability to deliver at least some of the 30,000 acre-feet south of I-90 the benefits from the proposal would not be maximized.

If you have any questions regarding our comments, please give me a call.

Sincerely,

Craig N. Simpson
Secretary-Manager

CNS:ll

cc: Richard Lemargie
Directors
Bill Gray, USBR

Comment Letter No. 37 – East Columbia Basin Irrigation District – Craig Simpson

37-1. Comment noted.
37-2. Information has been added to the Final Supplemental EIS to include possible construction of the second barrel of the Weber Siphon on the East Low Canal and other improvements to the canal.

CHAPTER 6.0 REFERENCES

3 Treaty Tribes-Action Agency Agreement. 2008. *Memorandum of Agreement Among The Umatilla, Warm Springs and Yakama Tribes, Bonneville Power Administration, U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation.* April 4, 2008. Available: http://www.salmonrecovery.gov/biological_opinions/FCRPS/2007_biop/docs/3tribesMOA.pdf.

Avista Utilities (Avista). 2008. Available: http://www.avistautilities.com/services/energypricing/rates/Documents/Wa_E_2Calc_Res_bills_01-16-08.pdf. Accessed March 19, 2008.

Baldwin, C.M and M.C. Polacek. 2002. *Evaluation of Limiting Factors for Stocked Kokanee and Rainbow Trout in Lake Roosevelt, Washington, 1999.* Report by the Washington Department of Fish and Wildlife, Inland Fish Investigations, Spokane, WA as a subcontract of the Lake Roosevelt Fisheries Evaluation Program, chaired by the Spokane Tribe of Indians, Welpinit, WA. Prepared for: U.S. Department of Energy Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR. BPA Contract Number 94BI32148, March 2002.

Baldwin, C.M., J.G. McLellan, M.C. Polacek, and K. Underwood. 2003. Walleye predation on hatchery releases of kokanees and rainbow trout in Lake Roosevelt, Washington. *North American Journal of Fisheries Management* 23:660-676.

Baldwin, C., M. Polacek, and H. Woeller. 2003. *Banks Lake Fishery Evaluation Project Annual Report: Fiscal Year 2001 (September 1, 2001 – August 31, 2002).* Washington Department of Fish and Wildlife technical report to the U.S. DOE/Bonneville Power Administration, Portland, OR. DOE/BP-00005860-1.

Barber, M.R. 1988. *Predicting the Effect of Reduced Stream Flow on Rainbow Trout, Brown Trout, and Sculpin Populations in Chamokane Creek Using the Instream Flow Incremental Methodology (IFIM).* M.S. Thesis. Department of Biology, Eastern Washington University.

Beak Consultants Incorporated. 1980. *Technical Report 10, Aquatic Biota.* Prepared for the Mount Tolman Project No. 02694. Colville Confederated Tribes, Fish and Wildlife Department.

Beckman, L. G., J. F. Novotny, W. R. Parsons, and T. T. Tarrell. 1985. *Assessment of the Fisheries and Limnology in Lake F.D. Roosevelt 1980-1983.* U.S. Fish and Wildlife Service, Final Report to U.S. Bureau of Reclamation. Contract No. WPRS-0-07-10-X0216; FWS-14-06-009-904, Boise, ID.

Besser, J.M., Brumbaugh, W.G., Ivey, C.D., Ingersoll, C.G., and Moran, P.W. 2007. Biological and Chemical Characterization of Metal Bioavailability in Sediments

from Lake Roosevelt, Columbia River, Washington, USA. Archives of Environmental Contamination and Toxicology: 54(4).

BioSonics. 2000. *Fixed-location Hydroacoustic Evaluation of Resident Fish Entrainment at Grand Coulee Dam 1999.* Draft Report prepared by BioSonics, Inc. for the Colville Confederated Tribes, Nespelem, WA.

Black, A.R., G.W. Barlow and A.T. Scholz. 2003. Carbon and nitrogen stable isotope assessment of the Lake Roosevelt aquatic food web. *Northwest Science* 77(1): 1-11.

Bonneville Power Administration (BPA). 2007a. *2007 Pacific Northwest Loads and Resources Study: Operating Years 2008 through 2017: The White Book Bonneville Power Administration.* Available: http://www.bpa.gov/power/pgp/whitebook/2007/Summary_Document_2007_White_Book.pdf. March.

Bonneville Power Administration (BPA). 2007b. *Surplus Power Sales Transaction Quarterly Reports: Calendar Year 2007.* Available: http://www.bpa.gov/corporate/finance/surp_power_sales/.

Bonneville Power Administration, U.S. Bureau of Reclamation, and U.S. Army Corps of Engineers. 2004. *The Columbia River System Inside Story.* Originally posted June 13, 2001. Updated and reposted on December 1, 2004. Second Edition, April 2001, DOE/BP-3372.

Bortleson, G.C., Cox, S.E., Munn, M.D., Schumacker, R.J., Block, E.K., Lucy, and Cornelius, S.B. 1994. Sediment-quality Assessment of Franklin D. Roosevelt Lake and Upstream Reach of the Columbia River, Washington, 1992. U.S. Geological Survey Open-File Report 94-315.

Bortleson, G.C., Cox, S.E., Munn, M.D., Shumaker, R.J., and Block, E.K. 2001. Sediment-quality Assessment of Franklin D. Roosevelt Lake and Upstream Reach of the Columbia River, Washington, 1992: U.S. Geological Survey Water-Supply Paper 2496.

Bradley, C.E. and D.G. Smith. 1986. Plains cottonwood recruitment and survival on a prairie meandering river floodplain, Milk River, Southern Alberta and Northern Montana. *Canadian Journal of Botany* Vol. 64, No. 7.

Brannon, E., and A. Setter. 1992. *Movements of White Sturgeon in Lake Roosevelt. Final Report 1988-1991.* BPA Project No. 89-44, Contract No. DE-BI79-89BP97298.

Burt, O.R., and D. Brewer. 1971. Estimation of net social benefits from outdoor recreation. *Econometrica* 39 (5): 813-827.

Callahan, B., Miles, E., and Fluharty, D. 1999. Policy implications of climate forecasts for water resources management in the Pacific Northwest. *Policy Sciences* 32, 269.

Cameron, T.A., W.D. Shaw, S.E. Ragland, J.M. Callaway, and S. Keefe. 1996. Using actual and contingent behavior data with differing levels of time aggregation to model recreation demand. *Journal of Agricultural and Resource Economics* 21 (1): 130-149.

CH2M Hill. 2006. *Draft Final Phase I Sediment Sampling Data Evaluation, Upper Columbia River Site, CERCLA RI/FS.* Region 10 USEPA.

CH2M Hill. 2007. *Final Phase I Fish Tissue Sampling Data Evaluation, Upper Columbia River Site, CERCLA RI/FS.* Region 10 USEPA.

Chelan Public Utility District (PUD). 2008. Available: http://www.chelanpud.org. Accessed April 4, 2008.

Cichosz, T.A., J.P. Shields, and K.D. Underwood. 1999. *Lake Roosevelt Monitoring/Data Collection Program. 1997 Annual Report.* Prepared for Bonneville Power Administration. Portland, OR.

Cichosz, T. A., J. P. Shields, K. D. Underwood, A. Scholz, and M. B. Tilson. 1997. *Lake Roosevelt Fisheries and Limnological Research, Annual Report 1996.* Project Number 94-043, Contract Number 94BI32148.

Cichosz, T.A., J.P. Shields, K.D. Underwood, M.B. Tilson, and A.T. Scholz. 1998. *Lake Roosevelt Fisheries and Limnological Research, 1996 Annual Report.* Prepared for Bonneville Power Administration. Portland, OR. Project No. 94-043.

Climate Change Technical Subcommittee (CCTS): Regional Water Supply Planning Process. 2006. *Climate Change Building Blocks*. Available: http://www.sdfoundation.org/communityimpact/pdf/ClimateBuildingBlocks_WA_Oct06.pdf. Accessed March 2008.

Columbia River DART. 2007. Data Access in Real Time. Available: http://www.cbr.washington.edu/dart/dart.html.

Columbia River Inter-Tribal Fish Commission. 1994. *A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin.* Technical Report 94-3. October. Portland, OR.

Combs, M. 2001. *Sherman Creek Hatchery Annual Report; January 1, 2000 - December 31, 2000.* Washington Department of Fish and Wildlife Fish Program. Submitted to Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR. Annual Report Number FPA01-06.

Combs, M. 2002. *Sherman Creek Hatchery Annual Report; January 1, 2001 - December 31, 2001.* Washington Department of Fish and Wildlife Fish Program. Submitted to Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR. Annual Report Number FPA02-03.

Combs, M. 2003. *Sherman Creek Hatchery Annual Report; January 1, 2002 - December 31, 2002.* Washington Department of Fish and Wildlife Fish Program. Submitted to Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR. Project # 91-047-00.

Combs, M. and J. Lovrak. 2004. *2003 Sherman Creek Hatchery Annual Report.* Washington Department of Fish and Wildlife Fish Program report.

Cominco. 1991. Slag Disposal Options, Environmental and Engineering Studies, Trail Operations, Cominco Metals Environmental Management Program.

Confederated Tribes of the Colville Reservation (CCT). 2000. *Colville Indian Reservation Integrated Resource Management Plan 2000 - 2014 FEIS.* Nespelem, WA.

Confederated Tribes of the Colville Reservation (CCT). 2004. Teck Cominco Metals Ltd. Trail Facility: Massive Pollution, Gross Non-compliance and Government Lack of Enforcement, Briefing Document, February 20, 2004.

Confederated Tribes of the Colville Reservation (CCT). 2006. *Fish and Wildlife Resource Management Plan and Five Year Implementation Schedule, 2007-2011.* Fish and Wildlife Department, Nespelem, WA.

Confederated Tribes of the Colville Reservation, Bonneville Power Administration, U.S. Army Corps of Engineers, and the U.S. Bureau of Reclamation (CCT and Action Agencies). 2008. *Draft Memorandum of Agreement between the Confederated Tribes of the Colville Reservation, the Bonneville Power Administration, the U.S. Army Corps of Engineers, and the U.S. Bureau of Reclamation.* March 25, 2008. Available: http://www.salmonrecovery.gov/biological_opinions/FCRPS/2—7_biop/docs/CCTMOA.pdf.

Contaminated Sediments Technical Advisory Group (CSTAG). 2007. *CSTAG Recommendations for the Upper Columbia River Site.* May, 2007..

Cook, K. 1996. *A Report on Nitrate Concentration of Ground Water in the Mid-Columbia Basin.* Washington State Department of Ecology Report 96-017.

Cooke, G. D. 1980. Lake level drawdown as a macrophyte control technique. *Water Resources Bulletin* 16:317-322.

Cooke, G. D., E. B. Welch, S. A. Paterson, and P. R. Newroth. 1986. *Lake and Reservoir Restoration.* Butterworth Publishers, Stoneham, MA.

Cordell. H.K., and J.C. Bergstrom. 1993. Comparison of recreation use values among alternative reservoir water level management scenarios. *Water Resources Research* 29 (2): 247-258.

Cox, S.E., Bell, P.R., Lowther, J.S., VanMetre, P.C. 2005. Vertical Distribution of Trace Element Concentrations and Occurrence of Metallurgical Slag Particles Accumulated Bed Sediments of Lake Roosevelt, Washington. September 2002. U.S. Geological Survey Scientific Investigations Report 2004-5090.

Dashiell, Ray. 2008. Facilities Manager. Lake Roosevelt National Recreation Area. Telephone conversation regarding recreation facilities, March 21, 2008.

DeVore, J.D., B.W. James, D.R. Gilliland, and B.J. Cady. 2000. Draft Report B. In D.W. Ward, ed., *White Sturgeon Mitigation and Restoration in the Columbia and Snake Rivers Upstream from Bonneville Dam.* Annual Progress Report. Bonneville Power Administration, Contract DE-AI79-86BP63584. Portland, OR.

Douglas Public Utility District (PUD). 2008. Available: http://relicensing.douglaspud.org/default.htm. Accessed April 4, 2008.

Duff, R. L. 1973. *1971-1972 Banks Lake Creel Census.* Unpublished data. Washington Department of Game, Region 2, Olympia, WA.

Duff, R.L. 1974. *A Year's Survey of the Lake Moses Fishery.* Washington Department of Game. Olympia, WA.

Earnest, D.E., M.E. Spence, R.W. Kiser and W.D. Brunson. 1966. *A Survey of the Fish Populations, Zooplankton, Bottom Fauna, and Some Physical Characteristics of Roosevelt Lake.* Rep. to Washington Department of Game.

Erwin, M.L. and M.D. Munn. *1997. USGS Fact Sheet FS-102-97: Are Walleye from Lake Roosevelt Contaminated with Mercury?* USGS Water Resources Division. Tacoma, WA. Available: http://wa.water.usgs.gov/pubs/fs/fs.102-97/. Accessed March 24, 2008.

EVS Environmental Consultants, Inc. 1998. *Assessment of Dioxins, Furans and PCBs in Fish Tissue from Lake Roosevelt, Washington, 1994.* EPA.

Federal Columbia River Power System. 2001. *The Columbia River System Inside Story*. Second Edition. Prepared by Bonneville Power Administration, U.S. Army Corps of Engineers, and the U.S. Bureau of Reclamation.

Federal Energy Regulatory Commission (FERC). 2006. *Final Environmental Impact Statement. Rocky Reach Hydroelectric Project.* Washington. FERC Project No. 2145-060.

Fields, K., B. Scofield, C. Lee, and D. Pavlik. 2002. *Lake Roosevelt Fisheries Evaluation Program; Limnological and Fisheries Monitoring, 2002 Annual Report.* Project No. 199404300. BPA Report DOE/BP-00005756-5.

Fletcher, D.S. 1997. Department of Fish and Wildlife correspondence. Washington Department of Fish and Wildlife Fisheries Management Files. Region 2, Ephrata, WA.

Fredrickson, L.H. and T.S. Taylor. 1982. *Management of Seasonally Flooded Impoundments for Wildlife.* USFWS Resource Publication 148.

Golder Associates Ltd. 2007. *Upper Columbia River Juvenile White Sturgeon Monitoring: Phase 4 Investigations, 2005 - 2006.* Report prepared for BC Hydro, Burnaby, B.C. March.

Goldman, C. and A. Horne. 1994. *Limnology.* 2nd Edition.

Grant County Public Utility District (Grant PUD). 2008. Grant County PUD Resources – Hydropower. Available at: http://www.gcpud.org/resources/resEnergy/hydropower.htm. Accessed April 4, 2008.

Graves, Ritchie (NOAA Fisheries). November 14, 2007. *Draft 2007 FCRPS Biological Opinion and Grand Coulee Operations.* Presented at Lake Roosevelt Forum 2007 Conference, November 14-16, 2007. Available: http://www.lrf.org/conf/presentations/D1D.html.

Griffin, S.W. and Potter, E.F. 1936. Undissolved Mineral Water, Natural and Extraneous, in the Columbia River in Northern Stevens County, Washington: Slag Pollution. Northport, WA: Bureau of Chemistry and Soils, USDA.

Griffith, J.R. and A.T. Scholz. 1991. *Lake Roosevelt Fisheries Monitoring Program. Annual Report 1990.* Prepared by Upper Columbia United Tribes Fisheries Research Center for Bonneville Power Administration. Portland, OR.

Groves, K.E. 1951. *Fishes of Moses Lake, Washington.* Walla Walla College Department of Biological Science. College Place, WA.

Haller, Dan. Washington State Department of Ecology. 2008. Personal communication with Mary McCrea of Cascadia Law Group, March 12, 2008.

Hamlet, A.F., and Lettenmaier, D.P., 1999. Effects of climate change on hydrology and water resources in the Columbia River Basin. *Journal of the American Water Resources Association* 35(6) 1597-1623.

Hamlet, A.F., P.W. Mote, M.P. Clark, and C.P. Lettenmaier. 2007. 20th century trends in runoff, evaporation, and soil moisture in the western U.S. *Journal of Climate* 20(8): 1468-1486.

Hansen, P.J. 1987. Grand Coulee Dam. In R.W. Galster, *Engineering Geology in Washington.* Volume 1: Washington Division of Geology and Earth Resources Bulletin 78, pp. 418-430.

Hanson, T.R., L.U. Hatch, and H.C. Clonts. 2002. Reservoir water level impacts on recreation, property, and nonuser values. *Journal of the American Water Resources Association* 38 (4): 1007-1018.

Harper, R.J., K.M. McMaster, and L.G. Beckman. 1981. *Assessment of Fish Stocks in Lake F.D. Roosevelt.* Annual Report to the U.S. Bureau of Reclamation. U.S. Fish and Wildlife Service, National Fishery Research Center, Seattle, WA. Internal report.

Harris, R. 1998. Personal communication, Jonathan M. Beck, of Dames and Moore, with Randy Harris, Geologist, USDI Bureau of Recreation, Grand Coulee Office. August 13, 1998.

Hess, A.D. and C.C. Kiker. 1943. Water level management for malaria control on impounded waters. *Journal of the National Malaria Society* 3:181-196.

Howell, M.D. and J.G. McLellan. 2005. *Lake Roosevelt White Sturgeon Recovery Project Annual Progress Report, January 2003 – March 2004.* Prepared for U.S. Department of Energy, Bonneville Power Administration, Portland, OR.

Howell, M.D. and J.G. McLellan. 2006. *Lake Roosevelt White Sturgeon Recovery Project, Annual Progress Report, January 2004 - March 2005.* Report prepared for the U.S. Department of Energy, Bonneville Power Administration, Environment, Fish and Wildlife. Project Number 1995-027-00.

Howell, M.D. and J.G. McLellan. 2007. *Lake Roosevelt White Sturgeon Recovery Project, Annual Progress Report, April 2005 - March 2006.* Draft Report prepared for the U.S. Department of Energy, Bonneville Power Administration, Environment, Fish and Wildlife. Project Number 1995-027-00.

IPCC. 2001. *Summary for Policymakers. Climate Change 2001: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change J. J. McCarthy, O. F. Canziani, N. A. Leary, D. J. Dokken, and K. S. White (eds.) Cambridge University Press, Cambridge, United Kingdom and New York, NY.

Ives, R. 2007. *An Archaeological and Historical High Level Class 1 Inventory of the Bureau of Reclamation's Odessa Subarea Special Study, Columbia Basin Project, Adams, Franklin, Grant, and Lincoln Counties, Washington.* Short Report 918. Prepared for Bureau of Reclamation, Upper Columbia Area Office by Archaeological and Historical Services, Eastern Washington University.

Johnson, A., D. Norton, and B. Yake. 1988. *An Assessment of Metals Contamination in Lake Roosevelt, Department of Ecology Waterbody No. WA-CR-9010.*

Jones, F.O., D.R. Embody, and W.L. Peterson. 1961. *Landslides along the Columbia River Valley, Northeastern Washington.* U.S. Geological Survey Professional Paper 367.

Kassler, T.W. and J. Loxterman. 2006. *Mixture Analysis of Lake Roosevelt Kokanee Fisheries and Genetic Characterization of Lake Roosevelt Kokanee Populations.* Draft Report. Washington Department of Fish and Wildlife, Olympia, WA.

Kieffer, Keith. 2008. Park Ranger. Spokane Tribe of Indians. Telephone conversation regarding recreation facilities, March 27, 2008.

Klock, G.O. 2001. *Colville Indian Reservation Record of Decision and Plan for Integrated Resources Management 2000 – 2014.* Colville Confederated Tribes, Nespelem, WA.

Knetsch, J. 1964. The influence of reservoir projects on land values. *Journal of Farm Economics* 46: 520-538.

KWA Ecological Sciences, Inc. 2004. *Crab Creek Subbasin Plan.* Washington Department of Fish and Wildlife. Olympia, WA.

Lake Roosevelt Fisheries Evaluation Program (LRFEP). 1999. *Annual Report for 1999.*

Lake Roosevelt Forum (LRF). 2004. Spring 2004 Newsletter. Available: www.lrf.org. Accessed March 18, 2008.

Lake Roosevelt Forum (LRF). 2006a. Winter 2006 Newsletter. Available: www.lrf.org. Accessed March 18, 2008.

Lake Roosevelt Forum (LRF). 2006b. Spring 2006 Newsletter. Available: www.lrf.org. Accessed March 18, 2008.

Lake Roosevelt Forum (LRF). 2008a. *About Lake Roosevelt, Operations*. Available: www.lrf.org. Accessed May 8, 2008.

Lake Roosevelt Forum (LRF). 2008b. *Lake Roosevelt Fisheries History, Management, Angling.* Available: www.lrf.org. Accessed March 18, 2008.

Lansford, N.H. and L.L. Jones. 1995. Recreational and aesthetic value of water using hedonic price analysis. *Journal of Agricultural and Resource Economics* 20(2): 341-355.

LeCaire, R. 1999. *Draft Chief Joseph Kokanee Enhancement Project: 1999 Annual Report and Final Report on Entrainment.* Report to U.S. Department of Energy,

Bonneville Power Administration, Division of Fish and Wildlife. Project number: 9501100.

LeCaire, R. 2000. *Lake Rufus Woods Subbasin Summary (including the Nespelem River).* Prepared for the Northwest Power Planning Council by the Confederated Tribes of the Colville Reservation.

LeCaire, R. and J. Peone. 1991. *Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project: Final Report Phase 1.* Report to U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife, Contract No. DE-BI-79-90BP08120. Portland, OR.

Lee, C. 2002. *2002 Two Rivers Trout Derby*. Lake Roosevelt Fisheries Evaluation Program.

Lee, C., D. Pavlik-Kunkel, K. Fields, and B. Scofield. *Lake Roosevelt Fisheries Evaluation Program; Limnological and Fisheries Monitoring, 2004-2005 Annual Report.* Project No. 199404300. BPA Report DOE/BP-00014804-1.

Lee, C., B. Scofield, D. Pavlik and K. Fields. 2003. *Lake Roosevelt Fisheries Evaluation Program. 2000 Annual Report.* U.S. Department of Energy. Bonneville Power Administration.

Lee, C., and K. Underwood. 2002. *Lake Roosevelt White Sturgeon Juvenile Sampling.* Report prepared for B.C. Ministry of Water, Land and Air Protection.

Lewis, M. 2003. *Ford Hatchery Improvement Operation & Maintenance, Statement of Work for November 1, 2003 to September 31, 2004 for the Spokane Complex.* BPA Project No. 2001-029-00 / Contract # 00005850. Washington Department of Fish and Wildlife, Olympia, WA.

Lewis, M., J. Lovrak, M. Polacek, K. Knuttgen and C. Balwin. 2002. *Ford Hatchery Annual Report; August 1, 2001 - July 31, 2002.* Washington Department of Fish and Wildlife Fish Program Hatcheries Division Project No. 21021. Report prepared for U.S. Department of Energy Bonneville Power Administration Division of Fish and Wildlife. Intergovernmental Agreement DE-B179-91BP21191 and 00B124636 November 2002. FPA 02-13.

McLellan, H.J., C. Lee, B. Scofield, and D. Pavlik. 2003. *Lake Roosevelt Fisheries Evaluation Program, 1999 Annual Report.* Prepared by Department of Natural Resources, Spokane Tribe of Indians, Wellpinit, WA, for Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR.

McLellan, J.G., H.J. McLellan, and A.T. Scholz. 2002. *Assessment of the Lake Roosevelt Walleye Population: A Compilation of Data 1997-1999. Annual Report.* Prepared by Eastern Washington University Fisheries Center Spokane Tribe for Bonneville Power Administration, Portland, OR. Project Number 88-63, Contract No. 94BI321486.

McLellan, H.J., J.G. McLellan, A.T. Scholz, and M.B. Tilson. 2001. *Lake Whatcom Kokanee Salmon* (Oncorhynchus nerka kennerlyi) *Investigations in Lake Roosevelt, 1998-2000. 1999 Annual Report.* Prepared by Eastern Washington University Fisheries Center for Bonneville Power Administration, Portland OR. Project Number BP96, Contract No. 96BP192246.

McLellan, H.J., J.G. McLellan, and A.T. Scholz. 2004a. Evaluation of release strategies for hatchery kokanee in Lake Roosevelt. *Northwest Science* 78 (2): 158-167.

McLellan, H.J., A.T. Scholz, and J.G. McLellan. 2004b. *Open Water Release Strategies for Kokanee in Lake Roosevelt, 2003. Annual Report 2003.* Prepared by Eastern Washington University Fisheries Center and Washington Department of Fish and Wildlife for Bonneville Power Administration, Portland, OR.

McLellan, H.J. and A.T. Scholz. 2001. *Meadow Creek vs. Lake Whatcom Kokanee Salmon Investigations in Lake Roosevelt, 2000. Annual Report 2000.* Prepared by Eastern Washington University Fisheries Center for Bonneville Power Administration, Portland, OR. Project Number 00000118-00001, Contract No. 96BP192246.

McLellan, H.J. and A.T. Scholz. 2002a. *Meadow Creek vs. Lake Whatcom Kokanee Salmon Investigations in Lake Roosevelt, 2001. Annual Report 2001.* Prepared by Eastern Washington University Fisheries Center for Bonneville Power Administration, Portland, OR. Project Number 1997-043-00, Contract Number 00005756.

McLellan, H.J. and A.T. Scholz. 2002b. *Movements and Growth of Marked Walleye Recaptured in Lake Roosevelt, 2000-01. Annual Report 2001.* Prepared by Eastern Washington University Fisheries Center for Bonneville Power Administration, Portland, OR. Project Number 00000118-00001, Contract No. 96BP192246.

McLellan, H.J. and A.T. Scholz. 2003. *Meadow Creek vs. Lake Whatcom Kokanee Salmon Investigations in Lake Roosevelt, Final Report.* Prepared by Eastern Washington University Fisheries Center for Bonneville Power Administration, Portland, OR. Project No. 1997-043-00, Contract No. 00005756.

McLellan, H., A. Scholz, C. Lee, and R. LeCaire. 2006. *Lake Roosevelt Fisheries Evaluation Program; Assessment of Hatchery Kokanee in Lake Roosevelt, 2004-2005 Annual Report.* Project No. 199404300, BPA Report DOE/BP-00014804-2.

Mihuc, J. R., C. H. Trost, and T. B. Mihuc. 1997. Shorebird predation on benthic macroinvertebrates in an irrigation reservoir. *Great Basin Naturalist* 57(3):245-252.

Miles, E. L., A.K. Snover, A.F. Hamlet, B. Callahan, and D. Fluharty. 2000. Pacific Northwest regional assessment: The impacts of climate variability and climate

change on the water resources of the Columbia River Basin. *Journal of the American Water Resources Association* 36, 399.

Montgomery Water Group, Inc. (MWG). 2003. *Columbia Basin Project: Water Supply, Use and Efficiency Report.* Prepared for East Columbia Basin Irrigation District, Quincy-Columbia Basin Irrigation District, South Columbia Basin Irrigation District, Grand Coulee Project Hydroelectric Authority, and U.S. Bureau of Reclamation. September.

Mote, P.W. 2003. Twentieth-century fluctuations and trends in temperature, precipitation, and mountain snowpack in the Puget Sound/Georgia Basin region. *Canadian Water Resources Journal* 28, 567–586.

Mote, P. W., E. A. Parson, A. F. Hamlet, K. N. Ideker, W. S. Keeton, D. P. Lettenmaier, N. J. Mantua, E. L. Miles, D. W. Peterson, D. L. Peterson, R. Slaughter, and A. K. Snover. 2003. Preparing for climatic change: The water, salmon, and forests of the Pacific Northwest. *Climatic Change* 61, 45-88.

Mote, P. W., Snover, A. K., L. Whitely Binder, A.F. Hamlet, and N. J. Mantua. 2005. *Uncertain Future: Climate Change and its Effects on Puget Sound-Foundation Document.* A report for the Puget Sound Action Team by the Climate Impacts Group. Center for Science in the Earth System, Joint Institute for the Study of the Atmosphere and Oceans, University of Washington, Seattle.

National Academy of Sciences. 2006. *Surface Temperature Reconstructions for the Last 2,000 Years.* Climate Research Committee, Committee on Surface Temperature Reconstructions for the Last 2,000 Years, Board of Atmospheric Sciences and Climate, Division on Earth and Life Studies, National Research Council.

National Park Service (NPS). 2000. *General Management Plan.* September 2000. U.S. Department of the Interior.

National Park Service (NPS). 2008a. *LARO YTD Report.* Available: http://www.nature.nps.gov/stats/ park.cfm?parkid=559. Accessed March 20, 2008. U.S. Department of the Interior.

National Park Service (NPS). 2008b. *Chart of Recreation Area Services.* Available: http://www.nps.gov/laro/planyourvisit/maps.htm. Accessed March 20, 2008. U.S. Department of the Interior.

National Park Service (NPS). 2008c. *Monthly Public Use Report.* Available: http://www.nature.nps.gov/ stats/park.cfm?parkid=559. Accessed March 20, 2008. U.S. Department of the Interior.

National Park Service (NPS). 2008d. *Swimming Information "Let's Go Swimming".* Available: http://www.nps.gov/laro/planyourvisit/swimming.htm. Accessed March 20, 2008. U.S. Department of the Interior.

National Resources Council of the National Academies. 2004. *Managing the Columbia River: Instream Flows, Water Withdrawals, and Salmon Survival.* Washington, DC: The National Academies Press.

Nebraska Game and Parks Commission. No date. *Economic Benefits of Using Water for Recreation* (manuscript).

NOAA Fisheries. 2007. *Executive Summary for the Draft FCRPS and Upper Snake River Biological Opinions.* October 30, 2007.

NOAA Fisheries. 2008. *Executive Summary of the FCRPS 2008 Biological Opinion.* May 5, 2008.

Northwest Power Planning Council (NPPC). 1987. *1987 Columbia River Basin Fish and Wildlife Program.*

Office of Governor Christine Gregoire. 2005. October 31, 2005. News Release: *Governor Gregoire Criticizes Columbia River Injunction Proposal*. Olympia, WA. Available: http://www.governor.wa.gov/news/news-view.asp?pressRelease=181&newsType=1 Accessed April 2, 2008.

Office of Governor Christine Gregoire. 2008. February 5, 2008. *Spokane Tribe Joins State, Colville Tribes in Partnership to Boost Water Supplies in Columbia Basin.* Available: http://www.ecy.wa.gov/nes/2008news/gov_200805.html.

O'Laughlin, K. 1988. *An Instream Flow (IFIM) Analysis of Benthic Macroinvertebrates in Chamokane Creek, Spokane Indian Reservation.* M.S. Thesis. Department of Biology, Eastern Washington University.

Osborn, R. P. 2007. *Columbia River Treaty: Past and Possible Futures.* WA-AWRA Section Newsletter, November-December 2007, p.9.

Palmer, Mike. 2008. Parks and Recreation Manager. Colville Confederated Tribes. Telephone conversation regarding recreation facilities and Inchelium-Gifford ferry, March 27, 2008.

Paulson, A.J., Wagner, R.J., Sanzolone, R.F., and Cox, S.E. 2006. Concentrations of Elements in Sediments and Selective Fractions of Sediments, and in Natural Waters in Contact with Sediments from Lake Roosevelt, Washington. September 2004: U.S. Geological Survey Open-File Report 2006-1350.

Pavlik-Kunkel, D., K. Fields, B. Scofield, and C. Lee. 2003. *Lake Roosevelt Fisheries Evaluation Program; Limnological and Fisheries Monitoring. 2003 Annual Report.* Project No. 199404300 (et al.), BPA Report DOE/BP-00005756-6.

Peone, T. 2003. *Spokane Tribal Hatchery, Project No. 1991-04600.* BPA Report DOE/BP-00004731-1.

Peone, T. 2004. *Spokane Tribal Hatchery, 2004 Annual Report.* Submitted to Bonneville Power Administration, Portland, OR. Project No. 91-046-00.

Peone, T. A., T. Scholz, J. R. Griffith, S. Graves, and M. G. Thatcher. 1990. *Lake Roosevelt Fisheries Monitoring Program. Annual Report 1989-1990.* Upper Columbia United Tribes Fisheries Center. Eastern Washington University, Cheney, WA.

Peone, T.L., A.T., Scholz, J.R. Griffith, S. Graves, and M.G. Thatcher. 1991. *Lake Roosevelt Fisheries Monitoring Program. Annual Report 1988-1989.* Prepared by Upper Columbia United Tribes Fisheries Center for Bonneville Power Administration, Portland, OR. DOE/BP-91819-1.

Polacek, M.C., K. Knuttgen, H. Woller, and C. Baldwin. 2002. *Banks Lake Fishery Evaluation Project.* WDFW Draft Annual Report submitted to the U.S. Department of Energy, Bonneville Power Administration. Project Number #2001-028-00.

Polacek, M. and R. Shipley. 2005. *Banks Lake Fishery Evaluation Project.* WDFW Draft Annual Report submitted to the U.S. Department of Energy. Bonneville Power Administration. Project #2001-028-00.

Polacek, M., R. Shipley, R. Black and A. Gabriel. 2003. *Banks Lake Fishery Evaluation Project.* WDFW Draft Annual Report submitted to the U.S. Department of Energy, Bonneville Power Administration. Project #2001-028-00.

Purdue University. 2008. Future snowmelt in West twice as early as expected; threatens ecosystems and water reserves. Science Daily. Retrieved July 16, 2008, from http://www.sciencedaily.com /releases/2008/07/080715155513.htm.

Pynn, L. 2007. Water woes, water wars? *Vancouver Sun*, August 10, 2007. Available: www.canada.com/components/print.aspx?id-ccd57d5e-df19-4981-b7c8-b3eec0bab31d&k-71301.

Rauscher, S. A., J. S. Pal, N. S. Diffenbaugh, and M. Benedetti. In press. Future changes in snowmelt-driven runoff timing over the Western US. Geophysical Research Letters. doi:10.1029/2008GL034424, in press. (accepted 1 July 2008).

Reidel, J.L. 1997. *Lake Roosevelt Natural Recreation Area, Washington; Water Resources Scoping Report.* Technical Report NPS/NRWRD/NRTR-97/107.

R.L. & L. Environmental Services Ltd. 1996. *Columbia River White Sturgeon Investigations. 1995 Study Results.* Report prepared for B.C. Hydro, Kootenay Generation, Vancouver, B.C. and B.C. Ministry of Environment, Lands, and Parks, Nelson Region. R.L.& L. Report No. 96-377F.

Salem-News.com. 2008. *Tribes and Feds Create Unprecedented Agreements Over Columbia River Basin Fish.* April 7, 2008. Available: http://www.salem-news.com/printview.php?id=7999.

Scholz, A., K. O'Laughlin, D. Geist, D. Peone, J. Uehara, L. Fields, T. Kleist, I. Zozaya, T. Peone, and K. Teesatuskie. 1985. *Compilation of Information on Salmon and Steelhead Total Run Size, Catch and Hydropower Related Losses in the Upper Columbia River Basin, above Grand Coulee Dam.* Technical Fisheries Report No. 2. Upper Columbia United Tribes Fisheries Center, Eastern Washington University, Department of Biology, Cheney, WA.

Scholz, A.T., J.K. Uehara, J. Hisata, and J. Marco. 1986. Feasibility report on restoration and enhancement of Lake Roosevelt Fisheries. In: *Northwest Power Planning Council. Applications for Amendments.* Volume 3A: 1375-1489.

Schuster, R.L. 1979. Reservoir-induced landslides. *Bulletin of the International Association of Engineering Geology* No. 20. pp. 8-15.

Scofield, B., C. Lee, D. Pavlik-Kunkel, and K. Fields. 2005. *Lake Roosevelt Fisheries Evaluation Program; Limnological and Fisheries Monitoring, 2005 Annual Report.* Project No. 199404300, BPA Report DOE/BP-00014804-5.

Sears, S. 2005. *Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project, 2004-2005 Annual Report.* Project No. 199001800, BPA Report DOE/BP-00004413-7.

Selby, M.J. 1992. *Earth's Changing Surface.* Clarendon Press, Oxford.

Shannon, D. 2007. *High Level Class I Traditional Cultural Property Inventory for Potholes Supplemental Feed Route and Odessa Subarea Special Study, Columbia Basin, Washington.* Unpublished report prepared for the Bureau of Reclamation by the History/Archaeology Program, Confederated Tribes of the Colville Reservation.

Shields, J.P. and K.D. Underwood. 1996. Measurement of Lake Roosevelt biota in relation to reservoir operations, 1995 Annual Report. In K.D. Underwood and J.P. Shields, *Lake Roosevelt Fisheries and Limnological Research, 1995 Annual Report.* Bonneville Power Administration. Portland, OR. Project No. 88-63.

Shields, J.P. and K.D. Underwood. 1997. Measurement of Lake Roosevelt biota in relation to reservoir operations, 1996 Annual Report. In K.D. Underwood and J.P. Shields, *Lake Roosevelt Fisheries and Limnological Research, 1996 Annual Report.* Bonneville Power Administration. Portland, OR. Project No. 88-63.

Showman, J. 2003. *An Informal History of the Canada-US Columbia River Treaty, for Kyrgz Visitors.* December 10, 2003. Available:

www.wutc.wa.gov/…/$FILE/An%20Informal%20Histroy%20of%20the%20Columbia%20River%20Treaty.doc.

Simmons, M.A., R.L. Johnson, C.A. McKinstry, S.M. Angela, C.S. Simmons, S.L. Thorsten, R. LeCaire, and S. Francis. 2002. *Chief Joseph Kokanee Enhancement Project Strobe Light Deterrent Efficacy Test and Fish Behavior Determination at Grand Coulee Dam Third Powerplant Forebay.* Prepared for the Bonneville Power Administration, U.S. Department of Energy under Contract DE-AC06-76RL01830. January 2002.

Slattery, Ken. 2002. Personal communication, Washington State Department of Ecology, email subject CSRIA Settlement/probability of regulation under existing rule. December 2, 2002.

Smith, C.S. and J.W. Barko. 1990. *Ecology of Eurasian Watermilfoil*. Journal of Aquatic Plant Management. Volume 28: 55-64.

Snover, A. K., P. W. Mote, L. Whitely Binder, A.F. Hamlet, and N. J. Mantua. 2005. *Uncertain Future: Climate Change and its Effects on Puget Sound.* A report for the Puget Sound Action Team by the Climate Impacts Group. Center for Science in the Earth System, Joint Institute for the Study of the Atmosphere and Oceans, University of Washington, Seattle.

Snow, W. E. 1956. *Production and Control of Floodwater Mosquitoes Incidental to Water Level Operations on Reservoirs of the Tennessee Valley Authority.* Proceedings of the Tenth International Congress of Entomology 3: 745-750.

Snyder, G.R. 1967. Unpublished data of fish samplings in Lake Roosevelt. NOAA, National Marine Fisheries Service. Seattle, WA.

Spence, M. 1965. Washington Department of Game Records, Ephrata.

Spotts, J., J. Shields, K. Underwood, and D. Pavlik. 2002. *Lake Roosevelt Fisheries Evaluation Program, Fisheries Creel Survey and Population Status Analysis, 1998 Annual Report.* Submitted to Bonneville Power Administration. Portland, OR. Project No. 88-63.

Sprandel, G.L., R. L. Cailteux, and D. T. Cobb. 2002. Influence of a reservoir drawdown on bird use of Lake Talquin, Florida. *Lake and Reservoir Management* 18(2):164-176.

Steinkampf, W.C. 1989. *Water-quality Characteristics of the Columbia Plateau Regional Aquifer System in Parts of Washington, Oregon, and Idaho.* U.S. Geological Survey, Water-Resources Investigations Report 87-4242.

Stevens County Conservation District. 2000. *Chamokane Creek Watershed Management Plan.*

Stober, Q.J., M.E. Kopache, and T.H. Jagielo. 1981. *The Limnology of Lake Roosevelt.* Final Report Contract No. 14-16-0009-80-0004, to the U.S. Fish and Wildlife Service. National Fisheries Research Center, Seattle WA. Fisheries Research Institute, University of Washington, Seattle, WA. FRI-VW-8 106.

Stober, Q. J., P. B. Roger, W. A. Karp, G. L. Thomas, R. E. Thorne, J. J. Dawson, D. T. Griggs and R. E. Nakatani. 1974. *Preliminary Assessment of the Effects of Grand Coulee Pumped/Storage Development on the Ecology of Banks Lake, Washington.* Annual Progress Report submitted to U.S. Bureau of Reclamation, Contract # 14-06-100-7794.

Stober, Q.J., R.W. Tyler, C.E. Petrosky, T.J. Carlson, C. Gaudet, and R.E. Nakatani. 1977. *Survey of Fisheries Resources in the Forebay of FDR Reservoir, 1967-1977.* Fisheries Research Institute, University of Washington. Final Report to U.S. Bureau of Reclamation, Contract 14-06-100-9001.

Stober, Q. J., R. W. Tyler, C. E. Petrosky, K. R. Johnson, C. F. Cowman, Jr., J. Wilcock, and R. E. Nakatani. 1979. *Development and Evaluation of a Net Barrier to Reduce Entrainment Loss of Kokanee from Banks Lake.* Final Report submitted to U.S. Bureau of Reclamation, Contract No. 7-07-10-S0023.

Stober, Q. J., R. W. Tyler, G. L. Thomas, L. Jensen, J. A. Kuntzen, D. L. Smith and R. E. Nakatani. 1976. *Operational Effects of Irrigation and Pumped/Storage on the Ecology of Banks Lake, Washington.* Third Annual Progress Report submitted to U.S. Bureau of Reclamation, Contract No. 14-06-100-7794.

Supalla, R.J. 2005. *Economics of Management Options for Lake McConaughy: Executive Summary.* University of Nebraska – Lincoln, Department of Agricultural Economics. December 13.

Thatcher, M.G., A. McDowell, J. Griffith, and A.T. Scholz. 1993. *Lake Roosevelt Fisheries Monitoring Program, Annual Report 1992.* Prepared by Spokane Tribe Fish and Wildlife Center for Bonneville Power Administration, Portland, OR. Project No. 88-63, Contract No. DE-8179-88D P91819.

Tilson, M.B. and A.T. Scholz. 1997. Artificial imprinting of juvenile kokanee salmon (*Oncorhynchus nerka*): Implications for operating Lake Roosevelt kokanee salmon hatcheries. 1996 Annual Report. Prepared by Eastern Washington University Fisheries Center. In: T.A. Cichosz, J.P. Shields, K.D. Underwood, A.T. Scholz, and M.B. Tilson, 1997, *Lake Roosevelt Fisheries and Limnological Research, Annual Report 1996*. Prepared by Department of Natural Resources, Spokane Tribe of Indians for Bonneville Power Administration, Portland, OR.

Tilson, M.B. and A.T. Scholz. 1998. *Kokanee* (Oncorhynchus nerka) *Coded Wire Tagging Investigations in Lake Roosevelt, WA. Annual Report 1997.* Prepared by Eastern Washington University Fisheries Center for the Spokane Tribe of Indians

Natural Resource Department for Bonneville Power Administration, Portland, OR.

Tilson, M.B., AT. Scholz and J.L. Miller. 1996. Artificial imprinting and smoltification of juvenile kokanee salmon (*Oncorhynchus nerka*): Implications for operating Lake Roosevelt kokanee salmon hatcheries. Pages 281-340 in K.D. Underwood and J.P. Shields, 1996, *Lake Roosevelt Fisheries and Limnological Research: 1995 Annual Report.* Prepared by Upper Columbia United Tribes Fisheries Research Center for the United Stated Department of Energy, Bonneville Power Administration, Portland, OR. Report number DOE/BP-91819-16.

Tilson, M.B., A.T. Scholz, R.J. White and H. Galloway. 1994. *Thyroid-induced Chemical Imprinting in Early Life Stages and Assessment of Smoltification in Kokanee Salmon Hatcheries. 1993 Annual Report.* Prepared by Upper Columbia United Tribes Fisheries Research Center for Bonneville Power Administration. Portland, OR.

Tilson, M.B., A.T. Scholz, R.J. White and J.L. Hendrickson. 1995. *Artificial Imprinting and Smoltification in Juvenile Kokanee Salmon: Implications for Operating Lake Roosevelt Kokanee Salmon Hatcheries. 1994 Annual Report.* Prepared by Upper Columbia United Tribes Fisheries Research Center for Bonneville Power Administration. Portland, OR.

Truscott, K. 1995. *Draft Colville Tribal Fish Hatchery Production Report.* Internal tribal report. Colville Confederated Tribes Fish and Wildlife Division. Nespelem, WA.

Truscott, K. 2000. *Draft San Poil River Subbbasin Summary.* Prepared for the Northwest Power Planning Council by the Confederated Tribes of the Colville Reservation, November 15, 2000.

Underwood, K.D. 2000. *Draft Lake Roosevelt River Subbbasin Summary.* Prepared for the Northwest Power Planning Council by the Spokane Tribe of Indians, November 15, 2000.

Underwood, K.D. and J.P. Shields. 1996. *Lake Roosevelt Fisheries and Limnological Research, 1995 Annual Report.* U.S. Department of Energy, Bonneville Power Administration. Contract No. DE-8179-88DP91819. Portland, OR.

Underwood, K.D., J.P. Shields and M.B.Tilson. 1997. Lake Roosevelt Fisheries Monitoring Program, 1995 Annual Report. In K.D. Underwood and J.P. Shields, *Lake Roosevelt Fisheries Research, 1995 Annual Report.* Bonneville Power Administration.

U.S. Army Corps of Engineers. 2000. Draft Chief Joseph Dam gas abatement project Draft Environmental Assessment. U.S. Army Corps of Engineers, Seattle District. Seattle, Washington.

U.S. Army Corps of Engineers, Bonneville Power Administration, and U.S. Bureau of Reclamation. 2004. *Federal Columbia River Power System (FCRPS) Brochure.* Updated and reposted on January 9, 2004. Originally printed July 2002. Updated and reprinted August 2003.

U.S. Bureau of Reclamation (Reclamation). 2000. *Review of Past Studies and Data Related to Temperature Management Options for Columbia River below Grand Coulee Dam, Washington.* Prepared by Tracy B. Vermeyen, Water Resources Services, Denver, CO. March 2000.

U. S. Bureau of Reclamation (Reclamation). 2004. *Banks Lake Drawdown Final Environmental Impact Statement.* Pacific Northwest Region, Ephrata, WA.

U.S. Bureau of Reclamation (Reclamation), Pacific Northwest Region. 2007. *Potholes Reservoir Supplemental Feed Route Environmental Assessment and Finding of No Significant Impact.* August 2007.

U.S. Bureau of Reclamation (Reclamation). 2008a. Hydromet data. Available online http://www.usbr.gov/pn/hydromet/arcread.html. Accessed February 25, 2008, March 31, 2008 and July 21, 2008.

U.S. Bureau of Reclamation (Reclamation). 2008b. *Public Comment Summary, Appraisal-level Investigations, Odessa Subarea Special Study.* File report prepared April 1, 2008.

U.S. Bureau of Reclamation and Washington State Department of Ecology (Reclamation and Ecology). 2008. *Draft Planning Report/Environmental Impact Statement: Yakima River Basin Water Storage Feasibility Study. Benton, Yakima, and Kittitas Counties, Washington.* Ecology Publication No. 07-11-044.

U.S. Census Bureau. 2008a. Demographic Profiles: Colville Reservation and Off-Reservation Trust Land. 2000 Census. Obtained March 21, 2008 from website http://censtats.census.gov/data/US.

U.S. Census Bureau. 2008b. Demographic Profiles: Spokane Reservation. 2000 Census. Obtained March 21, 2008 from website http://censtats.census.gov/data/US.

U.S. Census Bureau. 2008c. State & County QuickFacts. Obtained March 21, 2008 from website http://quickfacts.census.gov.

U.S. Department of Agriculture. 1981. *Soil Survey of Douglas County, Washington.* United States Department of Agriculture, Soil Conservation Service in Cooperation with Washington State University, Agricultural Research Center. November 1981.

U.S. Department of Agriculture. 1984. *Soil Survey of Grant County, Washington.* United States Department of Agriculture, Soil Conservation Service in Cooperation with Washington State University, Agricultural Research Center. January 1984.

U.S. Department of Agriculture, National Agricultural Statistics Service. 2008. 2002 Census of Agriculture. Obtained March 27, 2008, from website http://www.nass.usda.gov/Census/.

U.S. Department of Energy. 2008a. Energy Information Administration. Official Energy Statistics from the U.S. Government. Form EIA-86 Database. Available: http://www.eia.doe.gov/cneaf/electricity/page/eia861.html. Accessed April 4, 2008.

U.S. Department of Energy. 2008b. Energy Information Administration. Official Energy Statistics from the U.S. Government. Form EIA-906 and EIA-920 Databases. Available: http://www.eia.doe.gov/cneaf/electricity/page/eia906_920.html. Accessed April 4, 2008.

U.S. Environmental Protection Agency, Region 10. 2002. Columbia River Basin Fish Contaminant Survey, 1996-1998. EPA 910-R-02-006. Seattle, WA.

U.S. Environmental Protection Agency. 2006a. Draft Final Phase I Sediment Sampling Data Evaluation, Upper Columbia River Site, CERCLA Remedial Investigation and Feasibility Study.

U.S. Environmental Protection Agency, Region 10. 2006b. Draft Screening-Level Risk Assessment for Recreational Use of Beaches, Upper Columbia River Remedial Investigation and Feasibility Study. August, 2006. Seattle, Washington.

U.S. Environmental Protection Agency. 2007. Upper Columbia River Site CERCLA RI/FS, Summary and Evaluation of 2005 Sediment Toxicity Test Results, Draft Final Technical Memorandum (August 24, 2007). Prepared by CH2M HILL.

U.S. Fish and Wildlife Service (USFWS). 1982. *Management of Seasonally Flooded Impoundments for Wildlife*. Resource Publication 148. Washington D.C.

U.S. Fish and Wildlife Service (USFWS). 1987. *National Wetland Inventory.* Available: http://www.fws.gov/nwi/. Division of Habitat and Resources Conservation. Arlington, VA.

U.S. Fish and Wildlife Service (USFWS). 2002. *Final Fish and Wildlife Coordination Act Report for the U.S. Bureau of Reclamation's Banks Lake 10-foot Drawdown Study.* Prepared for U.S. Bureau of Reclamation, Ephrata, WA.

U.S. Fish and Wildlife Service (USFWS). 2006. *Hanford Reach Monument Comprehensive Conservation Plan - Draft Environmental Impact Statement.*

U.S. Geological Survey (USGS). 2006. Gauge #12472800 Columbia River below Priest Rapids Dam, Washington. Monthly data summary table accessed as of August 22, 2006.

U.S. Geological Survey (USGS). 2008. Ground-water levels for Washington. Available: http://waterdata.usgs.gov/wa/nwis/gwlevels. Accessed February 25, 2008.

Voeller, A.C. 1993. *Measurement of Lake Roosevelt Biota in Relation to Reservoir Operations.* Report prepared for U.S. Department of Energy, Bonneville Power Administration, Portland, OR. Project no. 94-043, under Contract No. 94B132-148 by the Spokane Tribal Fish and Wildlife Center, Wellpinit, WA.

Washington State and the Confederated Tribes of the Colville Reservation (CCT). 2007. Water Resources Management Agreement for Lake Roosevelt between the Confederated Tribes of the Colville Reservation and the State of Washington. December 17, 2007.

Washington State and the Spokane Tribe of Indians (STI). 2008. Water Resources Management Agreement for Lake Roosevelt between the Spokane Tribe of Indians and the State of Washington. February 4, 2008.

Washington State Department of Ecology (Ecology). 2003. *Mercury in Edible Fish Tissue and Sediments from Selected Lakes and Rivers of Washington State.* Publication No. 03-03-026. June. Olympia, WA.

Washington State Department of Ecology (Ecology). 2004. *Water Quality 2002/2004 Assessments for Washington.* Available: http://apps.ecy.wa.gov/wats/WATSQBEHome.asp. Accessed April 10, 2008.

Washington State Department of Ecology (Ecology). 2007. *Final Programmatic Environmental Impact Statement for the Columbia River Water Management Program.* Ecology Publication # 07-11-009. February 15, 2007.

Washington State Department of Ecology (Ecology). 2008a. *Tribal-State Agreements to Deliver Water from Lake Roosevelt to Farms, Towns and Salmon in Eastern Washington.* Ecology Publication # 07-11-050, rev. 1/08.

Washington State Department of Ecology. 2008b. *Lake Roosevelt – Incremental Storage Releases.* Available: http://www.ecy.wa.gov/programs/wr/cwp/cr_lkroos.html. Accessed April 4, 2008.

Washington Department of Fish and Wildlife (WDFW). 1994. *Walleyes in Washington.* Special Report FM 95-2. Olympia, Washington.

Washington State Department of Fish and Wildlife (WDFW). 1996. Banks Lake kokanee monitoring in Region #2 Annual Report. Washington Department of Game, Region #2.

Washington Department of Fish and Wildlife (WDFW). 2007. *Accomplishments Relative to Implementation of E2SHB 2860 (an Act Relative to Columbia River Water Resource Management) for July 2006 to June 2007.* Final Report prepared by T. Scott, H. Beecher, P. LaRiviere, P. Miller, and P. Verhey. Submitted to Washington Department of Ecology as part of the Columbia River Basin Water Management Program to fulfill requirements of Interagency Agreement Ecology #C0600321; WDFW #06-1262. August 10, 2007.

Washington Department of Fish and Wildlife (WDFW). 2008. Priority Habitats and Species (PHS) Database. Information received from WDFW on February 20, 2008.

Washington Department of Game (WDG). 1986. *Wildlife Protection, Mitigation and Enhancement Planning for Grand Coulee Dam.* Final Report of the WDG Habitat Management Division, Olympia, WA. Report funded by U.S. Department of Energy Bonneville Power Administration, Division of Fish and Wildlife under Contract No. DE-AI79-86BP60445, Project No. 86-74, August 1986.

Washington State Department of Health (DOH). 1997. *Consumption Patterns of Anglers Who Frequently Fish Lake Roosevelt.* Office of Environmental Health Assessments. Olympia, WA.

Washington Department of Health. 2007a. ATSDR Health Consultation Lake Roosevelt Beach Sediment Non-Tribal Exposure Northeast, Washington – agency review draft July 2007.

Washington State Department of Health (DOH). 2007b. *Guidance for Surveillance, Prevention, and Control of Mosquito-borne Disease.* DOH Publication 333-149.

Washington State Department of Health (DOH). 2008. *Fish Facts for Healthy Nutrition: Washington State Fish Consumption Advisories.* Available: http://www.doh.wa.gov/ehp/oehas/fish/fishadvisories.htm. Accessed May 7, 2008. Last updated April 30, 2008.

Washington State Ferries (WSF). 2008. *State Ferries in Eastern Washington: Keller Ferry.* Available: http://www.wsdot.wa.gov/Regions/Eastern/KellerFerry/. Accessed April 3, 2008.

Watson Engineering, Inc. 2008. *Analysis of Alternative Operating Scenarios for Hydropower and Impact upon Agreement Between the Confederated Tribes of the Colville Reservation and Bonneville Power Administration.* January 4, 2008. Prepared for Confederated Tribes of the Colville Reservation.

Whalen, J. 2000. *Draft Spokane River Subbbasin Summary.* Prepared for the Northwest Power Planning Council by the Washington Department of Fish and Wildlife, November 15, 2000.

Wydoski, R. S., and R. R. Whitney. 2003. *Inland Fishes of Washington.* 2nd edition. American Fisheries Society, Bethesda, MD, and University of Washington Press, Seattle, WA.

CHAPTER 7.0 DISTRIBUTION LIST

* GARY CHANDLER VP GOV'T AFFAIRS
ASSOC OF WA BUSINESS
1414 CHERRY ST SE
OLYMPIA WA 98507

*KATHLEEN COLLINS LOBBYIST
WATER POLICY ALLIANCE
3905 LAKEHILLS DRIVE SE
OLYMPIA WA 98501

* JON CULP
IRR EFFICIENCIES PROG COORDNTR
WA ST CONSERV COMMISSION
921 MURRY ST
OKANAGON WA 98840

CONSTITUENT ACCNT EXEC
BONNEVILLE POWER ADMINISTRATION
924 CAPITOL WAY SOUTH
OLYMPIA WA 98501

* CRAIG SIMPSON
EAST COLUMBIA BASIN IRR DIST
PO BOX E
OTHELLO WA 99344

TECK COMINCO AMERICAN INC
MARKO E. ADZIC
501 N RIVERPOINT BLVD., SUITE 300
SPOKANE, WA 99202

* RICK GEORGE PROGRAM MANAGER
ENVIRON PLANNING & RIGHT PROTECTION-UMATILLA TRIBES
PO BOX 638
PENDLETON OR 97801

* BILL GRAY MANAGER
EPHRATA DIST OFFICE
US BUREAU OF RECLAMATION
32 "C" ST NW
EPHRATA WA 98823

*TONY GROVER
DIRECTOR OF FISH AND WILDLIFE DIV
NW POWER & CONSERVATION COUNC
851 SW 6th AVENUE

* BOB HAMMOND CITY MANAGER
CITY OF KENNEWICK
210 W SIXTH AVENUE
PO BOX 6108
KENNEWICK WA 99336-0108

* JOE ASSISTANT GENERAL MANAGER / ROSS HENDRICK
GRANT CO PUD
PO BOX 878
EPHRATA WA 98823

* ROB MASONIS REGIONAL DIRECTOR
AMERICAN RIVERS
4005 20TH AVENUE W EST SUITE 221
SEATTLE WA 98199

MO MCBROOM POLICY DIRECTOR
WA ENVIRON COUNCIL
615 2ND AVENUE ST 380
SEATTLE WA 98104

* DON ODEGARD BOARD REP
COLUMBIA-SNAKE RIVERS IRR ASSOC
3030 W CLEARWATER SUITE 205-A
KENNEWICK WA 99336

* MERRILL OTT COMMISSIONER
STEVENS CO COMMISSION
215 S OAK ST
COLVILLE WA 99114

* GARY PASSMORE
ENVIRON TRUST DIRECTOR
COLVILLE TRIBES
PO BOX 150
NESPELEM WA 99155

* LISA EXECUTIVE DIRECTOR
WA RIVERS CONSERVANCY
103 PALOUSE SUITE 33
WENATCHEE WA 98801

* RUDY PEONE –SPOKANE TRIBE
NATURAL RESOURCES DIR
6208 FORD/WELLPINIT ROAD
PO BOX 100
WELLPINIT WA 99040

* PHIL RIGDON NATURAL RESOURCES DIRECTOR
YAKAMA NATION
PO BOX 151
TOPPENISH WA 98948

* MIKE SCHWISOW LOBBYIST
COLUMBIA BASIN DEVEL LEAGUE
606 COLUMBIA ST NW SUITE 101
OLYMPIA WA 98501

* TERESA SCOTT POLICY ANALYST
WA DEPT OF FISH & WILDLIFE
600 CAPITOL WAY NORTH
OLYMPIA WA 98501

* PEGGY MILLER
WA DEPT OF FISH & WILDLIFE
600 CAPITOL WAY NORTH
OLYMPIA WA 98501

CHRIS PARSONS
WA DEPT OF FISH & WILDLIFE
1550 ALDER ST
EPHRATA WA 98823

* RON WALTER
CHELAN CO
400 DOUGLAS ST
WENATCHEE WA 98801

7 BAYS MARINA
LAUREL & LYLE PARKER
1250 MARINA DR.
SEVEN BAYS, WA 99122

PAUL WAGNER
NOAA FISHERIES HYDRO PROGRAM
US DEPT OF COMMERCE--NOAA
1201 NE LLOYD BLVD ST 1100
PORTLAND OR 97232-2737

* GERRY O'KEEFE
POLICY ADVISOR
DEPT OF ECOLOGY
PO BOX 47600
OLYMPIA WA 98504

*DEREK I SANDISON
REGIONAL DIRECTOR
DEPT OF ECOLOGY
15 W YAKIMA AVENUE SUITE 200
YAKIMA WA 98902

ELIZABETH MCMANUS
ROSS & ASSOC ENVIRON CONSULT
606 COLUMBIA ST NW
SUITE 212 OFFICE 211
OLYMPIA WA 98501

* DAN SILVER
606 COLUMBIA ST NW SUITE 212
OLYMPIA WA 98501

* RUDY PLAGER
CO COMMISSIONERS CO
210 W BROADWAY
RITZVILLE WA 99169

CO COMMISSIONERS
ASOTIN CO
135 2ND ST
ASOTIN WA 99402

* MAX BENITZ COMMISSIONER
BENTON CO
620 MARKET ST
PROSSER WA 99350

CO COMMISSIONERS
CHELAN CO
350 ORONDO AVENUE
WENATCHEE WA 98801

CO COMMISSIONERS
COLUMBIA CO
341 E MAIN ST
DAYTON WA 99328-1361

* CO COMMISSIONERS
DOUGLAS CO
213 RAINIER
WATERVILLE WA 98858

CO COMMISSIONERS
FERRY CO
350 E DELAWARE
REPUBLIC WA 99166

CO COMMISSIONERS
FRANKLIN CO
1016 N 4TH AVENUE
PASCO WA 99301

CO COMMISSIONERS
GARFIELD CO
PO BOX 278
POMEROY WA 99347

*RICH STEVENS COMMISSIONER
GRANT CO
35 C ST NW
EPHRATA WA 98823

CO COMMISSIONERS
KITTITAS CO
205 W 5TH AVENUE
ELLENSBURG WA 98926

CO COMMISSIONERS
KLICKITAT CO
205 S COLUMBUS
GOLDENDALE WA 98620

* CO COMMISSIONERS
LINCOLN CO
PO BOX 28
DAVENPORT WA 99122

* CO COMMISSIONERS
OKANOGAN CO
149 3RD N
OKANOGAN WA 98840

* CO COMMISSIONERS
PEND OREILLE CO
PO BOX 5025
NEWPORT WA 99156

CO COMMISSIONERS
SKAMANIA CO
PO BOX 790
STEVENSON WA 98648-0790

* CO COMMISSIONERS
SPOKANE CO
W 1116 BROADWAY
SPOKANE WA 99260

* CO COMMISSIONERS
STEVENS CO
215 S OAK ST
COLVILLE WA 99114

CO COMMISSIONERS
WALLA WALLA CO
315 W MAIN ST
WALLA WALLA WA 99362

CO COMMISSIONERS
WHITMAN CO
400 N MAIN
COLFAX WA 99111

*MIKE LEITA
CO COMMISSIONERS
YAKIMA CO
128 N 2ND ST
YAKIMA WA 98901

STUART CRANE
YAKAMA NATION WATER PROGRAM
503 SOUTH ELM ST
TOPPENISH WA 98948

ROBERT T REW
AVISTA UTILITY
PO BOX 587
OTHELLO WA 99344

BIG BEND BASS MASTERS
1013 OREGON ST
MOSES LAKE WA 98837

WILLIAM RILEY
BIG BEND ECONOMIC DEV COUNCIL
410 W 3RD AVENUE SUITE E
MOSES LAKE WA 98837

BIG BEND ELECTRIC CO-OP
PO BOX 348
RITZVILLE WA 99169-0348

BLACK SANDS IRR DIST
PO BOX 432
EPHRATA WA 98823

MARK PETERSON
PETERSON LAW OFFICE
103 PALOUSE ST SUITE 5
WENATCHEE WA 98801

JOANNE WELLNER
WA STATE DEPT OF ECOLOGY
15 WEST YAKIMA AVENUE, SUITE 200
YAKIMA WA 98902

* ROB SWEDO
BONNEVILLE ADMIN -PGP-5
PO BOX 3621
PORTLAND OR 97208

* BUREAU OF INDIAN AFFAIRS
THE FEDERAL BLDG
911 NE 11TH AVENUE
PORTLAND OR 97232

* DENNIS BLY
LINCOLN CO COMMISSIONER
PO BOX 28
DAVENPORT WA 99122

BUREAU OF INDIAN AFFAIRS
ENVIRON
SERVICES DIVISION 2
1849 C ST NW MS-4516 MIB
WASHINGTON DC 20240

MARY LINES
8305 N VALERIE
SPOKANE, WA 99208

STEVE FRAZIER
CENTRAL BASIN AUDUBON SOCIETY
PO BOX 86
MOSES LAKE WA 98837

CENTRAL WA BASS CLUB
1721 METHOW ST
WENATCHEE WA 98801

KAREN WAGNER
CHAMBER OF COMMERCE
324 SOUTH PIONEER WAY
MOSES LAKE WA 98837

CHELAN CO PLANNING DEPT
411 WA ST
WENATCHEE WA 98801

CITY OF CONNELL
PO DRAWER 1200
CONNELL WA 99326

CITY OF COULEE CITY
PO BOX 398
COULEE CITY WA 99115

CITY OF ELECTRIC CITY
PO BOX 130
ELECTRIC CITY WA 99123

CITY OF ELLENSBURG
501 NORTH ANDERSON ST
ELLENSBURG WA 98926

CITY OF EPHRATA
L21 ALDER ST
EPHRATA WA 98823

CITY OF GRAND COULEE
PO BOX 180
GRAND COULEE WA 99133

RICK WHITE
CITY OF KENNEWICK
PO BOX 6108
KENNEWICK WA 99336

GILBERT ALVARADO
CITY OF MOSES LAKE
PO BOX 1579
MOSES LAKE WA 98837

DAVID MCDONALD
CITY OF PASCO
PO BOX 293
PASCO WA 99301

RICK SIMON
CITY OF RICHLAND
PO BOX 190
RICHLAND WA 99352

DAVE NAKAGAWARA
CITY OF SPOKANE
W 808 SPOKANE FALLS BLVD
SPOKANE WA 99201

LINDA KASTING
CITY OF WALLA WALLA
PO BOX 478
WALLA WALLA WA 99362

CITY OF WENATCHEE
PO BOX 388
WENATCHEE WA 98807

COEUR D'ALENE TRIBE
PO BOX 408
PLUMMER ID 83851

ALICE PARKER
COLUMBIA BASIN DEVEL LEAGUE
PO BOX 1235
ROYAL CITY WA 98837

TRI-CITIES HERALD
ANDREW SICOCCHI
PO BOX 2608
PASCO WA 99302

COLUMBIA BASIN ENVIRON COUNCIL
PO BOX 1285
SOAP LAKE WA 98551

* ANDREW DUNAU
2206 SOUTH SHERMAN ST
SPOKANE WA 99203

* RACHAEL P OSBORN
COLUMBIA INSTITUTE FOR WATER POLICY
2421 W MISSION
SPOKANE WA 99201

JULIE A CARTER
COLUMBIA RIVER INTER-TRIBAL FISH COMM
729 NE OREGON ST SUITE 200
PORTLAND OR 97232

PAT HAMOD
FERRY CONSERV DIST
PO BOX 1045
REPUBLIC WA 99166

* STEVE SUAGEE
COLVILLE CONFEDERATED TRIBES
PO BOX 150
NESPELEM WA 99155

*PAUL STOKER
890 SOUTH LUCY RD
OTHELLO WA 99344

*PATTY O'TOOLE
CONFEDERATED TRIBES OF
THE WARM SPRINGS RESERVATION
PO BOX C
WARM SPRINGS OR 97761

PETER FRALEY
OGDEN MURPHY WALLACE PLLC
1 FIFTH ST SUITE 200
PO BOX 1606
WENATCHEE WA 98807

*CULTURAL RESOUCES SPOKANE TRIBE OF INDIANS
PO BOX 100
WELLPINIT WA 99040

LINDA CRERAR
DEPT OF AGRICULTURE
PO BOX 42560
OLYMPIA WA 98504

LLEWELLYN MATTHEWS
NW PULP & PAPER ASSOC
1300 114TH AVENUE SE SUITE 200
BELLEVUE WA 98004

DEPT OF TRANSPORTATION
PO BOX 47330
OLYMPIA WA 98504

BIG BEND ECONOMIC COUNCIL
226 W THIRD AVENUE
MOSES LAKE WA 98837

MARK KULAAS
DOUGLAS CO
140 19TH ST NW SUITE A
EAST WENATCHEE WA 98802

* BRIAN WALKER
THE LANDS COUNCIL
423 W FIRST AVENUE SUITE 240
SPOKANE WA 99201

* ENVIRON PROTECTION AGENCY
GEOGRAPHIC IMPLEMENTATION UNIT REGION 10 ECO-088
1200 SIXTH AVENUE
SEATTLE WA 98101

MARK NIELSON
FRANKLIN CONSERV DIST
1620 ROAD 44
PASCO WA 99301

GRANT CO PLANNING DEPT
PO BOX 37
EPHRATA WA 98823

CHRISTOPHER W HESSE
GRANT CO FARM BUREAU
480 N FRONTAGE RD E
MOSES LAKE WA 98837

GRANT CO PORT DIST NO 4
PO BOX 537
COULEE CITY WA 99115

GRANT CO PORT DIST NO 7
PO BOX 616
GRAND COULEE WA 99133

HAROLD SHEPHERD
CENTER FOR WATER ADVOCACY
PO BOX 331
MOAB, UT 84532

* IDAHO DEPT OF ENVIRON QUALITY
1401 N HILTON
BOISE ID 83706

IDAHO RIVERS UNITED
PO BOX 633
BOISE ID 83701

CURT DREYER
KLICKITAT CO
228 WEST MAIN ST MS – CH-17
GOLDENDALE WA 98620

KOOTENAI TRIBES OF IDAHO
PO BOX 1269
BONNERS FERRY ID 83805

MOSES LAKE IRR & REHAB DIST
PO BOX 98
MOSES LAKE WA 98837

* DALE BAMBRICK
NTL MARINE FISHERIES SERVICE
304 S WATER ST #200
ELLENSBURG WA 98926

JAIME PINKHAM
NEZ PERCE TRIBE
3404 HWY 12
OROFINO ID 83544

* NEZ PERCE TRIBE
PO BOX 365
LAPWAI ID 83540

* DENNIS CONLEY
NW FOOD PROCESSORS ASSOC
4 PELICAN PLACE
MOSES LAKE WA 98837

* CRAIG SMITH
NW FOOD PROCESSORS ASSOC
9700 SW CAPITOL HWY SUITE 250
PORTLAND OR 97219

JOHN OSBORN MD
UPPER COLUMBIA RIVER GROUP
4815 N. ASSEMBLY ST
SPOKANE WA 99205

PAT BOSS
ODESSA AQUIFER REPLEN COALITION
PO BOX 1940
MOSES LAKE WA 98837

*DR ROBERT WHITLAM
OFFICE OF ARCHAEOLOGY & HISTORIC PRESERVATION
PO BOX 48343
OLYMPIA WA 98504

OREGON DEPT OF ENVIRON QUALITY HEADQUARTERS
811 SW 6TH AVENUE
PORTLAND OR 97204

OREGON WATER RESOURCES DEPT
725 SUMMER ST NE SUITE A
SALEM OR 97301

PACIFIC FISHERY MNGMNT COUNCIL
7700 NE AMBASSADOR PLACE SUITE 200
PORTLAND OR 97220

* PARKS & REC COMMISSION
PO BOX 42668
OLYMPIA WA 98504

PORT OF WARDEN
PO BOX 841
WARDEN WA 98857

ANDREW GLASSELL
PUD - CHELAN CO
PO BOX 1231
WENATCHEE WA 98801

* DARVIN FALES
QUINCY COLUMBIA BASIN IRR DIST
PO BOX 188
QUINCY WA 98848

BRENT FOSTER
COLUMBIA RIVER KEEPER
724 OAK ST
HOOD RIVER OR 97301

JOHN AHERN
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

MIKE ARMSTRONG
REPRESENTATIVE
P O BOX 40600
OLYMPIA WA 98504

BRIAN BLAKE
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

DAVID BURI
REPRESENTATIVE
P O BOX 40600
OLYMPIA WA 98504

BRUCE CHANDLER
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

CURTIS KING
SENATOR
PO BOX 40600
OLYMPIA WA 98504

CARY CONDOTTA
REPRESENTATIVE
P O BOX 40600
OLYMPIA WA 98504

CHRIS & PATTY ESVELT
3174 ESVELT RD.
RICE, WA 99167

LARRY CROUSE
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

RICHARD CURTIS
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

JEROME DELVIN
REPRESENTATIVE
P O BOX 40408
OLYMPIA WA 98504

JIM DUNN
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

YBSA
PO BOX 30
PROSSER WA 99350

BILL FROMHOLD
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

BILL GRANT
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

LARRY HALER
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

SHIRLEY HANKINS
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

BILL HINKLE
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

JANEA HOLMQUIST
SENATOR
PO BOX 40600
OLYMPIA WA 98504

JOEL KRETZ
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

JIM MOELLER
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

DANIEL NEWHOUSE
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

ED ORCUTT
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

TIMM ORMSBY
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

ERIC PETTIGREW
REPRESENTATIVE
P O BOX 40600
OLYMPIA WA 98504

LYNN SCHINDLER
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

REG DAVENPORT
1433 EVANS CUTOFF RD
EVANS, WA 99126

MARY SKINNER
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

BOB SUMP
REPRESENTATIVE
P O BOX 40600
OLYMPIA WA 98504

DEAN TAKKO
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

DEB WALLACE
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

MAUREEN WALSH
REPRESENTATIVE
P O BOX 40600
OLYMPIA WA 98504

ALEX WOOD
REPRESENTATIVE
PO BOX 40600
OLYMPIA WA 98504

RITZVILLE AREA
CHAMBER OF COMMERCE
PO BOX 122
RITZVILLE WA 99169

SAVE OUR WILD SALMON
2031 SE BELMONT
PORTLAND OR 97214

POTHOLES BASS CLUB
PO BOX 1155
MOSES LAKE WA 98837

SUSANNE WAID
1184 C WEST OLD KETTLE RD.
KETTLE FALLS, WA 99141

DONNY BENTON
SENATOR
PO BOX 40417
OLYMPIA WA 98504

* LISA BROWN
SENATOR
PO BOX 40403
OLYMPIA WA 98504

* MERLE GIBBENS
GRAND COULEE PROJECT
HYDROELECTRIC AUTHORITY
PO BOX 219
EPHRATA WA 98823

JAY MINTHORN
PROTECTION-UMATILLA TRIBES
PO BOX 638
PENDLETON OR 97801

MIKE HEWITT
SENATOR
P O BOX 40416
OLYMPIA WA 98504

JIM HONEYFORD
SENATOR
PO BOX 40415
OLYMPIA WA 98504

BOB MCCASLIN
SENATOR
PO BOX 40404
OLYMPIA WA 98504

* BOB MORTON
SENATOR
P O BOX 40407
OLYMPIA WA 98504

JUDITH WARNICK
REPRESENTATIVE
P O BOX 40413
OLYMPIA WA 98504

LINDA EVANS PARLETTE
SENATOR
P O BOX 40412
OLYMPIA WA 98504

CRAIG PRIDEMORE
SENATOR
PO BOX 40449
OLYMPIA WA 98504

MARK SCHOESLER
SENATOR
PO BOX 40409
OLYMPIA WA 98504

PAUL SHIN
SENATOR
PO BOX 40421
OLYMPIA WA 98504

JOSEPH ZARELLI
SENATOR
PO BOX 40418
OLYMPIA WA 98504

US BUREAU OF LAND MNGMNT
SPOKANE DIST OFFICE
1103 N FANCHER
SPOKANE WA 99212

* PEG PLUMMER
WA DEPT OF ECOLOGY
PO BOX 47703
OLYMPIA WA 98504

DEANNA PAVLIK
SPOKANE TRIBE OF INDIANS
PO BOX 100
WELLPINIT WA 99040

* DOC HASTINGS
US REPRESENTATIVE
2715 ST ANDREWS LOOP SUITE
D
PASCO WA 99301

* CATHY MCMORRIS
US REPRESENTATIVE
10 NORTH POST 6TH FLOOR
SPOKANE WA 99201

* MARIA CANTWELL
US SENATOR
717 HART SENATE OFFICE BLDG
WASHINGTON DC 20510

UNITED STATE BUREAU OF
LAND MNGMNT
915 WALLA WALLA
WENATCHEE WA 98801

ROBERT FLORES
US FISH & WILDLIFE SERVICE
PO DRAWER F
OTHELLO WA 99344

* MARK MILLER ECOLOGICAL SERVICES
US FISH & WILDLIFE SERVICE
CENTRAL WA FIELD OFFICE
215 MELODY LANE SUITE 119
WENATCHEE WA 98801

* PATTY MURRAY
US SENATOR
402 E YAKIMA AVENUE SUITE 390
YAKIMA WA 98901

JIM PETERSEN
USGS/CRRL
5501 A COOK-UNDERWOOD RD
COOK WA 98605

LOU NEVSIMAL
WA STATE BASS FEDERATION
BANKS LAKE ENHANCEMENT PROJECT
PO BOX 6
WILBUR WA 99185

REX C CRAWFORD PHD
WA STATE DEPT OF NATURAL RES
WA NATURAL HERITAGE PROGRAM
PO BOX 47016

GRETCHEN BORCK
WA ASSOC OF WHEAT GROWERS
109 EAST FIRST
RITZVILLE WA 99169

PEG PLUMMER
WA DEPT OF ECOLOGY
PO BOX 47703
OLYMPIA WA 98504

* KEITH STOFFEL
WA DEPT OF ECOLOGY
4601 N MONROE ST
SPOKANE WA 99205

* BILL TWEIT
WA DEPT OF FISH & WILDLIFE
600 CAPITOL WAY N
OLYMPIA WA 98501

* DENNIS BEICH
WA DEPT OF FISH & WILDLIFE REG 2 OFFICE
1550 ALDER ST NW
EPHRATA WA 98823

* MILT JOHNSTON
WA DEPT OF NATURAL RESOURCES
713 E BOWERS RD
ELLENSBURG WA 98926

* SALLY SOVEE
BUREAU OF LAND MNGMNT
915 WALLA WALLA AVENUE
WENATCHEE WA 98801

WA STATE PARKS
PO BOX 370
ELECTRIC CITY WA 99123

MARK C SCHULZ
WA STATE PARKS & REC COMM
EASTERN WA RESOURCES DEV
2201 NORTH DUNCAN DRIVE
WENATCHEE WA 98801

CHRIS VOIGT
WA STATE POTATO COMMISSION
108 INTERLAKE RD
MOSES LAKE WA 98837

* TOM MYRUM
WA STATE WATER RESOURCES ASSOC
606 COLUMBIA ST NW SUITE 100
OLYMPIA WA 98501

JOHNSON MENINICK
YAKAMA NATION CULTURAL RESOURCES
PO BOX 151
TOPPENISH WA 98948

DAVID TAYLOR
TAYLOR ANGUS RANCH
1661 BEANE RD
MOXEE WA 98936

* TOM RING
YAKAMA NATION WATER RES PROG
PO BOX 151
TOPPENISH WA 98948

AGNES KATCHEN
YAKAMA NATION WATER CODE
PO BOX 151
TOPPENISH WA 98948

JEFF BRECKEL
LOWER COLUMBIA FISH RECOVERY BOARD
2127 8TH AVENUE
LONGVIEW WA 98632

MELODIE TERESKI
LOWER COLUMBIA FISH RECOVERY BOARD
2127 8TH AVENUE
LONGVIEW WA 98632

PHIL TRASK
LOWER COLUMBIA FISH RECOVERY BOARD
2127 8TH AVENUE
LONGVIEW WA 98632

CHARLY BOYD
SKAMANIA CO
PO BOX 790
STEVENSON WA 98648

DAVE MCCLURE
KLICKITAT CO
228 W MAIN ST MS-CH-17
GOLDENDALE WA 98620

CATHY SCHAEFFER
WALLA WALLA CO
PO BOX 1506
310 W POPLAR SUITE 001
WALLA WALLA WA 99362-2865

ROBERT BUCHERT
PALOUSE CONSERV DIST
325 NW STATE ST
PULLMAN WA 99163

* DAVID LUNDGREN
LINCOLN CO
27234 SR 25N
DAVENPORT WA 99122

SARAH WALKER
CHELAN CO CONSERV DIST
301 YAKIMA ST ROOM 307
WENATCHEE WA 98801

TIM SIMPSON
ASOTIN CO
PO BOX 6051
CLARKSTON WA 98403-0605

JIM MILTON
TRI-CO WATER RESOURCE AGENCY
2301 FRUITVALE BLVD
YAKIMA WA 98902

* BOB HEINITH
COLUMBIA RIVER INTER-TRIBAL
FISH COMMISSION
729 NE OREGON ST SUITE 200
PORTLAND OR 97232

JIM DEGRAFFENREID
LINCOLN CO
27234 SR-25N
DAVENPORT WA 99122

MARILYNN LYNN
FOSTER CREEK CONSERV DIST
PO BOX 428
WATERVILLE WA 98858-0428

MIKE KAPUTA
CHELAN CO NATURAL RES DEPT
316 WA ST SUITE 401
WENATCHEE WA 98801

HAROLD HEACOCK
TRI-CITIES DEVEL COUNCIL
901 NORTH COLORADO
KENNEWICK WA 99336

PEGGY ENTZEL
CHELAN CO CONSERV DIST
301 YAKIMA ST ROOM 307
WENATCHEE WA 98801

JOE PEONE
COLVILLE TRIBES
PO BOX 150
NESPELEM WA 99155

CRAIG NELSON
OKANOGAN CONSERV DIST
1251 S 2ND AVENUE ROOM 101
OKANOGAN WA 98840

ROB LINDSAY
SPOKANE CO PUBLIC WORKS
UTILITIES DIVISION
1026 W BROADWAY
SPOKANE WA 99260-0430

WALT EDELEN
SPOKANE CO CONSERV DIST
210 N HAVANA
SPOKANE WA 99202

LINDA KIEFER
STEVENS CO
215 S OAK ST
COLVILLE WA 99114

JOY OSTERBERG
FERRY CO
350 EAST DELAWARE #5
REPUBLIC WA 99166

DON COMINS
PEND OREILLE CONSERV DIST
PO BOX 280
NEWPORT WA 99156

ASOTIN CO LIBRARY
417 SYCAMORE ST
CLARKSTON WA 99403-2666

* EPHRATA COMMUNITY LIBRARY
45 ALDER ST NW
EPHRATA WA 98823-2420

COLVILLE PUBLIC LIBRARY
195 SOUTH OAK ST
COLVILLE WA 99114-2845

* GRAND COULEE COMMUNITY LIBRARY
225 FEDERAL
GRAND COULEE WA 99133-0062

DAYTON MEMORIAL LIBRARY
COLUMBIA COUNTY RURAL LIBRARY
PO BOX 74
111 SOUTH 3RD ST
DAYTON WA 99328-0074

* MOSES LAKE COMMUNITY LIBRARY
418 EAST 5TH AVENUENUE
MOSES LAKE WA 98837-1797

* FORT VANCOUVER REGIONAL LIBRARY
1007 EAST MILL PLAIN BLVD
VANCOUVER WA 98663-3504

* OKANOGAN COMMUNITY LIBRARY
228 PINE
OKANOGAN WA 98840-0489

* KENNEWICK LIBRARY
1600 SOUTH UNION ST #1699
KENNEWICK WA 99338-2264

WENATCHEE PUBLIC LIBRARY-
NCRL
NCRL HEADQUARTERS
318 DOUGLAS ST
WENATCHEE WA 98801-2864

ODESSA PUBLIC LIBRARY
21 EAST 1ST
ODESSA WA 99159-0218

WALLA WALLA PUBLIC LIBRARY
238 EAST ALDER ST
WALLA WALLA WA 99362-1943

COULEE CITY COMMUNITY
LIBRARY
PO BOX 398
405 WEST MAIN ST
COULEE CITY WA 99115-0387

* CLARK KAGELE
CBDL
1491 KAGELE RD N
ODESSA WA 99159

VJ MEADOWS
BENTON CO
PO BOX 910
PROSSER WA 99350

SCOTT REVELL
KENNEWICK IRR DIST
1500 S CLODFELTER RD
KENNEWICK WA 99336

* DEBORAH BIRD
NTL PARK SERVICE
LK ROOSEVELT NTL REC AREA
1008 CREST DRIVE
COULEE DAM WA 99116

BUELL HAWKINS COMMISSIONER
COMMISSIONER CHAMBERS
400 DOUGLAS ST
WENATCHEE WA 98801

OTHELLO LIBRARY
101 EAST MAIN ST
OTHELLO WA 99344-1039

* SPOKANE PUBLIC BRANCH
906 WEST MAIN AVENUE
SPOKANE WA 99206-5114

* BRIDGEPORT COMMUNITY
LIBRARY
1206 COLUMBIA ST
BRIDGEPORT WA 98813-0220

WILLIAM GARY
US BUREAU OF RECLAMATION
PO BOX 815
EPHRATA WA 98823

DEVON MICHEL
2235 MCMANAMAN RD
OTHELLO WA 99344

* PETE ROGALSKY
CITY OF RICHLAND
505 SWIFT BLVD
RICHLAND WA 99352

NANCY ALDRICH
CITY OF RICHLAND
PO BOX 190 MS-26
RICHLAND WA 99352

* GERALD W KELSO AREA
MANAGER
US BUREAU OF RECLAMATION
UPPER COLUMBIA AREA OFFICE
1917 MARSH RD
YAKIMA WA 98901

SANDY SWOPE MOODY
WA NATURAL HERITAGE PROGRAM
DEPT OF NATURAL RESOURCES
PO BOX 47014
OLYMPIA WA 98504

RICHLAND PUBLIC LIBRARY
955 NORTHGATE DRIVE
RICHLAND WA 99352-3539

* PASCO LIBRARY
1320 WEST HOPKINS ST
PASCO WA 99301-5097

YAKIMA VALLEY REGIONAL
LIBRARY
102 NORTH 3RD ST
YAKIMA WA 98901-2759

JAKE WOLLMANT
CBDC
1054 W HARDER RD
WARDEN WA 98857

HOWARD FUNKE –SPOKANE
TRIBE NATURAL RESOURCES
DIR
6208 FORD/WELLPINIT ROAD
PO BOX 100
WELLPINIT WA 99040

PETER BEAUDRY
CITY OF KENNEWICK
PO BOX 6108
KENNEWICK WA 99336

KEITH GOEHNER
400 DOUGLAS ST
WENATCHEE WA 98801

* SHANNON D WORK PC
ATTORNEY AT LAW
PO BOX 3409
COEUR D'ALENE ID 83816

DON & JUNE HOECHER
883 BASIN RD
COLVILLE, WA 99114

GEORGE RODICK
LAND OWNER
PO OBX 126
ODESSA WA 99159

DWIGHT HANSEN
33086 HAWK CREEK
DAVENPORT WA 99122

LORNA JOHNSON
539 ORN RICE RD
COLVILLE, WA 99114

LARRY MATTSON
2810 SHELTON AVENUE
YAKIMA WA 98902

WESLEY L MCCART PRESIDENT
STEVENS CO FARM BUREAU
4979 LYON HILLS RD
SPRINGDALE WA 99173

JON SOEST CONSERV CHAIR
N CENTRAL WA AUDUBON SOCIETY
18150 RIVER ROAD
LEAVENWORTH WA 98823

ANITHA SATHER
PO BOX 128
ROYAL CITY WA 99347-0128

ROSS HENDRICK
GRANT CO PUD
154 "A" ST SE
EPHRATA WA 98823

SHIRLEY NIXON
PO BOX 178
PORT ANGELES WA 98362

STEVE NELSON
RH2 ENGINEERING
12100 NE 195TH ST SUITE 100
BOTHELL WA 98011

LARRY VINSONHALER
2567 LYNX WAY
BOISE ID 83705

HAROLD SHEPHARD
EXECUTIVE
DIRECTOR-STAFF ATTORNEY
CENTER FOR WATER ADVOCACY
PO BOX 583
CLIFTON CO 81520

NORMA F BOOKER
PO BOX 116
ROYAL CITY WA 99357-0116

AARON SHEARER
14518 ROAD E
ROYAL CITY WA 99357

PAT RYAN
1111 WA ST SE
OLYMPIA WA 98504

JEFF FEREDAY
GIVENS PURSLEY LLP
601 WEST BANNOCK ST
BOISE ID 83702

CHRIS COLLINS
3721 WEST HOFFMAN
SPOKANE WA 99205

* CO COMMISSIONER
PEND ORIELLE CO
PO BOX 5025
NEWPORT WA 99156

GLEN FIEDLER
6006 68TH AVENUE EAST
PUYALLUP WA 98371

* SHANNON MCDANIEL SEC/MNGR
S COLUMBIA BASIN IRR DIST
PO BOX 1006
PASCO WA 99301

MR. STEPHENSON
677 GALLER CREEK RD.
COLVILLE, WA 99114

DAVID McCLURE
KLICKITAT CO
228 WEST MAIN ST MS – CH-17
GOLDENDALE WA 98620

OKANOGAN COUNTY
OFFICE OF PLANNING AND DEVELOPMENT
123 5TH AVE N, SUITE 130
OKANOGAN, WA 98840

DARRYLL OLSEN
CSRIA
3030 W. CLEARWATER, SUITE 205-A
KENNEWICK, WA 99336

BOB ALBERTS
CITY OF PASCO
PO BOX 293
PASCO WA 99301

MICHAEL GARRITY
AMERICAN RIVERS
4005 20TH AVENUE W EST SUITE 221
SEATTLE WA 98199

GAIL A HOWE, MAYOR
CITY OF PATEROS
PO BOX 8
PATEROS, WA 98846

DEPARTMENT OF FISH AND WILDLIFE
600 CAPITAL WAY NORTH
OLYMPIA, WA 98501-1091

DAVID KEELEY
CITY OF KETTLE FALLS
PO BOX 457
KETTLE FALLS, WA 99141

JIM BLANCHARD
US BUREAU OF RECLAMATION
PO BOX 815
EPHRATA WA 98823

* DR BRENDA BATEMAN
SR POLICY COORDINATOR
OREGON DEPT OF WATER RESOURCES
SUMMER STREET NE SUITE A
SALEM OR 97301

* MICHAEL MAYER
LEGAL DIRECTOR WA ENVIRN COUNCIL
615 SECOND AVENUE SUITE 380
SEATTLE WA 98104

Appendix A.
Memorandum of Understanding Concerning the State of Washington's Columbia River Initiative

Memorandum of Understanding Concerning the State of Washington's Columbia River Initiative

PARTIES

This Memorandum of Understanding (MOU) is entered into between the State of Washington (State), acting through the state agencies which are signatories hereto; the Pacific Northwest Region of the U.S. Bureau of Reclamation (Reclamation); and the South Columbia Basin Irrigation District, the East Columbia Basin Irrigation District, and the Quincy-Columbia Basin Irrigation District (collectively, the Districts). The State, Reclamation, and the Districts are collectively referred to as the "parties" herein.

EFFECT

Section 1. This MOU is intended only to coordinate and facilitate cooperation between the parties to advance the actions described in this MOU and is not intended to and does not create a legally binding contract or any right or benefit, substantive or procedural, enforceable at law or in equity by any party against another party, its directors, officers, employees or other persons. This MOU does not constitute an explicit or implicit agreement by the parties to subject any of the parties to the jurisdiction of any federal or state court over and above any rights or procedures presently available to the parties. This MOU does not create any right or benefit, substantive or procedural, enforceable at law or in equity, by any person or entity against the parties. This MOU shall not be construed to create any right to judicial review involving the compliance or noncompliance of the parties with this MOU.

Section 2. Nothing in this MOU shall (a) result in any impairment to the existing water supplies or water rights for the Columbia Basin Project (Project), (b) result in an amendment or modification of the rights and obligations of the Districts and Reclamation under the existing Project repayment contracts, (c) affect the priority dates of any existing water rights, (d) impair the current operations of the Project, (e) impair or interfere with eventual completion of the Project as congressionally authorized, or (f) result in an increase in the Districts' construction cost obligations and operation and maintenance obligations under the existing Project repayment contracts.

PURPOSE AND OBJECTIVES

Section 3. The parties will use their best efforts in working collaboratively and in good faith to secure economic and environmental benefits from improved water management both within the federal Project and along the mainstem of the Columbia River by advancing the actions described in this MOU.

Section 4. Through the Columbia River Initiative (CRI), the State is developing a program for the mainstem of the Columbia River that will allow access to the river's water resources while

providing support for salmon recovery. The objectives of the CRI are to meet the water needs of growing communities and their rural and agricultural economies along the mainstem of the Columbia River, and to do so in a manner that reduces the risk to fish resulting from out-of-stream use of water. While the CRI is focused on the mainstem of the Columbia River, the State recognizes that there are important needs within the Project that remain unmet and that require and warrant increased attention and resources from the State. As established in state statute and state-based water rights, the parties hereby affirm their long-standing and mutual commitment to the Project as congressionally authorized.

MAINSTEM STORAGE PROGRAM

Section 5. The parties recognize the growing water needs of the region will require development and use of new water storage facilities that are properly designed, constructed and managed to meet both economic and environmental needs – including power production, municipal water supplies, irrigation development, and improved stream flows to assist salmon recovery.

Section 6. The parties will cooperate in initiating an appraisal level assessment of the potential to store additional water from the Columbia River mainstem, including an assessment of the costs and benefits of alternative water storage sites (the Storage Assessment). The State will be responsible for conducting the Storage Assessment with existing state funds. The State will, in consultation with other parties, develop a scope of work for the Storage Assessment by December 31, 2004. The State will also secure by February 28, 2005, a contractor to conduct the Storage Assessment. The State will request additional state funding for the Storage Assessment for the coming state fiscal biennium. Reclamation will participate in and support the Storage Assessment to the extent funding is available to it within its Washington Investigations budget line item in federal fiscal years 2005 and 2006, as determined by it.

Section 7. If and as warranted by the initial results of the Storage Assessment, the State and the Districts will propose by July 2005 federal legislation to authorize and fund a mainstem storage program, including feasibility studies by Reclamation for proposed storage projects; provided, however, the Districts may participate and support one or more of these feasibility studies, as they determine. By December 20, 2004, the State will submit a budget request to support the new mainstem storage program during the state 2005-2007 biennium to include funding for feasibility studies. Reclamation's position regarding the authorization and funding of the mainstem storage program and feasibility studies will be determined by the views of the Administration at the time Congress considers authorizing legislation and appropriations. If and as authorized by Congress, the State and Reclamation will negotiate and enter into one or more feasibility study contracts. If federal authorization is not secured by January 2006, the State will fund the initiation of one or more feasibility studies to evaluate potential new storage sites, while continuing to pursue federal authorization. By July 2006, the parties will develop a schedule of future milestones for the mainstem storage program.

Section 8. If and as warranted by the feasibility studies, the State and the Districts agree to pursue federal authorization of mainstem storage projects to be undertaken by Reclamation, with the State as local sponsor for the storage projects. As authorized and as necessary to support the

new mainstem storage program, or as specific storage projects are identified for feasibility studies, Reclamation and the State will work together to secure a new federal withdrawal of water from the mainstem pursuant to Chapter 90.40 RCW.

MAINSTEM DROUGHT RELIEF

Section 9. Reclamation and the State, acting through the Department of Ecology (Ecology), will use their best efforts to negotiate and enter into a contract by March 31, 2005 (the Drought Relief Contract), to make available up to 50,000 acre-feet from the Project storage rights from Lake Roosevelt for release into the Columbia River in any year in which the March 1 runoff forecast at the Dalles for April through September, as provided by the National Weather Service in their "Water Supply Outlook for the Western United States," is less than 60 MAF, and in which the Governor of the State of Washington makes a formal request in accordance with the Reclamation States Drought Relief Act of 1991 (P.L. 102-250) (the Drought Relief Act).

Section 10. The Drought Relief Contract, if entered into, will allow the use of the water to be made in accordance with applicable state and federal laws by existing water rights which divert from the Columbia River downstream of Grand Coulee Dam and to benefit fish in the Columbia River. Of the amount to be made available under the Drought Relief Contract, if entered into, up to 33,000 acre-feet would be made available for existing state-based water rights along the mainstem and up to 17,000 acre-feet would be made available for improving stream flows for fish during the drought. The Drought Relief Contract, if entered into, will be effective for a term not exceeding the maximum period authorized by law and will, as needed and if and when allowed by law, provide for renewal of the contract for a longer period of time.

Section 11. The parties acknowledge that the Drought Relief Act is set to expire on September 30, 2005, and that any subsequent renewals of the Drought Relief Contract, if entered into, will be contingent, in part, upon the Drought Relief Act being extended or otherwise reauthorized. The State and the Districts agree to seek and support favorable congressional action to extend or otherwise reauthorize the Drought Relief Act and to pursue authorization for drought relief contracts that could exceed the current two-year statutory limit. Reclamation's position will be determined by the views of the Administration at the time Congress considers any such extension, amendment or reauthorization. The State will request support for reauthorization of the Drought Relief Act from the Western States Water Council and the Western Governor's Association and will introduce federal legislation by no later than March 2005.

MUNICIPAL AND INDUSTRIAL WATER SUPPLY

Section 12. Reclamation and the State, acting through Ecology, will use their best efforts to negotiate and enter into a water service contract, in accordance with subsection 9(c) of the Reclamation Project Act of 1939 (53 Stat. 1187) by December 31, 2005 (the M&I Contract) to make available up to 37,500 acre-feet of water annually from the storage rights of the Project, of which up to 25,000 acre-feet would be available for municipal and industrial purposes and up to 12,500 acre-feet would be available to benefit stream flows and fish in the Columbia River. Most of this water would be delivered to the State by Reclamation in the Columbia River at the foot of Grand Coulee Dam, though a smaller portion of this water would be made available for

direct withdrawal from Lake Roosevelt. Under the terms of the M&I Contract, if entered into, the State would accept this water and place it into the state trust water rights program as a water right for instream flow purposes to serve as mitigation for new water rights to be issued to qualifying municipalities and industries along the Columbia River.

Section 13. The term of the M&I Contract, if entered into, will be as allowed under federal reclamation law and policy and may be renewed as provided by the Act of June 21, 1963 (77 Stat. 68) pertaining to the renewal of certain municipal, domestic, and industrial water supply contracts entered into under the Reclamation Project Act of 1939. Allocation of water under the M&I Contract shall be in increments of time and quantity based on satisfactory performance in meeting the terms and milestones provided for the Odessa Subarea in Section 14 of this MOU. Water allocated for a given increment will be made available for the duration of the M&I Contract, while the remaining portion of the unallocated water will remain subject to satisfactory performance under this MOU. The initial increment for the contract will be the period of January 2006 through December 2007. Thereafter, the increments will run for a six-year period, to align water supply decisions with the next increment of municipal growth as projected through municipal water supply plans required by state law. These timeframes may be amended by the parties during negotiation of the contract. Release of future increments of water is subject to performance deemed satisfactory by all parties to this MOU. A decision to limit access to water under the contract based on unsatisfactory performance shall not result in loss of water previously committed and distributed under the contract. The amount of water available during the initial increment shall be specified in the contract, and the amount of water available for future increments shall be based on projected municipal and industrial water supply needs.

ODESSA SUBAREA

Section 14. The parties will cooperate to support and pursue the diversion and delivery of an additional 30,000 acre-feet of water from Lake Roosevelt to the Odessa Subarea. In an effort to satisfy this objective, Reclamation will file by March 2005 an application with the State for a water right permit to divert 30,000 acre-feet of water from the federal withdrawal and storage rights for the Project to serve the Odessa Subarea. The State will process the application and issue a permit decision by September 2005. If the permit decision is challenged, the State commits to active and good faith defense of the permit, with assistance from Reclamation and the Districts, as appropriate. The goal is to make up to 30,000 acre-feet of water available to the Odessa Subarea no later than December 2006 for use during the 2007 irrigation season. Use of this water is limited to existing agricultural lands, with priority for use on lands currently irrigated under state ground water permits in areas where the Odessa aquifer is declining. Lands receiving water under this section which are also covered by state ground water permits shall not divert water under the permits. This water is separate from and in addition to other ongoing programs to deliver water within the Project.

Section 15. In addition to the quantity of water described in Section 14, the parties will cooperate to explore opportunities for delivery of water to additional existing agricultural lands within the Odessa Subarea. As opportunities become known, the State will seek state funding to cost share the potential development of infrastructure to deliver this water. Reclamation's

position regarding the future delivery of water under this section will be determined by the views of the Administration at the time.

Section 16. In addition, the State will conduct an appraisal level assessment of the potential to store additional water from the Columbia mainstem in the Odessa aquifer (the Odessa Assessment). Reclamation will participate in the Odessa Assessment to the extent funding is available in its Washington Investigations program. The Districts will assist in evaluating the infrastructure implications of delivering water to the aquifer.

POTHOLES RESERVOIR OPERATIONS

Section 17. The parties will cooperate in completing by March 2006 an appraisal level assessment of alternatives for managing Potholes Reservoir, including an alternative water feed route, changes in the storage rule curves, improving the water evacuation route, and evaluating potential solutions to the delivery constraints of the East Low Canal below Interstate 90 (the Potholes Assessment). The parties will cooperate to develop and execute a study contract to define and assign the remaining tasks of the Potholes Assessment. As part of the Potholes Assessment, Reclamation will initiate by January 2005 an appraisal level analysis of the hydrology of Potholes Reservoir and the implications of changes in the feed route, increased seasonal storage and flood evacuation. The State will request funding for its 2005-2007 biennium to complete the Potholes Assessment. Reclamation and the Districts will make available, subject to Reclamation security policies, studies and cost estimates previously prepared for the Potholes feed and evacuation routes, and for the improvements to the East Low Canal.

Section 18. The purpose of the Potholes Assessment is to determine whether changes in operations could secure additional benefits without jeopardizing existing Project benefits. These additional benefits could include increased reliability of irrigation water supply, the ability to irrigate additional lands, improved water quality in Project reservoirs, increased fish and wildlife habitat within the Project, and reduced reliance on the Columbia mainstem during the summer months. The parties recognize that Potholes Reservoir is first and foremost a water supply for two of the Project districts, and agree that the actions under this MOU are not intended to, and shall not, jeopardize the reliability of this water supply. The parties further recognize that any evaluation of the reservoir must be conducted within the context of the overall Project, as the feed route, reservoir operations and evacuation route must be considered together, and that the reservoir is central to the proper functioning of the Project as a whole.

Section 19. If and as warranted by the results of the Potholes Assessment, the State and the Districts will pursue appropriate feasibility level studies, including the authorization and funding of feasibility studies by Reclamation. Reclamation's position regarding authorization and funding of such feasibility studies will be determined by the views of the Administration at the time Congress considers authorizing legislation and appropriations. The State will cost share in any such feasibility studies should Reclamation be authorized and funded to conduct the studies. The State will request feasibility study funds for the next state fiscal biennium. The tasks and responsibilities for feasibility studies will be specified by contract. If and as warranted by the results of such feasibility studies, the parties will work in good faith to develop and implement a

specific proposal for changes to the operation of Potholes Reservoir. Subject to congressional authorization, feasibility studies, if undertaken, would be completed by June 2008.

WATER FROM CANADA

Section 20. The parties acknowledge that the State will seek to secure, through the United States, water from Canadian reservoir storage facilities. The State and Reclamation will use their best efforts to cooperate in ensuring that water released from Canadian facilities is moved through Lake Roosevelt in an acceptable manner. In this regard, the State and Reclamation will consider whether a written agreement regarding the delivery of water from Canada through Lake Roosevelt would be desirable. If so, they will endeavor in good faith to negotiate and execute an operating agreement in this regard during calendar year 2005 and invite the Bonneville Power Administration to be a signatory to any such operating agreement.

ADDITIONAL PROVISIONS

Section 21. Reclamation will submit to the State a proof of appropriation form to request issuance of a state water right certificate for the perfected portions of the existing permit held by Reclamation for the Project. The State will issue a water right certificate reflecting the amount of Project water and land developed under the existing permit, and will issue a superceding permit for the amount of Project water and land that may continue to be developed under the superceding permit.

Section 22. In partial consideration of the State's contribution toward the Storage Assessment, the Potholes Assessment including an alternative feed route, improved evacuation route and solutions to East Low Canal delivery constraints, and the State's timely implementation and performance of other actions described in this MOU, the parties will cooperate to make available up to 15,000 acre-feet of water annually from the Project storage rights in Lake Roosevelt to benefit stream flows for fish. This water will be made available after December 2006. The timing of release of the water will be determined by Reclamation, in consultation with parties responsible for salmon recovery on the mainstem.

Section 23. The State will consult with the Colville Confederated Tribes and the Spokane Tribe of Indians regarding the CRI and will secure the concurrence of these tribal governments. Given the concurrence obtained by the State, Reclamation will be responsible for Government to Government consultation with the Tribes.

Section 24. The State will consult with NOAA Fisheries and the US Fish and Wildlife Service (USFWS) regarding the CRI and will obtain their concurrence. Given the concurrence obtained by the State, Reclamation will consult with NOAA Fisheries and USFWS as required by the Endangered Species Act.

IMPLEMENTING CONTRACTS

Section 25. Implementation of the actions described in this MOU is subject to the authority of the parties and the availability of funding as approved by the State Legislature and Congress and

will be undertaken pursuant to any contracts that may be subsequently entered into among the parties as described in this MOU. The contracts involving Reclamation as a party shall be prepared, negotiated, and executed in accordance with federal reclamation laws, rules and regulations, and policies.

Section 26. Any contracts prepared under this MOU shall be available for review by all parties to this MOU prior to execution of the contract. Where a party will not be a signatory to a contract, such party may request consultation with the other MOU parties to address any questions or concerns with a proposed contract. Any party requesting consultation concerning a contract shall be provided an opportunity for consultation before the contract is executed.

OVERSIGHT PANEL

Section 27. The parties will create an Oversight Panel to provide oversight and coordination for all aspects of this MOU. The Oversight Panel shall consist of one designated representative of each of the signatories to this MOU. The Oversight Panel's functions include, but are not limited to: (a) monitoring implementation of the actions set forth in this MOU, (b) tracking and reporting of performance by the parties under any contract executed under this MOU, (c) reviewing and evaluating, at least on an annual basis, this MOU and its implementation by the parties, and (d) resolving disagreements between the parties.

Section 28. In the event disagreements arise between the parties and cannot be resolved, any party to this MOU may request the Oversight Panel to attempt to resolve the disagreement. Within 45 days of any such request, the Oversight Panel shall notify the parties of its recommended proposal for resolving the disagreement; provided, however, such decision or proposal shall be advisory only and not binding on the parties.

GENERAL PROVISIONS

Section 29. The period of performance of this MOU shall commence on the date when it is signed by the last signatory. This MOU shall terminate on December 31, 2014, unless it is extended by mutual written consent of the parties. Termination of this MOU does not invalidate contracts executed under the MOU.

Section 30. Notwithstanding Section 29 above, any party desiring to terminate its participation in this MOU will give 90 days written notice to the other parties. Upon receipt of a notice of termination, the parties may meet or elect to convene the Oversight Panel within 45 days in a good faith effort to resolve any disagreements relating to the notice of termination. Termination by a party does not in any way invalidate contracts executed under this MOU; contracts may be terminated only through the provisions of the contract. Where one party terminates from this MOU, other parties may agree to continue to implement the MOU within the scope of their authority and funding.

Section 31. This MOU may only be amended by mutual written consent of the parties. No amendment shall be effective for any purpose unless it is made in writing and signed by authorized representatives of all the parties to this MOU.

Section 32. Notwithstanding any other provision of this MOU, the parties acknowledge that Reclamation's actions are subject to federal reclamation law, as amended and supplemented, and the policies, rules and regulations promulgated by the Secretary of the Interior under federal reclamation law; and applicable federal law, including but not limited to, the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA). NEPA compliance activities may include public scoping meetings and hearings, Fish and Wildlife Coordination Act and cultural resource consultations, and consultations with Tribes on Indian Trust Assets. ESA activities may include consultation with NOAA Fisheries and the USFWS.

Section 33. Notwithstanding any other provision of this MOU, the parties acknowledge that any contract executed under this MOU where Project benefits are afforded shall be subject to federal reclamation law, policies, and rules and regulations governing recovery of Project costs. The parties further acknowledge that the costs of development, review and approval of proposed actions, including but not limited to, environmental compliance activities, preparation, negotiation and execution of contracts, and any costs of mitigation determined to be required, shall be incurred by the benefiting contractor. Costs to the benefiting contractor may be mitigated by other enhancements or contributions that benefit the parties to this MOU, at the discretion of Reclamation. Any contract executed under this MOU that implements a joint federal and state program, as authorized and directed by federal law and funded through federal appropriations, shall be subject to federal cost sharing laws, policies and practices.

Section 34. The signatures of the Districts on this MOU shall not be interpreted as an acknowledgment or endorsement by the Districts of the technical conclusions and proposed policies of the State related to the Columbia River mainstem water management program, or in any way to be acceptance of or agreement with a "no net loss" policy for management of water resources in the Columbia River.

Section 35. As necessary to support budget development and legislative review of budget requests, the State and/or the Districts may request an estimate of costs for actions proposed under this MOU. Reclamation will provide estimates based on information available at the time of the request.

Section 36. All actions and schedules called for by this MOU are subject to and contingent upon the availability and allocation of future federal and state appropriations, existing and future limitations on a party's statutory authorities, and state and federal regulatory approvals as needed. The parties recognize that if any necessary authority and/or funding is not forthcoming, the schedules identified in this MOU will be reviewed and adjusted as necessary, by mutual consent.

Section 37. This MOU is executed in multiple originals, with one originally executed copy for each of the below signatories.

SIGNATORIES

Director, Pacific Northwest Region, U.S Bureau of Reclamation — DATE: Dec 17, 2004

Governor, State of Washington — DATE: Dec 17, 2004

Director, Washington State Department of Fish and Wildlife — DATE: Dec 17, 2004

Attest:

Secretary

SOUTH COLUMBIA BASIN IRRIGATION DISTRICT
PO Box 1066
Pasco WA 99301

By _____
President, Board of Directors

Attest:

Secretary

EAST COLUMBIA BASIN IRRIGATION DISTRICT
PO Box E
Othello WA 99344

By _____
President, Board of Directors

Attest:

Asst Secretary

QUINCY-COLUMBIA BASIN IRRIGATION DISTRICT
PO Box 188
Quincy WA 98848

By _____
President, Board of Directors

Appendix B.
Summary of Scoping Comments

Comment	Discussion/EIS Section Reference
Describe existing conditions for fish in the reservoir including primary and secondary production, interactions among impacted species.	Refer to Section 3.7 of the Supplemental EIS.
Lake Roosevelt Impacts: Quantify the loss of fish and impacts to hatchery programs, nesting, spawning, and access to tributaries by resident fish. Describe impacts of change in reservoir conditions on fish distribution.	Refer to Section 4.2.1.6 of the Supplemental EIS.
Address the likelihood of undesirable material becoming entrained.	Refer to Section 4.2.1.4 of the Supplemental EIS.
Operation: Discuss timing and rate of the incremental releases; assess impacts to immediate project vicinity, downstream of the release site, habitat losses associated with conveyance systems and development. Display exposed shorelines, lake depths, and refill rates/downstream flow in graph/table format.	Refer to Sections 4.2.1.3, 4.2.2.3, 4.2.3.3, 4.2.1.7, 4.2.2.7, and 4.2.3.7 of the Supplemental EIS.
Odessa: Add more analysis of impacts associated with new conveyance system. Establish impact baseline for fish and wildlife impacts on East Low Canal. Impacts of new infrastructure for Odessa to wildlife and wildlife habitat.	The locations of new conveyance systems for Odessa are not known at this time. Additional information in the East Low Canal is provided in Sections 3.7, 3.8, 4.1.3.6 and 4.2.3.7 of the Supplemental EIS.
Storage Reservoir Impacts: Describe impacts to fish and fisheries in Banks Lake, Moses Lake, and Potholes Reservoir.	Refer to Section 4.2.2.6 of the Supplemental EIS.
Downstream impacts on fish migration, entrainment, and disease.	Refer to Section 4.2.2.6 of the Supplemental EIS.
Impacts to the Hanford Reach.	Refer to Sections 4.2.2.6 and 4.2.2.7 of the Supplemental EIS.
Impacts to tribal burial areas on Columbia River islands.	Refer to Section 4.2.2.8 of the Supplemental EIS.
Describe impacts to recreation, including economic impacts.	Refer to Sections 4.2.1.11, 4.2.2.11, 4.2.3.11, 4.2.1.12, 4.2.2.12, and 4.2.3.12 of the Supplemental EIS.
Impacts of additional municipal water.	This was evaluated in the Programmatic EIS.
Species Info and Impacts: Provide a brief narrative of each priority species and provide a more detailed impact analysis.	Information on priority species was provided in the Programmatic EIS. Refer to Sections 4.2.1.6, 4.2.2.6, and 4.2.2.3 of the Supplemental EIS.

Comment	Discussion/EIS Section Reference
Impacts to Wildlife species of concern.	
Evaluate cumulative impacts of this proposal in conjunction with Reclamations plans.	See Section 4.3 of the Supplemental EIS.
Effect on water available in river during July and August and fish flows that could be imposed by Judge Redden.	See Sections 4.2.2.3, 4.2.2.5 and 4.2.2.6 of the Supplemental EIS.
Effect on return flow/seepage from Odessa.	See Section 4.2.2.3 of the Supplemental EIS.
Effect on area between Lake Roosevelt and area where water from Odessa would return to the river.	See Section 4.2.2.3 of the Supplemental EIS.
Include history of Odessa Subbasin area and the interruptible water rights on the Columbia.	This information was provided in the Programmatic EIS.
Include an alternative that explores a return to dry-land farming.	This potential is discussed under the No Action Alternative and was evaluated under Socioeconomics in the Programmatic EIS.
More detailed explanation of the proposal's effect on stream flow.	See Section 4.2.2.3 of the Supplemental EIS.
Provide a detailed water budget showing where and when flow would be reduced in the river.	See Section 4.2.2.3 of the Supplemental EIS.
Stop piece-mealing the Columbia water supply development program. Describe the relationship between related projects.	The related projects and the separate environmental evaluations being conducted on them are described in Chapter 1.
Alternatives: add an aggressive water conservation alternative.	See Section 2.5.2 of the Supplemental EIS.
Add a discussion of global warming.	See Section 3.3 and Section 4.2.1.2 of the Supplemental EIS.
Add discussion of future changes in the Columbia River Treaty with Canada. Consider impacts on Canadian reservoirs with future changes to the Treaty.	See Sections 3.6 and 4.2.1.5 of the Supplemental EIS.
Explain why Washington State has rejected NAS recommendations.	The analysis and conclusions of the National Academy of Sciences were described in the Programmatic EIS. The legislature considered the recommendations when the Columbia River Water Management Act was developed.
Impact of the project on the CELP-Quad Cities Settlement Agreement.	The incremental storage releases may be used as mitigation for the agreement. See Section 2.4.1.3 of the Supplemental EIS.
Discuss how released water may be used to offset or mitigate for new out of stream water rights.	See Chapter 2 of the Supplemental EIS.

Comment	Discussion/EIS Section Reference
Describe shrub-steppe habitat losses from increased agriculture and urban sprawl	This was evaluated in the Programmatic EIS.
Analyze costs to Washington and federal taxpayers.	SEPA does not require a cost benefit analysis of projects. An evaluation of the socioeconomic impacts of the storage releases is included in this Supplemental EIS. The federal government will undertake a separate cost benefit analysis of construction projects as part of appraisal and feasibility level studies.
Impacts on current and future water rights.	See Sections 4.2.1.5, 4.2.2.5, and 4.2.3.5 of the Supplemental EIS.
What actions or mitigation will be taken to guard against water interruption for well water users?	See Section 4.2.1.4 of the Supplemental EIS.
Discuss how potential water rights will impact the economic growth needs of Ferry County.	Socioeconomic impacts were evaluated in the Programmatic EIS and in Sections 4.2.1.11, 4.2.2.11, and 4.2.3.11 of the Supplemental EIS.
A portion of released water should be set aside for adjacent upstream counties.	This is one alternative that Ecology is considering. See Section 2.4 of the Supplemental EIS.
Discuss impacts to boat launch facilities and recreation.	See Section 4.2.1.11.
Will Washington State compensate communities other than the tribes for impacts?	See Section 1.3.1 of the Supplemental EIS.
Will draw downs be discontinued if up stream impacts are negative?	This Supplemental EIS has concluded that no significant negative impacts will occur.
What is the process for terminating the project if it is not effective?	The incremental storage releases are intended as a temporary measure to address water management issues until more permanent solutions can be developed.
Evaluate issues identified in the comment letter submitted on the Draft Programmatic EIS.	These issues were reviewed and are evaluated in the appropriate sections of the document.
Discuss mitigation measures proposed for exposed cultural resources.	See Section 4.2.1.8 of the Supplemental EIS.
Add alternatives that encourage conservation.	See Section 2.5.2 of the Supplemental EIS.
Concerns that state and tribal agreements ignore the economic needs of local governments.	See Section 1.3.1 of the Supplemental EIS.
Impacts to upstream areas of allocating water to downstream uses should be evaluated and efforts made to stabilize water use in the upstream area.	One of the allocation efforts that Ecology is consider would allow withdrawals for municipal and industrial uses upstream of Grand Coulee Dam (Section 2.4.1.4). Ecology is also exploring

Comment	Discussion/EIS Section Reference
	options to ensure water resources are available for their current and future needs as part of ESSSB 6874.
Engage adjacent WRIAs in planning process.	Ecology has met with adjacent WRIAs during development of the Proposal.
Document existing conditions.	Refer to Chapter 3 of the Supplemental EIS.
Every alternative should include a thorough evaluation of impacts to resources. Use best available science. Consider both direct and cumulative impacts.	Refer to Chapter 4 of the Supplemental EIS.
Consider a reasonable range of alternatives including the no action alternative and an alternative with reduced impacts. For example reduce the amount of water released for M&I uses.	Refer to Chapter 2 of the Supplemental EIS.
Explore options for reducing consumptive use.	Refer to Chapter 2 of the Supplemental EIS.
New water rights should not be issued until basic water management data can be gathered and a realistic water budget can be developed. Include basic data-gathering needs in the EIS—list provided in comment.	Ecology continues to collect water management data on the Columbia River.
Include the analysis and conclusions of the National Academy of Sciences report.	The analysis and conclusions of the National Academy of Sciences were described in the Programmatic EIS. The legislature considered the recommendations when the Columbia River Water Management Act was developed.
EIS should discuss mitigation for the issuance of new permits.	See Sections 4.2.1.5, 4.2.2.5, and 4.2.3.5 of the Supplemental EIS.
The allocation of the drought year releases does not accurately reflect the 1/3-2/3 requirement of the legislation. Agriculture is short changed by 333 acre-feet.	Interruptible water rights are allocated 33,000 acre-feet during drought years and stream flows are allocated an additional 17,000 acre-feet. That allocation meetings the 1/3-2/3 requirement.
What is the economic impact to the counties and small businesses surrounding Lake Roosevelt?	See Section 4.2.1.12 of the Supplemental EIS.
Discuss impacts on adjacent drainages including Hunters Creek and the Colville River. Include economic impacts and mitigation.	These areas were considered in the impacts analysis in Section 4.2.1 of the Supplemental EIS.
Impacts on adjacent aquifers including the Colville River Aquifers. Include	See Sections 4.2.1.4 of the Supplemental EIS.

Comment	Discussion/EIS Section Reference
economic impacts and mitigation.	
How will the Spokane River be impacted by further lowering Lake Roosevelt and how will this be mitigated?	See Section 4.2.1.3 of the Supplemental EIS.
Impacts to upper Columbia Basin should be analyzed through Canada, Idaho, Montana, and the reservoir and backwater regions behind Libby Dam.	The Proposal is not expected to impact upstream areas.
What guarantees that the increased stream flows will be available downstream? Downstream dam operators are not part of the agreement and have no requirement to release the flows.	The flows will be managed as part of the Trust Water Rights Program. The downstream dams are not storage dams, so flows will pass through those reservoirs.
EIS should evaluate how the re-timing of releases will result in predictable "new" downstream water supplies.	The impact of the Proposal on downstream water supplies is discussed in Section 4.2.2.4 of the Supplemental EIS.
Examine the risks and potential impacts of granting new perpetual water rights for out of stream uses when Reclamation is under only a short term contractual obligation to modify its reservoir operations.	See Sections 4.2.1.5 and 4.2.2.5 of the Supplemental EIS.
The SEIS should address cumulative effects to riparian vegetation, specifically rare plants, downstream as well as to the riparian habitats on Lake Roosevelt.	See sections 4.1.1.7 and 4.1.2.7 of the Supplemental EIS.
Specifically evaluate the impacts to rare riparian species.	See sections 4.1.1.7 and 4.1.2.7 of the Supplemental EIS.
What are the impacts to Columbia River flows and the aquatic ecosystem during the times of year when the flow would have otherwise been released?	See Sections 4.2.2.3 of the Supplemental EIS.
Discuss impacts to the municipalities of Brewster and Pateros.	Impacts to downstream areas were considered in Section 4.2.2 of the Supplemental EIS.
Impacts to interruptible water rights.	See Sections 4.2.2.5 of the Supplemental EIS.
Potential for bank sloughing due to increased flows in the Columbia River.	See Section 4.2.2.1 of the Supplemental EIS.
Potential for stranding fish.	See Section 4.2.1.6 of the Supplemental EIS.
Temperature impacts in Lake Roosevelt and downstream on the Columbia River.	See Sections 4.2.1.3 and 4.2.2.3 of the Supplemental EIS.
Water quality impacts of increased sediment.	See Sections 4.2.1.3 of the Supplemental EIS.
Please provide the analysis of the pending demand for municipal and industrial water uses along the Columbia River and	The amount of water released is prescribed in the MOU with Reclamation and the Columbia Basin Irrigation Districts. See Section 1.3 of the

Comment	Discussion/EIS Section Reference
how that relates to the 25,000 acre-feet of water proposed to be made available, along with the list of the 128 pending applications for municipal and industrial water use.	Supplemental EIS.
Please confirm whether current interruptible water rights will no longer be deemed interruptible as a result of this proposal.	See Sections 4.2.2.5 and Section 2.2 of the Supplemental EIS.
It is unclear how the 25,000 acre feet for municipal and industrial use will be allocated.	See Section 2.4 of the Supplemental EIS.
The City of Kettle Falls supports inclusion of backwater areas in the one-mile zone that was considered in the Programmatic EIS. The Supplemental EIS should include a rationale for the alternative selected.	The one-mile zone referred to was discussed in Sections 2.2.9, 2.3.9 and 6.1.10 of the Programmatic EIS. The one-mile zone definition applies on to the implementation of RCW 90.90.030 and 90.90.050. It does not apply to the allocation of the incremental storage releases.
Is the state required to consider possible impairment of the City's existing groundwater rights before issuing new rights to water users downstream? Does this depend on whether the City's existing and planned points of diversion are inside or outside the One-Mile Zone?	See Section 4.2.2.4 regarding impacts to ground water. See above for the one-mile zone discussion.
Recommendations for interruptive water rights planning period: • Water demands for firm water right conversion should be targeted to a 2001 water-year condition. • If a water-year condition occurs with less water than a 2001 condition, the 2001 mitigation program should be implemented, with the Columbia River flow target WAC temporarily suspended in conjunction with a drought declaration by the Governor.	See Section 2.4 of the Supplemental EIS.
Recommendations for Interruptible Water Rights Allocations • Lake Roosevelt water should be allocated equitably among all the interruptible water rights with no attempt to prioritize water rights.	See Section 2.4 of the Supplemental EIS.
Interruptible Water Rights and the Critical Flow Adjustment	See Section 2.4 of the Supplemental EIS .

Comment	Discussion/EIS Section Reference
• There already exists a critical flow adjustment, the OCPI, allowed under current administrative rules. • The "lower" flow target should be a firm planning constraint for issuing future drought permits for relief/conversion of interruptive water rights. • There are no measurable fish benefits from flows beyond the OCPI during drought years and this should be used. • The utility of the "two-stage" adjustment to critical flow targets is very vague and questionable.	
Include discussion of impacts to alluvial deposits at the mouth of small tributaries.	See Section 4.2.1.1 of the Supplemental EIS.
Comments in opposition of Crab Creek and/or Hawk Creek Dams.	The Crab Creek and Hawk Creek Dams are not part of the Lake Roosevelt Incremental Storage Releases Program. They are being evaluated separately. See Section 1. 5.4.
Supplemental Feed Route project requires taking more water out of the Columbia River.	The Supplemental Feed Route was evaluated by Reclamation in a NEPA EA and the Frenchman Hills Route was evaluated in a SEPA Checklist by Ecology. See Section 1.5 of the Supplemental EIS. The Supplemental Feed Route Project does not require taking more water out of Lake Roosevelt. The Frenchman Hills Wasteway and Crab Creek Supplemental Feed Routes will route the same amount of water to Potholes Reservoir as is currently routed.
Need a long-term plan to resolve water resource problems.	The Columbia River Water Management Program is intended to address water resource problems.
Do not build more subsidized water projects.	Comment noted.
Project is not expansion of Columbia Basin Project. Water is needed to rebuild the groundwater source.	Comment noted.
Analysis should focus on management policies to maximize benefits to anadromous fish.	See Section 2.5. The purpose of the Columbia River Water Management Program is to address both instream and out of stream water needs. Several flow release alternatives and options are designed to maximize benefits to fish.
Alternative means to meet future water needs should be considered including	See Section 2.5.

Comment	Discussion/EIS Section Reference
water markets.	
Full economic costs and benefits of the proposed projects should be evaluated.	SEPA does not require a cost benefit analysis. The costs and benefits of any proposed storage projects will be evaluated separately.
Ecology should not support projects that reward wasteful practices such as the Tri-Cities and Odessa.	Ecology and Reclamation's conservation programs are discussed in Section 2.5.
Improved irrigation techniques would reduce current water use.	Ecology and Reclamation's conservation programs are discussed in Section 2.5.
Opposition to the state agreement with the Colville and Spokane Tribes.	Comment noted.
Project will impact senior water rights on Lake Roosevelt. Water level drop will add to pumping costs and make diversion points inaccessible.	See Section 4.2.1.4.
Air quality impacts of increased blowing dust and contaminated sediments.	See Section 4.2.1.9.

Appendix C.
Water Quality Parameters

Table 1

Total Dissolved Gas %	2005					2004					2003					2002				
	Mean	**SD**	**n**	**Min**	**Max**	**Mean**	**SD**	**n**	**Min**	**Max**	**Mean**	**SD**	**n**	**Min**	**Max**	**Mean**	**SD**	**n**	**Min**	**Max**
Location																				
Columbia River (Mainstem)																				
Gifford	104.7	6.0	99	94.8	116.8	106.2	5.5	86	96.8	114.4	107.2	8.3	88	97.2	126.7	108.8	8.8	94	95.5	124.8
Seven Bays	105.1	5.5	99	97.7	115.4	106.5	4.8	85	98.9	115.5	107.3	9.2	84	96.8	132.1	107.1	7.9	84	94.8	121.3
Keller Ferry	109.4	5.4	96	101.9	123.0	106.4	7.5	73	97.5	132.6	107.0	6.3	83	97.8	122.1	107.6	7.7	91	94.4	120.0
Spring Canyon	104.3	4.1	95	98.8	112.9	104.2	4.5	85	96.7	115.3	106.9	6.0	85	97.6	121.7	106.9	7.1	92	96.6	118.7
Spokane River (Spokane Arm)																				
Little Falls[1]	103.5	3.7	68	98.4	111.8	102.9	4.3	58	96.6	110.6	101.7	3.6	42	94.7	107.2	104.3	7.5	89	95.5	119.1
Porcupine Bay	105.3	5.5	94	98.8	119.1	102.4	4.6	87	92.8	113.2	102.4	5.8	82	90.6	112.8	106.8	7.4	29	97.0	126.2
Month[2]																				
Jan	100.2	1.6	129	96.5	104.7	98.0	1.5	130	93.9	103.2	98.1	2.6	65	94.7	108.2	99.4	3.9	248	94.4	126.2
Feb	101.3	1.1	56	99.6	104.3	99.2	1.5	58	96.6	102.0	97.9	1.7	33	95.8	105.5	98.9	1.5	56	96.1	102.9
Mar	103.7	1.2	62	101.7	106.2	101.9	1.6	61	99.1	105.6	100.0	3.1	60	94.5	109.5	100.8	1.1	62	98.5	103.0
Apr	105.6	2.4	128	98.3	113.8	106.8	1.6	60	102.8	110.2	108.3	4.5	60	102.4	119.5	107.6	5.1	60	102.0	118.2
May	110.7	4.6	129	98.4	121.4	110.9	4.4	132	103.2	132.6	113.0	4.7	120	106.6	127.3	113.0	4.5	122	105.5	128.9
Jun	112.5	5.6	131	99.5	125.2	109.8	5.8	117	99.6	120.7	117.0	5.8	126	103.6	132.1	120.8	6.7	126	105.2	133.3
Jul	109.8	4.3	131	98.4	116.0	111.4	4.3	130	101.9	123.2	110.0	3.0	128	100.5	117.5	118.7	6.5	118	100.7	132.8
Aug	106.1	3.1	131	98.9	112.2	107.0	4.4	124	94.8	118.0	105.4	3.2	132	90.6	113.3	108.8	4.7	127	99.3	120.1
Sep	103.0	2.3	129	97.7	108.2	103.2	2.7	129	92.8	113.9	101.9	1.6	124	98.4	105.6	104.1	2.4	122	97.7	109.4
Oct	103.7	7.6	131	94.8	123.0	101.6	3.7	131	96.7	118.3	99.2	1.5	125	96.5	105.0	100.3	2.5	111	96.9	110.0
Nov	100.5	4.1	59	96.0	119.3	99.2	1.9	58	96.6	104.3	97.2	1.2	53	94.7	99.7	96.1	0.9	23	94.7	98.5
Dec	100.0	3.4	60	95.4	105.8	101.4	4.3	62	95.4	107.9	97.6	2.0	62	94.4	100.9	96.5	-	1	96.5	96.5
Total	105.5	5.8	1276	94.8	125.2	104.9	6.0	1192	92.8	132.6	105.4	7.4	1088	90.6	132.1	107.0	9.1	1176	94.4	133.3

Notes:
SD = standard deviation
n = sample size
1. Little Falls locations combined
2. Monthly data includes data from fixed monitoring stations at US/Canada Border and Grand Coulee dam.

References:
Scofield, et. al, 2005
Lee, et. al, 2004
Pavlik-Kunkel, et. al, 2003
Fields, et. al, 2002

Table 2

Temperature (°C) Location	2005					2004					2003					2002*				
	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max
Columbia River (Mainstem)																				
Gifford	12.7	5.8	100	1.7	21.6	13.7	5.7	88	1.4	22.1	13.9	5.0	88	3.8	21.1	12.2	5.5	94	3.1	20.2
Seven Bays	13.4	6.1	99	2.2	22.2	14.5	5.9	85	2.4	22.8	14.5	5.4	84	4.4	23.3	13.7	5.5	85	3.0	22.1
Keller Ferry	12.8	6.1	154	2.7	21.5	13.8	5.9	131	2.5	22.9	14.0	5.3	132	4.9	22.4	13.2	5.2	136	4.5	21.2
Spring Canyon	12.7	6.2	151	3.2	22.2	13.7	5.9	133	2.9	23.5	14.1	5.4	130	5.3	22.7	13.4	5.0	138	5.4	20.7
Spokane River (Spokane Arm)																				
Porcupine Bay	13.4	5.9	95	2.4	23.1	14.4	5.7	87	2.5	24.4	14.6	5.5	83	4.4	24.1	13.3	5.8	89	3.1	22.3
Little Falls Above Dam	14.1	5.6	17	3.1	19.7	15.2	5.5	14	3.6	21.3	16.2	4.4	11	4.6	19.6	-	-	-	-	-
Little Falls Boat Launch	13.7	5.6	16	3.1	19.4	15.0	5.4	15	3.2	20.3	16.2	4.4	11	4.5	19.7	-	-	-	-	-
Little Falls Spillway	13.9	5.6	17	3.3	20.0	16.2	6.0	15	3.6	23.3	16.3	4.5	11	4.4	19.9	-	-	-	-	-
Little Falls Turbine	13.3	5.5	18	3.1	19.6	14.9	5.6	14	3.2	21.4	16.1	4.3	11	4.6	19.6	-	-	-	-	-
Little Falls[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.1	5.2	29	4	20.9
Month																				
Jan	2.7	0.5	83	1.7	3.4	2.6	0.5	82	1.4	3.6	4.7	0.5	78	3.8	5.3	4.0	1.0	198	0.4	5.8
Feb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	5.5	1.3	81	4.1	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	10.7	1.8	81	6.7	13.8	10.4	2.0	82	6.1	14.3	9.5	1.5	69	6.4	14.1	9.2	0.8	72	7.3	12.4
Jun	14.4	1.9	86	10.7	20.4	13.3	1.7	86	9.2	16.4	13.5	2.6	81	8.8	19.5	12.6	1.5	79	10.3	17.7
Jul	17.3	2.3	85	12.8	23.1	17.2	2.7	84	11.3	22.6	17.0	2.6	81	11.5	23.3	16.4	2.3	78	13.0	22.3
Aug	19.2	2.1	87	12.7	22.9	19.8	2.5	80	13.5	24.4	19.8	2.0	82	13.2	24.1	18.5	1.7	79	14.2	22.1
Sep	18.6	1.0	83	15.1	19.9	18.8	1.3	83	13.8	20.1	18.1	1.2	87	14.5	19.8	18.4	0.9	77	16.6	19.8
Oct	15.3	1.3	81	13.1	16.8	16.5	1.1	85	14.7	18.2	16.4	1.2	83	13.8	17.6	15.7	1.1	83	12.8	17.0
Overall	13.0	6.0	667	1.7	23.1	14.1	5.8	582	1.4	24.4	14.4	5.3	561	3.8	24.1	11.9	6.0	666	0.4	22.3

Notes:

SD = standard deviation

n = sample size

1. Little Falls locations combined

* Monthly statistics also include Evan's Landing, Kettle Falls, Hunters, Hawk Creek, Sanpoil R. Confluence and Sanpoil River sampling locations.

References:

Scofield, et. al, 2005

Lee, et. al, 2004

Pavlik-Kunkel, et. al, 2003

Fields, et. al, 2002

Table 3

Dissolved Oxygen (mg/L) Location	2005					2004					2003					2002*				
	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max
Columbia River (Mainstem)																				
Gifford	10.1	1.3	100	8.2	12.6	9.4	1.2	88	7.7	11.7	9.6	1.3	88	7.9	11.6	10.5	1.7	94	8.1	16.1
Seven Bays	9.8	1.5	99.0	7.9	12.7	9.2	1.3	85	7.0	11.2	9.5	1.5	84	7.7	12.0	10.2	1.7	85	7.7	12.9
Keller Ferry	9.6	1.7	154	5.5	12.2	8.9	1.4	131	5.1	11.2	9.0	1.7	132	1.9	11.9	9.9	1.7	136	7.2	13.3
Spring Canyon	9.6	1.6	151	6.1	12.0	8.9	1.4	133	5.4	11.1	9.0	1.6	130	5.4	11.6	9.8	1.6	138	6.7	12.5
Spokane River (Spokane Arm)																				
Porcupine Bay	8.4	2.7	95	0.2	12.4	7.9	2.0	87	0.2	10.5	8.2	2.1	83	0.5	11.4	9.4	2.4	89	3.3	12.4
Little Falls Above Dam	8.8	1.6	17	7.2	11.6	8.0	1.3	14	6.0	9.9	7.7	1.2	11	6.3	9.9	-	-	-	-	-
Little Falls Boat Launch	9.1	1.8	16	6.5	11.7	8.4	1.4	15	6.2	10.3	7.4	1.2	11	6.3	9.5	-	-	-	-	-
Little Falls Spillway	9.6	1.4	17	7.5	11.9	9.0	1.5	15	6.3	12.0	7.9	0.8	11	6.8	9.7	-	-	-	-	-
Little Falls Turbine	9.0	2.1	18	6.2	13.0	8.2	1.5	14	6.1	10.1	7.9	1.2	11	6.7	10.1	-	-	-	-	-
Little Falls[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.1	2.5	29	5.6	12.8
Month																				
Jan	12.0	0.4	83	10.6	12.7	10.8	0.5	82	9.3	12.0	10.4	0.4	78	9.5	11.2	11.8	0.7	198	10.4	16.1
Feb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	11.4	0.5	81	9.1	13.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	10.7	0.5	81	8.8	11.7	9.9	0.4	82	8.1	10.5	11.3	0.3	69	10.3	11.9	11.4	0.5	72	10.6	12.4
Jun	9.5	0.9	86	6.6	10.6	9.8	0.9	86	5.6	10.8	10.4	0.8	81	7.9	12.0	11.8	0.5	79	10.7	12.8
Jul	8.9	1.2	85	3.9	10.4	8.6	0.9	84	5.0	9.7	8.6	0.8	81	4.8	9.7	10.5	0.9	78	7.3	12.9
Aug	7.7	1.6	87	0.2	9.1	7.8	1.1	80	1.6	9.4	7.4	1.5	82	0.5	9.0	8.2	0.9	79	3.9	8.8
Sep	7.7	1.1	83	0.4	9.5	6.9	1.2	83	0.2	8.6	7.5	0.9	87	1.9	8.8	7.5	1.0	77	3.3	9.1
Oct	8.3	0.5	81	7.6	9.9	7.9	0.4	85	7.2	8.9	7.7	0.6	83	6.4	9.6	8.1	0.5	83	7.0	9.0
Overall	9.5	1.8	667	0.2	13.0	8.8	1.5	582	0.2	12.0	9.0	1.7	561	0.5	12.0	10.2	1.9	666	3.3	16.1

Notes:

SD = standard deviation

n = sample size

1. Little Falls locations combined

* Monthly statistics also include Evan's Landing, Kettle Falls, Hunters, Hawk Creek, Sanpoil R. Confluence and Sanpoil River sampling locations.

References:

Scofield, et. al, 2005

Lee, et. al, 2004

Pavlik-Kunkel, et. al, 2003

Fields, et. al, 2002

Table 4

Turbidity (NTU) Location	2005					2004					2003					2002*				
	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max
Columbia River (Mainstem)																				
Gifford	0.0	0.0	100	0.0	0.0	0.0	0.0	88	0.0	0.0	0.0	0.0	88	0.0	0.0	0.0	0.0	94	0.0	0.0
Seven Bays	0.1	0.6	98	0.0	6.3	0.0	0.2	85	0.0	2.0	0.0	0.0	83	0.0	0.0	0.0	0.0	82	0.0	0.0
Keller Ferry	0.0	0.1	148	0.0	1.1	0.0	0.0	129	0.0	0.4	0.2	1.5	130	0.0	16.4	0.0	0.3	132	0.0	3.5
Spring Canyon	0.0	0.0	147	0.0	0.0	0.0	0.0	130	0.0	0.0	0.0	0.0	127	0.0	0.0	0.0	0.0	137	0.0	0.0
Spokane River (Spokane Arm)																				
Porcupine Bay	0.0	0.1	94	0.0	1.2	0.1	0.7	86	0.0	6.1	0.1	1.1	81	0.0	9.9	0.0	0.0	86	0.0	0.4
Little Falls Above Dam	2.1	4.3	17	0.0	13.5	0.8	2.3	11	0.0	7.6	0.0	0.0	11	0.0	0.0	-	-	-	-	-
Little Falls Boat Launch	0.8	2.0	14	0.0	6.2	0.1	0.3	13	0.0	1.1	0.0	0.0	11	0.0	0.0	-	-	-	-	-
Little Falls Spillway	1.9	4.3	15	0.0	12.8	0.2	0.4	12	0.0	1.2	0.8	2.5	10	0.0	7.8	-	-	-	-	-
Little Falls Turbine	2.7	6.2	18	0.0	18.2	0.0	0.0	14	0.0	0.0	1.2	3.9	10	0.0	12.2	-	-	-	-	-
Little Falls[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0	7.5	27	0.0	22.2
Month																				
Jan	0.0	0.1	83	0.0	1.2	0.0	0.0	82	0.0	0.4	0.0	0.0	78	0.0	0.0	0.4	2.9	193	0.0	22.2
Feb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	1.2	4.0	80	0.0	18.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	0.2	0.9	79	0.0	6.3	0.0	0.0	82	0.0	0.0	0.0	0.0	69	0.0	0.0	0.0	0.1	71	0.0	0.4
Jun	0.0	0.0	83	0.0	0.0	0.0	0.2	86	0.0	1.5	0.19	1.4	78	0.0	12.2	0.0	0.0	75	0.0	0.0
Jul	0.0	0.1	80	0.0	1.1	0.1	0.9	79	0.0	7.6	0.1	1.0	79	0.0	7.8	0.0	0.0	75	0.0	0.0
Aug	0.1	0.7	84	0.0	6.2	0.0	0.0	73	0.0	0.0	0.1	1.1	79	0.0	9.9	0.0	0.0	76	0.0	0.0
Sep	0.1	1.0	81	0.0	8.8	0.1	0.7	82	0.0	6.1	0.19	1.8	86	0.0	16.4	0.0	0.0	77	0.0	0.0
Oct	0.0	0.0	81	0.0	0.0	0.0	0.3	84	0.0	2.0	0.0	0.0	82	0.0	0.0	0.0	0.4	82	0.0	3.5
All Locations	0.2	1.5	651	0.0	18.2	0.04	0.4	568	0.0	7.6	0.09	1.0	551	0.0	16.4	0.1	1.6	649	0.0	22.2

Notes:

Turbidity values > 20 NTU not included

SD = standard deviation

n = sample size

1. Little Falls locations combined

* Monthly statistics also include Evan's Landing, Kettle Falls, Hunters, Hawk Creek, Sanpoil R. Confluence and Sanpoil River sampling locations.

References:

Scofield, et. al, 2005

Lee, et. al, 2004

Pavlik-Kunkel, et. al, 2003

Fields, et. al, 2002

Table 5

Total Dissolved Solids (mg/L) Location	2005					2004					2003					2002*				
	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD	n	Min	Max
Columbia River (Mainstem)																				
Gifford	82.1	3.5	100	75.4	86.5	79.1	5.3	88	70.5	89.0	81.0	3.0	88	76.0	87.0	77.0	4.0	93	73.0	85.0
Seven Bays	81.9	9.0	99	0.4	87.6	78.8	6.3	85	54.4	89.0	81.0	4.0	84	67.0	88.0	74.0	10.0	85	1.0	81.0
Keller Ferry	82.3	3.6	154	76.3	87.0	79.0	4.5	131	71.6	88.8	81.0	4.0	132	75.0	90.0	75.0	4.0	136	66.0	82.0
Spring Canyon	82.5	3.5	151	76.6	86.9	79.4	4.7	133	71.5	89.6	81.0	4.0	130	74.0	90.0	75.0	5.0	138	36.0	82.0
Spokane River (Spokane Arm)																				
Porcupine Bay	87.2	23.8	95	55.1	140.9	82.1	27.0	87	48.7	130.5	95.0	27.0	82	57.0	142.0	71.0	30.0	89	21.0	123.0
Little Falls Above Dam	103.7	29.9	17	59.6	154.2	95.8	34.3	14	51.6	148.9	118.0	33.0	11	69.0	155.0	-	-	-	-	-
Little Falls Boat Launch	102.4	30.2	16	59.5	150.7	95.0	33.9	15	53.0	150.6	120.0	33.0	11	70.0	159.0	-	-	-	-	-
Little Falls Spillway	99.3	30.6	17	59.1	149.8	94.6	33.4	15	53.0	150.0	118.0	33.0	11	69.0	156.0	-	-	-	-	-
Little Falls Turbine	102.9	29.3	18	59.7	150.4	95.4	34.2	14	52.5	148.2	118.0	33.0	11	70.0	155.0	-	-	-	-	-
Little Falls[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	87.0	39.0	29	33.0	142.0
Month																				
Jan	85.0	5.6	83	69.0	92.3	91.0	8.3	82	85.4	119.6	84.0	16.0	78	74.0	118.0	82.0	2.0	198	79.0	102.0
Feb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	85.3	2.4	81	82.2	91.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	74.5	8.8	81	55.1	86.4	72.9	12.3	82	50.5	89.6	83.0	10.0	69	57.0	90.0	70.0	15.0	72	36.0	80.0
Jun	75.7	5.0	86	61.5	79.7	67.6	9.4	86	48.7	78.8	78.0	8.0	81	60.0	88.0	62.0	16.0	79	32.0	75.0
Jul	81.5	8.8	85	65.0	106.6	73.8	5.8	84	53.4	82.7	80.0	6.0	80	66.0	100.0	67.0	13.0	77	1.0	74.0
Aug	86.4	13.6	87	71.8	125.2	83.5	12.7	80	64.2	119.7	89.0	16.0	82	76.0	135.0	75.0	11.0	79	43.0	107.0
Sep	96.8	21.3	83	82.7	154.2	93.1	21.6	83	78.6	150.6	93.0	25.0	87	77.0	159.0	84.0	18.0	77	67.0	142.0
Oct	95.2	22.2	81	0.4	140.9	86.6	16.2	85	76.6	123.1	94.0	23.0	83	79.0	147.0	84.0	17.0	83	75.0	128.0
Overall	85.0	14.9	667	0.4	154.2	81.2	16.0	582	48.7	150.6	86.0	18.0	560	57.0	159.0	76.0	15.0	665	1.0	142.0

Notes:

SD = standard deviation

n = sample size

1. Little Falls locations combined

* Monthly statistics also include Evan's Landing, Kettle Falls, Hunters, Hawk Creek, Sanpoil R. Confluence and Sanpoil River sampling locations.

References:

Scofield, et. al, 2005

Lee, et. al, 2004

Pavlik-Kunkel, et. al, 2003

Fields, et. al, 2002

Appendix D.
Flow Action under the Biological Opinion

Appendix D

Flow Action under the Biological Opinion

A. ESA Actions

1. Hydro Operations

A.1.e. Flow Actions

The Parties agree to the following actions in addition to those in the draft FCRPS BiOp:

To address the Tribes' concerns regarding dry year operations of the FCRPS, particularly Lake Roosevelt, the Parties agree as follows:

(i). Summer Drafting. As described in the draft FCRPS Biological Opinion (October 2007)(draft FCRPS BiOp), currently Lake Roosevelt is drafted to elevation 1280 feet by August 31 when the April through August water supply forecast (WSF) is greater than 92 million acre feet (MAF) (wettest 50 percent of water years) at The Dalles. When the WSF is less than 92 MAF (driest 50 percent of water years), Lake Roosevelt is drafted to elevation 1278 feet (see draft FCRPS BiOp, Reasonable and Prudent Action (RPA) No. 4, Storage Project Operations, Table 1, Grand Coulee, pages 4 and 6 of 85). A study to evaluate drafting Lake Roosevelt to 1278 feet only in the lowest 20 percent of water years and to 1280 feet in all other water years (see FCRPS Biological Assessment) (August 2007) (FCRPS BA) at Section B.2.1, page B.2.1-9) will be initiated jointly by BPA and Reclamation in consultation with the Colville Tribes within 60 days of completion of the FCRPS BiOp and a draft report will be prepared within nine months of study initiation. The study results will be reviewed by the Action Agencies and the Regional Governance Group to determine whether to draft Lake Roosevelt to elevation 1278 only in the driest 20% of water years.

(ii). Other Dry Year Operations. An investigation of Dry Water Year Operations other than summer drafting will be initiated by BPA and Reclamation and a technical workgroup formed by the Action Agencies within 60 days of the issuance of the FCRPS Bi-Op as outlined in RPA No. 14 in the draft FCRPS BiOp (RPA No. 14: Dry Year Strategy, draft FCRPS BiOp page 15 of 85). The workgroup will be composed of representatives from BPA, Reclamation, and the Colville Tribes. NOAA Fisheries and other interested parties will be invited to participate. The workgroup will report preliminary results by nine months after its formation.

The Dry Water Year Operations investigation described above will include:

(4) Washington State's Columbia River Water Management Program (CRWMP), early action Lake Roosevelt drawdown includes a streamflow enhancement component. This component would allow for an additional release of up to 27,500 acre-feet in 96 percent of water years and 44,500 acre-feet in the driest 4% of water years. In most years that water will likely be released from Lake Roosevelt in July and August to benefit summer migrants, except that pursuant to a December 17, 2007, Agreement between the State of Washington and the Colville Tribes and as set forth in the FCRPS BA Appendix B, Attachment B.1-4 at B.1-4-6, in the driest 20% of water years the CRWMP streamflow enhancement component will be released in April-

June to benefit UCR migrants. This investigation will provide additional evaluation regarding release of the CRWMP water to benefit spring migrants in the driest 20% of water years.

In contrast to the study described in paragraph (i) above ("Summer Drafting") that evaluates the effects of drafting Lake Roosevelt to elevation 1278 feet by the end of August in the driest 20% vs. 50% of water years evaluates the effects to benefit summer migrants, the study called for in this paragraph (ii)("Dry Water Year Operation") evaluates possible hydroelectric system operations to benefit UCR steelhead and spring chinook salmon and other spring migrants.

(iv)…. Any planned changes to operational criteria for Lake Roosevelt or Rufus Woods Lake will be specifically coordinated, on a government-to-government basis with the Colville Tribes.

Appendix E.
Lake Roosevelt Artificial Fish Propagation Facilities

Appendix E

Artificial Fish Propagation Information

The Spokane Tribal Hatchery

The tribal hatchery, located on the Spokane Reservation along Chamokane Creek at Galbraith Springs, was built in 1991 and has been used as the primary rearing facility (Peone 2003). Rainbow trout from the Spokane Trout Hatchery (McCloud River stock) and kokanee (originally Lake Whatcom stock) eggs are reared at the hatchery. When available, Meadow Creek kokanee eggs (British Columbia) are obtained and reared, or conversely, they are crossed with local wild kokanee to generate what is known as a 'Lake Roosevelt' stock. Eggs are incubated and fish are raised to fingerling size. All kokanee are adipose fin clipped to distinguish them from wild kokanee present in the lake. The following management actions occur at the Tribal Hatchery:

1) Post-smolt kokanee are released at Fort Spokane boat launch, Little Falls Dam, and Colville River below Meyers Falls in June (67,000 kokanee).

2) An allotment of 360,000 kokanee fingerlings are transferred to Sherman Creek Hatchery for final rearing in the fall.

3) In conjunction with WDFW Sherman Creek Hatchery, a total of 500,000 yearling rainbow trout are stocked in 46 net pens located at Keller Ferry, Seven Bays, Lincoln, Two Rivers, Hall Creek, Hunters, Gifford and Kettle Falls. Net pen rainbow trout are released in May or June depending on reservoir conditions. Half the total number stocked (250,000 total rainbow trout) are transferred from the Spokane Tribal Hatchery to the Sherman Creek Hatchery as fingerlings in July for final rearing until October.

4) Kokanee salmon fingerlings are stocked into net pens at Seven Bays in October (126,000 kokanee) to be released the following May or June.

5) Kokanee salmon fry are released into Banks Lake (400,000 kokanee).

The Sherman Creek Hatchery

Operated by WDFW, the Sherman Creek Hatchery is located 3 miles west of Kettle Falls, Washington, adjacent to Sherman Creek. The hatchery is an acclimation and rearing facility for kokanee and rainbow trout, and is a kokanee egg collection facility. The hatchery was built in 1991 and began fish releases in 1992. It currently serves as the primary kokanee salmon release and collection site, as well as a critical location for net pen rainbow trout rearing in the upper reservoir (Combs, 2001, 2002, 2003).

Sherman Creek Hatchery's primary objective is the restoration and enhancement of the recreational and subsistence fishery in Lake Roosevelt and Banks Lake. The Sherman

Creek Hatchery was designed to rear 1.7 million kokanee fry for acclimation and imprinting during the spring and early summer. Additionally, it was designed to trap all available returning adult kokanee during the fall for broodstock operations and evaluations.

Since the start of this program, the operations on Lake Roosevelt have been modified to achieve improved program goals. The Washington Department of Fish and Wildlife, Spokane Tribe of Indians and the Colville Confederated Tribe form the interagency Lake Roosevelt Hatcheries Coordination Team (LRHCT) which sets goals and objectives for both Sherman Creek and the Spokane Tribal Hatchery and serves to coordinate enhancement efforts on Lake Roosevelt and Banks Lake. The primary changes have been to:

1) Replace the kokanee fingerling program with a yearling (post-smolt) program of up to 1,000,000 fish; and

2) Construct and operate twenty net pens to handle the increased production. This program enables the Spokane Tribal Hatchery to rear additional kokanee to further the enhancement efforts on Lake Roosevelt.

Current objectives for all of the artificial propagation facilities incorporate the increased use of native/indigenous stocks where available for propagation into Upper Columbia River Basin Waters. Management actions occurring at the Sherman Creek Hatchery include:

1) Obtaining kokanee fingerlings from Spokane Tribal Hatchery in October that are reared in net pens and released the following May (376,000 kokanee).

2) Obtaining kokanee pre-smolts from Spokane Tribal Hatchery in April that are held in the hatchery raceways and released in June or July directly into the Lake. Fish average 6 to 8 inches at release (250,000 kokanee).

3) Obtaining rainbow trout fingerlings from the Spokane Tribal Hatchery in July. The fish are transferred to net pens in October for winter rearing and released the following June (250,000 rainbow trout).

4) Obtaining Phalon Lake stock rainbow trout (interior redband rainbow trout) from the WDFW Colville Hatchery for the Kettle Falls net pens (60,000 Phalon Lake rainbow trout).

5) Collecting returning adult kokanee for spawning purposes. At age three or four, kokanee released from Sherman Creek return to spawn. Sherman Creek Hatchery is outfitted with a fish ladder to collect adults and take eggs. Fertilized kokanee eggs are transported to the Spokane Tribal Hatchery for rearing.

6) Acclimating additional rainbow trout and additional kokanee during the summer months depending on fish availability and water temperatures.

The Ford Trout Hatchery

Originally funded by Bureau of Reclamation, the Ford Hatchery is now maintained by WDFW. It is located in Ford, Washington. The role of the Ford Trout Hatchery is to provide kokanee salmon for release into Banks Lake and contribute to the combined production of the other two facilities. Ford Hatchery's production (along with Sherman Creek and the Spokane Tribal Hatchery) contribute to a goal of one million kokanee yearlings for Lake Roosevelt and one million kokanee fingerlings and fry for Banks Lake. The hatchery provides 1.14 million kokanee to Banks Lake; 440,000 kokanee fry in the spring and 700,000 fingerlings in the fall.

While the origin of kokanee hatchery stock comes from Lake Whatcom, current objectives promote the use of native (or, indigenous) stocks for propagation in Lake Roosevelt, Banks Lake, and the Upper Columbia River. The BPA implemented an increased commitment to operation and maintenance funding for the kokanee program in FY 2001, which is scheduled to continue through FY 2010.

The Ford Hatchery also produces resident rainbow trout (80,584 pounds per year) to promote the sport fisheries in trout fishing lakes in eastern Washington (WDFW Management, Region 1) including Lake Roosevelt. Monitoring and evaluation of the Ford stocking programs include existing WDFW creel and lake survey programs to assess resident trout releases in trout managed waters. BPA also funds creel surveys to assess the harvest of hatchery kokanee in Banks Lake.

The WDFW Colville Hatchery

Located in Colville, Washington, this hatchery raises, among other stocks, an indigenous Kettle River tributary stock of redband rainbow trout from Phalon Lake. These rainbow trout are reared at the hatchery, placed into net pens in the reservoir and released into Lake Roosevelt as yearlings in September. Phalon Lake stock is used because it is resident to tributaries of the upper Columbia and, therefore, this stock works toward the objective of sustaining native fisheries.

Operations began at the hatchery in 1990 and have continued to the present time. Originally the project was production goal oriented (1990-1994). However, in 1995 more fisheries-related goals and objectives were developed for the program as a means to assess the impact of the program on subsistence and recreational fisheries (Truscott, 1995).

The Colville Confederated Tribes

The Colville Confederated Tribes occasionally purchase sterile (triploid) rainbow trout from Trout Lodge, Montana, or Columbia River Fish Farms for recreational fishing enhancement. In the fall of 2001, approximately 12,000 two-pound rainbow trout were released at Kettle Falls, Two Rivers, and Keller Ferry Marinas. In July 2003, approximately 8,500 of these sterile 1.5 pound rainbow trout were released throughout the reservoir. The triploid fish grow larger than fertile fish of the same species since no

energy is expended in gamete production. These fish are marked with yellow floy tags. Response from anglers has been very positive, with tag returns increasing two-fold. Annual releases vary and depend on funding.

The Lake Roosevelt Volunteer Net Pen Program

The net pen program was initiated in 1985 by Mr. Winn Self, owner of the Seven Bays Marina. He released 5,000 trout from one net pen that year. Prompted by the excellent harvest and growth rates of the net pen reared fish and limited space at the hatcheries, changes were incorporated at the hatcheries to rear 500,000 rainbow trout for Lake Roosevelt net pens. Today there are 46 net pens located throughout the reservoir that hold rainbow trout and kokanee salmon. Net pens are usually filled in the fall, and the fish released the following May or June. WDFW purchases the food, but volunteers feed the fish daily, release the fish after the spring drawdown, and maintain the nets and floats.

The current objective is to rear fish to a sufficient size to minimize predation and to release the trout following spring reservoir drawdown in a manner to help reduce entrainment through Grand Coulee Dam. Two rainbow stocks are currently used in the program. The first stock is Spokane rainbow trout (McCloud River stock), which historically provided a successful and popular sports fishery on Lake Roosevelt. Currently both fertile and sterile Spokane rainbow stocks are being tested to assess the effect these fish may have on creel returns and impacts on native fish in the system. The second stock under assessment is the wild Phalon Lake redband trout, which originate from tributaries of the Kettle River.

The Lake Roosevelt Fisheries Evaluation Program, (LRFEP), conducts the monitoring and evaluation of the rainbow trout net pen program as described below. LRFEP research indicates the Phalon Lake rainbow trout, marked and released in the Kettle Falls area, were only recaptured in the northern section of the reservoir, suggesting this locally adapted stock tends to stay in local areas without migrating downstream like the coastal stock rainbow trout (McLellen et al., 2003).

The rainbow trout are released ideally in June, but in years of deep drawdown, physical limitations require earlier releases. The net pen program produces the most successful fishery in the lake. Over 95 percent of all rainbow trout captured in the lake are from the net pens (Underwood, 2000).

Lake Roosevelt Fisheries Evaluation Program

The scientific fisheries evaluation of the artificial production is accomplished through the Lake Roosevelt Fisheries Evaluation Program (LRFEP) funded by BPA. The Spokane Tribe is the lead entity, with the Colville Confederated Tribes, Washington Department of Fish and Wildlife and Eastern Washington University as sub-contractors. Each agency focuses on specific questions to answer regarding the artificial production program. Major projects on the reservoir include:

1) Spokane Tribe of Indians:

a) Long-term monitoring and analysis of fishery and limnology in Lake Roosevelt (Griffith and Scholz, 1991; Peone et al., 1991; Thatcher et al., 1993; Shields and Underwood, 1996, 1997; Cichosz et al., 1997, 1998; Spotts et al., 2002; McLellan et at., 2003).

b) Kokanee salmon precocity study (McLellen et al., 2003).

2) Colville Confederated Tribes

a) Shoreline habitat analysis

b) Under the Chief Joseph Kokanee Enhancement Project:

1. A micro-satellite DNA genetic inventory of all kokanee stocks found in Lake Roosevelt area.

2. Entrainment study to determine if strobe lights deter fish from entraining through Grand Coulee Dam (LeCaire, 1999; BioSonics, 2000; Simmons et al., 2002).

3) Washington Department of Fish and Wildlife

a) Determine limiting factors for kokanee and rainbow trout using hydro-acoustics and bioenergetics modeling (Baldwin et al., 2003; Baldwin and Polacek, 2003).

b) Cooperative effort between Spokane Tribe, Colville Tribes, and Canadian Fisheries Agencies and stakeholders to protect, recover, and enhance white sturgeon in the Upper Columbia.

4) Eastern Washington University

a) Evaluate release strategies for kokanee salmon to maximize angler harvest and adult returns for egg collection. Including evaluation of Meadow Creek (British Columbia) stock and Lake Whatcom (Washington) stock performance in the reservoir. (Tilson et al., 1994, 1995, 1996; Tilson and Scholz, 1997,1998; McLellan et al., 2001; McLellan and Scholz, 2001, 2002a, 2003).

b) Evaluate walleye population dynamics in Lake Roosevelt (McLellan et al., 2002; McLellan and Scholz, 2002b).

c) Facilitate fish tag reward program.

d) Evaluate rainbow trout program through the tagging project.

Local Propagation Facilities for other species

Cutthroat Trout

WDFW Colville Hatchery

Currently, westslope cutthroat trout are rarely encountered in Lake Roosevelt (Cichosz et al., 1999; Underwood and Shields, 1995). Moreover, tributaries of Lake Roosevelt contain limited populations of adfluvial cutthroat stocks. Inventory projects in some of the tributaries reveal that native populations of westslope cutthroat trout are extremely limited and in many areas are not detectable. Hatchery-reared cutthroat trout are not currently released into Lake Roosevelt under one of the fish restoration programs, but area lakes are stocked with cutthroat trout originating from the Colville Hatchery, including the Kings Lake Stock of westslope cutthroat trout (Underwood, 2000).

White Sturgeon

Since impoundment of Lake Roosevelt, white sturgeon populations have declined to extremely low levels. The only known viable spawning locations exist immediately downstream of the confluence with the Pend Oreille River in British Columbia and at two sites near Northport, Washington at the Little Dalles and Dead Man's Eddy (Howell and McLellan, 2006). In 1998, a stock-indexing project (Devore et al., 2000) found only 1.5 percent of the captured white sturgeon were juveniles [less than 110 cm (3.6 feet) fork length], suggesting poor juvenile recruitment to the population. The survey revealed an age structure of 12 to 96 year old fish (Devore et al., 2000). Devore et al. (2000) concluded the white sturgeon population had severe recruitment limitations. This effort supported conclusions of research conducted in the Canadian Reach of the Columbia River (R.L. & L Environmental Services Ltd., 1996).

Devore et al. (2000) also found the relative weight for white sturgeon collected from Lake Roosevelt during the study was significantly less than for other local populations. To date, the relative weight of Lake Roosevelt sturgeon is the lowest recorded for any of the Columbia River Basin white sturgeon populations (Underwood, 2000).

Preliminary results from recent stock assessments in the upper Lake Roosevelt suggest the reproductive potential of the population is currently high based on the abundance of broodstock sized fish, good condition factors and maturation characteristics similar to mid-Columbia populations that support limited levels of exploitation with periodic recruitment events. Gamete viability is good based on the success of conservation aquaculture efforts using wild caught broodstock, high survival rates of eggs and larvae during *in situ* incubation experiments, and recent collections of larvae. Despite these findings, recent gill netting has failed to capture wild fish (Howell and McLellan, 2006). Rearing habitat appears productive based on the post-release growth rates of hatchery juvenile releases that have that exceeded those of hatchery juveniles released in the Kootenai River and are similar to those of wild juvenile "trawl and haul" transplants in the mid- Columbia. These results suggest that factors limiting recruitment may primarily be acting on life stages between the initiation of feeding and age 1. The cause of the early mortality is unknown, but could be due to a variety of factors that are primarily acting within Lake Roosevelt. Some suggest the change to reservoir habitats in the upper Columbia River basin may have altered predator/prey relationships making young-of-the-year white sturgeon more vulnerable to predation or, conversely, vulnerable to changes in

their own prey items. It is likely, local population of white sturgeon could have the potential to become a candidate species for ESA protection because of a lack of juvenile recruitment and suitable spawning habitat within Lake Roosevelt.

Kootenay Sturgeon Conservation Hatchery

Based on these findings, the Upper Columbia White Sturgeon Recovery Initiative undertook fish culture work involving adult brood capture, in-hatchery breeding and juvenile rearing of white sturgeon since 2001. The Initiative operated a pilot fish culture conservation program at Hill Creek Hatchery, near Nakusp, Britich Columbia. During the winter of 2002, the larger Kootenay Sturgeon Conservation Hatchery near Cranbrook underwent modifications to operate as a conservation hatchery for upper Columbia white sturgeon. The Kootenay Sturgeon Conservation Hatchery now cultures and rears both Kootenay River white sturgeon and upper Columbia River white sturgeon in separate locations at the same facility. Juvenile fish reared at this conservation hatchery are used to prevent the population from disappearing in the short-term and will provide young fish for research to understand the poor success of reproduction in the wild. Although extremely important, the present fish culture work is not regarded as a long-term solution to the sturgeon's decline.

During the spring months, ripe adult females and males are captured during a May-June broodstock program on the upper Columbia River. The fish are transported to the hatchery and crossed to produce as many as six families and about 12,000 juvenile white sturgeon. Since 2002, between 10,000 and 13,000 juvenile white sturgeon have been released to the Columbia River each spring. The fish are tagged with a small Passive Integrated Transponder (PIT) tag. PIT tags provide information on each fish's background when the fish are subsequently recovered.

Moses Lake Pilot Hatchery

Beginning in February 2004, a Columbia Basin white sturgeon pilot hatchery at Moses Lake began rearing 2003 brood year juveniles for release at recommended sites. The hatchery program continues to develop and refine fish culture techniques, with the goal to implement a larger conservation facility with space to permit adult holding, incubation as well as juvenile rearing facilities.

In May 2004, the first hatchery sturgeon release occurred into Lake Roosevelt, utilizing fish produced at the Kootenay Sturgeon Conservation Hatchery in Canada, and reared by the Washington Department of Fish and Wildlife (WDFW) at the Moses Lake facility. Approximately 2,000 10- to 12-inch long yearling sturgeon were released in the Kettle Falls, North Gorge and Northport areas (LRF, 2004sp). Nearly 3,800 juveniles were released in Lake Roosevelt in 2005 (Howell and McLellan, 2006) and 3,400 12- to 15-inch long age-1 yearlings of the 2006 brood class were released near Kettle Falls and Marcus Flats in May 2007 (WDFW, 2008).

The current process includes: (1) collecting 10 wild spawning adult white sturgeon broodstock (5 of each sex in advanced stages of gonadal development) from the

Northport, Washington spawning site; (2) transporting and holding these fish at Sherman Creek Hatchery in Kettle Falls, Washington; (3) spawning enough fish to produce three unique families (1 male: 1 female matings); (4) transferring 45,000 eggs from Sherman Creek Hatchery to the WDFW Columbia Basin Hatchery in Moses Lake, Washington; and (5) incubating and rearing the juveniles to produce 6,000 white sturgeon from the US sub-population for release in to the Upper Columbia River following the protocols identified in the Upper Columbia River White Sturgeon Recovery Initiative plan. There are currently 70,000 larvae on station and the WDFW anticipates a release of 4,000 yearlings in May 2008 (WDFW, 2008).

Although the cause of the poor juvenile recruitment to the local populations is poorly understood, there has been some successful recruitment in recent years. Recent sampling programs have been initiated under the BPA-sponsored Lake Roosevelt White Sturgeon Recovery Plan (LRWSRP Project #199502700) to locate juvenile upper Columbia white sturgeon in the Lake Roosevelt system and to assess limiting factors. Over a three-day fall 2002 study period, the Spokane Tribe of Indians deployed 45 benthic-set horizontal gillnets in the northern portion of Lake Roosevelt between Northport and Kettle Falls, Washington. A total of 134 fish were collected from six families. Of the samples collected, six were juvenile white sturgeon, and two possessed PIT tags. The two tagged sturgeon juveniles, identified as originating from the British Columbia-based fish culture program at Hill Creek Hatchery, were collected near the river-reservoir interface between 119 and 130 miles upstream of Grand Coulee Dam. Although movement of white sturgeon from Canada into the United States has been verified, it is unknown if these fish return to Canada at some point in their long life-cycle. The other four juvenile sturgeon collected were not marked and were captured in close proximity to each other. These fish ranged from 626 mm to 710 mm in total length, and the Tribe assumed they represented a single-year class.

During the 2004 and 2005 study season, Howell and McLellan (2006) collected 210 wild and 3 juvenile hatchery white sturgeon from the 2001 brood year between Grand Coulee Dam and the US border. A majority of these collections occurred between the mouth of the Colville River and Marcus Island. The authors acoustically tagged 13 adult fish between 6 and 8 feet in length and followed their movements. Total cumulative distance traveled during a 5-month active movement period ranged between 9 and 469 miles with an average distance covered of 191 miles. Howell and McLellan (2006) provided evidence of white sturgeon spawning in the Northport area during late June and early July, 2004. Plankton netting in late July captured early stage sturgeon free-embryos, and the authors reported no sturgeon eggs or larvae in the diets of 164 sampled predators. Nevertheless, young-of-the-year white sturgeon were not found in any sampling during the remainder of the sampling season.

Similarly, Golder Associates, Ltd. (2007) reported the collection of 212 juvenile sturgeon in the upper Lake Roosevelt area during 2005 and 2006 sampling efforts. All of these fish were located near the river bottom in water depths exceeding 50 feet (15 m). Most occurred over fine sediment or fines with some amount of gravels or cobbles. Few of these fish were located over substrates with predominately large bed-element sizes including gravel, cobble or boulder size classes (Golder Associates, Ltd., 2007).

Additional research under the LRWSRP related to juvenile white sturgeon recruitment is on-going to assess life-history characteristics and potential limiting factors to improve recovery planning efforts in the upper Columbia River. Currently no fishery exists for white sturgeon in the Lake Roosevelt area.

Appendix F.
Fish Tissue Sampling Appendix Information

Fish Tissue Sampling Appendix Information

Fish tissue sampling was conducted in 2005 as part of the Phase I RI/FS Report for the upper Columbia River (CH2M Hill, 2007). Fish species and tissue types included in this sampling program were:

- Walleye *(Sander vitreus)* – Fillet and offal at three Fish Sample Collection Areas (FSCAs) and whole body at three FSCAs;
- Rainbow trout *(Oncorhynchus mykiss)* – Fillet and offal at three FSCAs and whole body at three FSCAs;
- Lake whitefish (*Coregonus clupeaformis*) – Whole body only;
- Largescale sucker *(Catostomas macrocheilus)* – Whole body only; and
- Burbot (*Lota lota)* – Whole body only (CH2M Hill, 2007).

Six fish sampling areas were located in Lake Roosevelt at upper, middle, and lower reaches, with five samples for each species and tissue type planned at each sampling location. Fish samples were analyzed for the target analyte list, PCBs, dioxins and furans, arsenic speciation, percent lipids, and percent moisture. Significant results for all tissues types tested during the study include:

- Concentrations were similar in fillet samples across species for nine Preliminary Contaminants of Interest: aluminum, barium, cadmium, chromium, copper, iron, selenium, uranium, and zinc.
- Arsenic and lead concentrations in fillets from walleye and wild rainbow trout were about twice the concentrations for hatchery rainbow trout.
- Mean nickel concentrations in walleye fillets were about three to four times higher than in wild and hatchery rainbow trout fillets.
- Mean mercury concentrations in walleye fillets were about two times those seen in wild and hatchery rainbow trout fillets.
- Wild rainbow trout fillets had about two times the concentration of total PCBs as did walleye fillets. Hatchery rainbow trout fillets were intermediate.
- 2,3,7,8 Tetrachlorodibenzofuran concentrations were about five times greater in wild rainbow trout fillets than in fillets from either walleye or hatchery rainbow trout (CH2M Hill, 2007).

Statistical analysis for relationships between species types and location within Lake Roosevelt (upper, middle, or lower reaches) were also calculated. Results follow:

- **Walleye:** There was no significant difference in the mean whole body walleye concentrations between reaches for aluminum, barium, chromium, iron, and zinc. All other Preliminary Contaminants of Interest (PCOI) showed a significant difference (P>0.1) in mean concentrations between reaches and the highest mean concentration in the middle reach, with the exception of mercury, total PCBs, and 2,3,7,8 TCDF, which showed an increasing downstream trend.

- **Rainbow trout:** For the comparison of whole body wild rainbow trout, the mean concentrations of lead and total PCBs were significantly different (P>0.1) between the upper and middle reaches. All other PCOI showed no significant difference (P>0.1) in mean concentrations. For the whole body hatchery rainbow trout, aluminum, cadmium, copper, lead, nickel, selenium, and mercury showed significant differences (P>0.1) in mean concentrations between the middle and lower reaches. All other PCOI were not significantly different (P>0.1). For the comparison of whole body wild and hatchery rainbow trout in the middle reach, the mean concentrations of arsenic and selenium were significantly different (P>0.1). All other PCOI showed no significant difference (P>0.1) in mean concentrations.

- **Lake whitefish:** There was no significant difference (P>0.1) in the mean lake whitefish whole body concentrations between reaches for aluminum, arsenic, copper, iron, uranium, and zinc. All other PCOI showed a significant difference (P>0.1) in mean concentrations between reaches. The observed pattern between reaches varied by PCOI. Of the PCOI with mean differences, barium and arsenic were characterized by having the highest concentrations in the middle reach; chromium, nickel, and total PCB showed an increasing trend downstream.

- **Largescale sucker:** There was no significant difference (P>0.1) in the mean largescale sucker whole body concentrations between reaches for aluminum, arsenic, barium, chromium, nickel, total PCBs, and 2,3,7,8 TCDF. All other PCOI showed a significant difference (P>0.1) in mean concentrations between reaches. The observed pattern between reaches varied by PCOI. Of the PCOI with mean differences, copper, iron, and zinc were characterized by having the highest concentrations in the upper reach and similar concentrations in the middle and lower reaches. Cadmium, lead, and uranium showed an increasing downstream trend. Mercury increased from the upper to the middle reaches and was the same in the lower reach. Selenium decreased from the middle to lower reaches.

- **Burbot:** There was no significant difference (P>0.1) in the mean burbot whole body concentrations between reaches for chromium, copper, lead, nickel, uranium, zinc, total PCBs, and 2,3,7,8 TCDF. All other PCOI showed a significant difference (P>0.1) in mean concentrations between reaches. The observed pattern between reaches varied by PCOI. Of the PCOI with mean differences, aluminum, barium, cadmium, iron, and mercury were characterized

by increasing downstream concentrations. Arsenic increased between the middle and lower reaches. Selenium decreased downstream. (CH2M Hill, 2007).

The 2007 upper Columbia River Report also compared results from the study with past fish tissue sampling efforts in Lake Roosevelt. These studies were not designed for detailed comparisons, but the following general trends were noted:

- Mercury may be declining in walleye and rainbow trout (i.e., both wild and hatchery) fillets.
- 2,3,7,8 TCDF continues to decline in lake whitefish.
- Metals appear to be unchanged in walleye and rainbow trout fillets and in largescale sucker whole body, with the exception of lower lead levels in the Northport area (CH2M Hill, 2007).

Appendix G.
Lake Roosevelt Shoreline Management Waterfront Facilities Drawdown Impact Study

Lake Roosevelt Shoreline Management

Waterfront Facilities

Drawdown Impact Study

July 17, 2008

kpff Consulting Engineers

Drawdown Impact Study

July 17, 2008

Prepared for:
National Park Service
Lake Roosevelt National Recreation Area
1008 Crest Drive
Coulee Dam, WA 99116

Prepared by:
KPFF Consulting Engineers
1601 Fifth Avenue, Suite 1600
Seattle, WA 98101
KPFF Project No. 108268

Table of Contents

1. Introduction 1

Background 1

Purpose of Study 1

2. Withdrawal Options 2

Reservoir Elevations 2

3. Facility Impacts 3

Site Visit 3

Evaluation Process 3

4. Findings 6

Average or Wet Year 6

Dry Year 8

Drought Year 8

5. Conclusion 11

Summary 11

List of Figures

Figure 3-1 – Boat Launch (Seven Bays) 4
Figure 3-2 – Skid Dock (Crescent Bay)..... 4
Figure 3-3 – Courtesy Dock (Porcupine Bay)..... 5
Figure 3-4 – Swimming Boom System (Spring Canyon))..... 5
Figure 3-5 – Marina Facilities (Keller Ferry)..... 5
Figure 3-6 – Marina Facilities (Kettle Falls) 5

List of Tables

2-1 Reservoir Elevations on August 31st..... 2
4-1 Non-Functional Facilities for Water Levels Below 1,280 Feet..... 7
4-2 Facility Impacts for Dry and Drought Years..... 9

Appendices

Appendix A – Facility Equipment Information and Cost Data

1. Introduction

BACKGROUND

The Washington State Department of Ecology, in partnership with the U.S. Bureau of Reclamation, has developed a plan to withdraw additional water from Lake Roosevelt. This water will be used to provide additional water supply for municipal and agricultural use, to replace a portion of current ground water usage in the Odessa sub-area, to benefit fish by enhancing stream flows in the Columbia River, and to maintain a steady supply of water to interruptible water rights holders in drought years. This plan for additional water withdrawals is known as the Lake Roosevelt Incremental Storage Releases Program. For non-drought years, the additional water withdrawals will result in a lake level approximately 1 foot below normal levels for a short duration period at the end of August. For drought years, the withdrawals will result in a lake level drawdown of approximately 1.8 feet below normal levels at the end of August.

The Washington State Department of Ecology has developed a Programmatic Environmental Impact Statement (EIS) and a Draft Supplemental EIS to evaluate potential environmental impacts of the proposal, including impacts to recreational and scenic resources. The majority of the lake shoreline is publicly owned and managed by the National Park Service (NPS) as the Lake Roosevelt National Recreation Area (LRNRA). The remaining shoreline is owned and managed by the Confederated Tribes of the Colville Reservation and the Spokane Tribe of Indians.

PURPOSE OF STUDY

The purpose of this report is to evaluate the likely impacts of the Lake Roosevelt Incremental Storage Releases Program on existing public-use facilities that are part of the Lake Roosevelt National Recreation Area, managed by the National Park Service. The facilities in the LRNRA include 26 public campgrounds and boat-in-only campgrounds, 11 designated swimming beaches, and three concessionaire-operated marinas located at Kettle Falls, Keller Ferry, and Seven Bays.

2. Withdrawal Options

RESERVOIR ELEVATIONS

The Programmatic EIS describes the original proposal for timing and quantities of the additional withdrawals. The timing of release proposed concentrates the additional releases in the months of July and August. The maximum amount of additional lake drawdown would occur at the end of August and last from several days to several weeks. The Draft Supplemental EIS describes additional options for timing of the water releases that have the effect of spreading out the withdrawal over the summer and decreasing the expected drawdown at the end of August. This report analyzes the impacts of the Programmatic EIS release timings, because these timings present the greatest drawdown elevations in the late August evaluation period.

Reservoir elevations vary considerably over the course of the year (potentially up to 80 feet) with lowest elevations occurring during the month of May. The reservoir elevation quickly rises in early June so that the lake levels are above elevation 1,280 feet by mid-June. This corresponds with the start of the heavy summer recreation period. Reservoir elevations may reach an elevation of 1,290 feet by mid-July and slowly taper back down to the elevation of 1,280 feet by the end of August, when heavy recreational use is nearing an end. The lake levels quickly rise again in September. Many of the shoreline facilities are currently designed to function only within the range of average summer lake levels, because most recreational usage occurs during the summer months. Additional lake drawdown would produce the greatest impact on August 31st of each year. This coincides with the time of the maximum water level drawdown and is still within the heavy summer visitation period.

Reservoir elevations for current August 31st conditions, and for corresponding proposed elevations due to maximum potential drawdown amounts, are shown below:

Table 2-1: Reservoir Elevations on August 31st

Rainfall Year	Current Elevation (MSL)	Proposed Elevation (MSL)
Average / Wet Year	1,280.0 feet	1,278.9 feet
Dry Year	1,278.0 feet	1,276.9 feet
Drought Year	1,278.0 feet	1,276.2 feet

3. Facility Impacts

SITE VISIT

KPFF Consulting Engineers visited NPS-operated waterfront facilities located along Lake Roosevelt on June 3-6, 2008. Two engineers from KPFF, Katie Herold, a civil engineer and Chris LeVan, a structural engineer, attended all site visits. These site visits allowed KPFF to gain familiarity with the layout of each waterfront facility and to inventory the various waterfront systems in place. Over the duration of the site visits, the water elevation of Lake Roosevelt varied from 1,267.4 feet to 1,272.4 feet. A total of 24 waterfront facility sites were visited. Ray Dashiell of the NPS accompanied KPFF on all site visits for facilities located south of Hunters. Only Lake Roosevelt waterfront facilities that are operated by the NPS or their concessionaires were evaluated. The following facilities were designated as non-impact by the NPS and were not evaluated: Crescent Bay, Hanson Harbor, Lincoln Mill, Hawk Creek, Kamloops Island, Kettle River, Napoleon Bridge, and Summer Island.

There are a total of six NPS-operated boat-in only campsites that have floating facilities located on Lake Roosevelt: Plum Point, Goldsmith, Penix Canyon, Sterling Point, Detillion, and Summer Island. Due to the similarity of these facilities and the difficulty of accessing each individual site, Sterling Point was the only boat-in campsite visited. This site was considered representative of all boat-in only facilities and impacts to the other boat-in sites were judged to be similar.

The NPS also provided photos for several facilities taken after KPFF's site visits with a higher lake water elevation of 1,276.3 feet. These photos provided a closer representation of actual equipment in-service conditions at the evaluation water levels, and were used as an aid to determine the functionality of equipment at the water drawdown levels.

EVALUATION PROCESS

Each NPS facility site included various amenities such as campgrounds, boat ramps, floating docks, play areas, picnic areas, and swimming areas. Of the amenities, only the boat docks, boat ramps, and swimming areas are directly affected by water levels. Facilities were evaluated for expected water level drawdown impacts by first determining the existing level of service provided by waterfront equipment at the current August 31st reservoir elevations shown in Table 2-1. The goal of the evaluation process is to determine what additional modifications, or additions may be required to maintain the same level of service or functionality at the proposed water level drawdown elevations. For example, if a given facility has 40 feet of usable dock length at the current water level elevation of 1,278.0 feet, the goal is to provide the same amount of usable dock length (40 feet) at the lower proposed lake drawdown elevation of 1,276.2 feet.

There are several common waterfront equipment types that are found at the waterfront facilities located along Lake Roosevelt. Most of the facility sites, excluding the boat-in campgrounds, have boat launch ramps. A photo of a typical boat launch is shown in Figure 3-1. Evaluations of boat launches were performed based on the minimum elevation required to launch provided by the NPS; these elevations are included in Appendix A.

Skid docks also exist at most sites with boat launches and sit directly on the concrete surface of the boat launch. See Figure 3-2 for a photo of a typical skid dock. As the water level rises and lowers, the skid docks can be towed up and down the ramp to adjust for fluctuating water levels; thus the skid docks have no impact.

Figure 3-1 – Boat Launch (Seven Bays)

Figure 3-2 – Skid Dock (Crescent Bay)

Courtesy docks are the most common facility amenity. Courtesy docks consist of floating dock sections that are attached to a fixed mount on shore and simply rest on the ground at low water elevations. At low lake elevations, only portions of the courtesy dock may be floating and usable. See Figure 3-3 for a photo of a typical courtesy dock. The typical improvement for this situation is to add an additional dock section to the end of the existing dock system to maintain the same useable length of dock for the current August 31st water levels.

Swim beaches are typically enclosed in one or two rings of either PVC or wood log boom systems. See Figure 3-4 for a typical swimming beach surrounded by PVC and wood log boom systems. These boom systems serve to keep boaters out of the swim area to protect swimmers, to provide a resting point for tired swimmers in areas of deeper water, and to provide some wave attenuation. The mitigation solutions for swimming beaches typically involve lengthening log boom systems and extending the booms outward to enlarge the enclosed swimming area. With the increased likelihood of people swimming beyond the booms in the deeper water, it is recommended that “no boat” buoys be added beyond the outer swim boom.

Figure 3-3 – Courtesy Dock (Porcupine Bay)

Figure 3-4 – Swimming Boom System (Spring Canyon)

The construction of most waterfront equipment is fairly consistent throughout Lake Roosevelt facility sites. However, three concessionaire-operated marinas have slightly different floating dock systems than other NPS operated facilities. These marina docks are typically wood dock systems that are anchored in place and connected to shore via ramps or stairs. The marinas also typically house floating docks for houseboat loading, fuel stations and boat repair. These are accessible via ramps that fluctuate with the water level. The marinas are all located in protected bays that tend to have large flat and shallow bottom areas. This shallow lake bottom is the restricting factor for low water level usability of the marina boat docks. Shifting docks to slightly deeper water where possible is recommended. See Figures 3-5 and 3-6 for photos of marina facilities.

Figure 3-5 – Marina Facilities (Keller Ferry)

Figure 3-6 – Marina Facilities (Kettle Falls)

The resulting drawdown impact was evaluated by comparing site investigation field notes and photos taken last year by the NPS with photos taken this year when the lake elevation was at approximately 1,276.3 feet. For NPS-attended site visits, the average expected facility functionality was discussed. This functionality was then compared with the resulting expected loss of functionality at the August 31st drought year elevation.

Ground slopes were estimated to determine the extent of beach or boat launch exposure at the drawdown depths. Facilities were evaluated without the benefit of a field survey.

4. Findings

AVERAGE OR WET YEAR

The drawdown amount expected for an average or wet year results in a lake elevation of 1,278.9 feet. This elevation is approximately 1-foot less than the current elevation seen at that time of year. However, 1,278.9 feet is still above the elevations typically seen at that time of the year during a dry or drought year. This drawdown elevation remains within the current normal range of summer elevations when considering dry or drought years. Because this elevation is within the normal facility operating range, the facilities are not newly impacted by the drawdown. There are however, several boat launch facilities that function adequately at 1,280 feet but are not recommended for use at lower elevations. Thus, although the facilities would typically remain functional around August 31st during an average or wet year, they would not now be recommended for use at that time of the year, regardless of the yearly rainfall conditions.

Table 4-1 lists NPS facilities that are not currently designed to function at elevations below 1,280 feet. The values shown for minimum boat launch elevations are published by the NPS.

Table 4-1: Non-Functional Facilities for Water Levels Below 1,280 Feet

Facility	Minimum Boat Launch Elevation	Impacts
Marcus Island	1,281 feet	No new impact.
Hawk Creek	1,281 feet	No new impact.
Evans	1,280 feet	Slight impact in average or wet year only.
North Gorge	1,280 feet	Slight impact in average or wet year only.
China Bend	1,280 feet	Slight impact in average or wet year only.
Napoleon Bridge	1,280 feet	Slight impact in average or wet year only.
Kettle Falls	-	No new impact to swim area.
Kamloops	-	No new impact. Courtesy dock on dry land above 1,280 feet.
Kettle River	-	No new impact. Courtesy dock on dry land above 1,280 feet.

For the Marcus Island and Hawk Creek boat launches, the lake level drops below the recommended launch elevation each year during the summer season. Thus, the drawdown does not directly affect those facilities, because they are already not recommended for use at that time of year.

Evans, North Gorge, China Bend, and Napoleon Bridge see lake elevations below minimum launch elevations at the end of August, during dry and drought years. The boat launches are not typically closed at the listed elevations. Site inspections reveal that all but very large boats and trailers could continue to use the ramps with the new drawdown elevation of 1,278.9 feet.

It is recommended that no improvements be made for this drawdown condition. Water elevations will typically be either already below the published boat launch elevation, or close enough to the elevation that few users would be inconvenienced. The small number of users that would need to go elsewhere to launch their boat and the length of time that this inconvenience would occur is not sufficient to justify improvements. Marcus Island, Hawk Creek, and Evans boat ramps are located in shallow surrounding areas; this is the limiting factor for extending ramps. North Gorge, China Bend, and Napoleon Bridge are in steep bank areas and would require extending the ramp on an embankment or building ramps steeper than the standard slope, neither of which is desirable.

DRY YEAR

The drawdown amount expected for a dry year would yield a lake elevation of 1,276.9 feet on August 31st. This is approximately 1 foot less than the current typical elevation occurring at that time of year. The difference between a drought year and a dry year elevation is approximately 8 inches. The specific difference in functionality that occurs between elevations 1,276.9 feet and 1,276.2 feet is too small to evaluate without the use of field survey data or site observations occurring at those two specific elevations. Therefore, site evaluations concentrated on identifying the impacts for the worst-case drawdown, which occurs during the drought year. Suggested improvements to handle drought year impacts are sufficient to mitigate the dry year drawdown.

DROUGHT YEAR

The drawdown amount expected for a drought year would yield a lake elevation of 1,276.2 feet on August 31st. This is 1.8 feet less than the current typical elevation occurring at that time of year. The drawdown amount impacts several facilities because they currently are not designed for operation at these new lower lake level elevations. The primary facilities impacted are courtesy docks and enclosed swim areas. A summary of facility impacts and recommended mitigation strategies are listed in Table 4-2.

The most common drawdown impact is the loss of floating courtesy dock space for boat moorage. Existing courtesy docks have been fabricated and installed by the National Park Service maintenance staff; the NPS has standard construction details for dock sections with 20-foot or 10-foot lengths and widths of 4 feet, 6 feet, or 8 feet. For a 1.8 feet drop in water elevation, the waterline recedes approximately 16.5 feet down the boat ramp. Many of the courtesy docks lie parallel to and at the same slope as the boat ramp. These docks lose approximately 16.5 feet of moorage space.
The recommended mitigation strategy is to add an additional 20-foot length of floating dock section. For courtesy docks not adjacent to boat ramps, the existing ground slope was estimated. It was then determined whether a 10-foot section or a 20-foot dock section should be added.
Specific recommendations for each facility can be found in Appendix A.

Swim areas consist of either log booms or polyvinylchloride (PVC) booms anchored to the shore and anchored out in the water. For the swim areas, rough estimates were made to determine the loss of water enclosed in the swim area. The recommendations are to add additional wood or PVC log boom sections to the existing booms and re-anchor the booms in deeper water. At areas where the inner boom already rests on dry land, the recommendation is to extend the outer log boom only.
Specific recommendations for each swimming area can be found in Appendix A.

In addition to the boat ramps already impacted during an average or wet year there is one additional ramp impacted. The boat launch ramp at Snag Cove is listed as having a recommended minimum lake elevation of 1,277 feet prior to use. The proposed drought drawdown elevation is 9.5 inches lower than this recommended elevation. The recommended minimum lake boat launch elevations are typically conservative and are expected to impact only very large boats. It is estimated that few if any people will be unable to launch at this ramp during the proposed drought year drawdown. No mitigation is recommended for boat launch ramps.

Estimated costs associated with the recommended improvements are based on the assumption that the National Park Service maintenance staff will purchase materials and construct courtesy docks and swim boom units, rather than an outside contractor. It is also assumed that NPS staff will be responsible for material delivery to the installation site and for all installation work. It is expected to take three years to construct and install the recommended improvements. Cost escalation to the mid point was applied to the total estimated cost assuming 4.5 percent yearly escalation. A summary of the total improvement cost for each site in today's dollars is listed in Table 4-2, with escalation added to the total cost of all improvements at the bottom. A more detailed cost breakdown can be found in Appendix A.

Table 4-2: Facility Impacts for Dry and Drought Years

Facility	Amenities Impacted	Recommended Mitigation	Estimated Total Cost
Spring Canyon	Three Courtesy Docks, PVC and Wood Swim Booms	Add a 20-foot long dock section to each dock, add four logs, move four buoy anchors to log boom, add four "No Boat" buoys, and retrofit PVC boom for easy removal.	$58,200
Plum Point	One Courtesy Dock	Add a 20-foot long dock section.	$12,000
Keller Ferry	Two Courtesy Docks, Wood Swim Boom	Add a 20-foot long dock section to each impacted dock, add four logs, move three buoy anchors, and add four "No Boat" buoys.	$34,200
Goldsmith	One Courtesy Dock	Add a 20-foot long dock section.	$15,000
Penix Canyon	One Courtesy Dock	Add a 20-foot long dock section.	$12,000
Jones Bay	Two Courtesy Docks	Add two 20-foot dock sections and one pile to one dock.	$34,000
Sterling Point	One Courtesy Dock	Add a 20-foot long dock section.	$12,000

Table 4-2 (continued): Facility Impacts for Dry and Drought Years

Facility	Amenities Impacted	Recommended Mitigation	Estimated Total Cost
Seven Bays	Three Marina Dock Systems	Move location of two docks and shore connections. Retrofit dock to allow temporary relocation to attach to main dock.	$42,000
Fort Spokane	Seven Courtesy Docks, Wood Swim Boom	Add two 20-foot sections to one dock, and one 20-foot section to another. Mitigation of other docks not recommended, due to steep bank. Swim area mitigation not recommended, due to narrow deep channel, add three "No Boat" buoys.	$59,500
Detillion	Two Courtesy Docks	Add a 20-foot long dock section to each dock.	$24,000
Porcupine Bay	Two Courtesy Docks, PVC and Wood Swim Booms	Add two 10-foot long sections to one dock and one 20-foot long section to the other. Add one log and two PVC pipes to swim booms and anchors to enlarge swim area. Add plant prohibitory fabric to new swim beach, and add four "No Boat" buoys.	$43,100
Hunters	Three Courtesy Docks, Wood Swim Boom	Add a 20-foot long section to each dock. Add four logs to swim boom and one anchor. Add three "No Boat" buoys.	$55,100
Gifford	Two Courtesy Docks	Add one 20-foot long dock section to one dock and two 10-foot long dock sections to the other.	$35,000
Cloverleaf	Wood Swim Boom	Add five logs and one anchor and relocate shore anchor. Add one "No Boat" buoy.	$8,200
French Rocks	One Courtesy Dock	Add a 20-foot long section to dock.	$12,000
Kettle Falls	One Government Dock	Add a 10-foot long section to dock.	$6,000
Evans	One Courtesy Dock, Wood Swim Boom	Add a 20-foot long section to dock, add four logs, move two anchors, and add two anchors to swim boom.	$21,000
Snag Cove	One Courtesy Dock	Add a 20-foot long section to dock.	$12,000
		Subtotal	$495,300
		Escalation to midpoint	$33,500
		Total	$528,800

5. Conclusion

SUMMARY

The effect of the proposed additional water withdrawals from Lake Roosevelt is a decrease in water elevations during the summer months. The lower water level does not affect summer recreation until the end of August, when the lake level is already at its lowest point of the summer season. During average or wet years, the water elevation is estimated at 1 foot less than the current operating elevation at the same time of year. This lower elevation still remains higher than typical lake levels at that time of year during dry or drought years. Because this water elevation is within current operational elevations, no improvements are recommended.

The drawdown amount for a dry year is 1 foot less than the current operating elevation at the same time of year. There are several facilities that are not currently designed to function at this lower elevation. Courtesy boat docks and swim areas are impacted by the drawdown. A portion of docks will remain above water level and swim areas will contain less water. Improvements are recommended, but it is recommended that improvements be made to handle the additional drawdown expected for the drought year rather than for the dry year alone.

A drought year will see a decrease in elevation 1.8 feet lower than the current drought year operation elevation for that time of year. This water level drop impacts many facilities. The main effect is less usable dock area for the courtesy docks and less surface area and depth of water in the swim areas. It is recommended that facilities be retrofitted where possible to maintain the current level of service. The estimated total cost to retrofit the existing facilities is $528,800. See Table 4-2 and Appendix A for specific recommendations and cost breakdown.

This Page Intentionally Left Blank

Appendix A

Facility Equipment Information and Cost Data

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Crescent Bay	*CR*	6/3/08	1,265'	-	-	-	-		**Total =**	**$0**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
Spring Canyon	*SC*	6/3/08	1,222'	X	-	-	X		**Total =**	**$58,200**
								Boat Launch	No adverse impact.	-
								Skid Dock - Low-Water	No adverse impact.	-
								Skid Dock - Main	No adverse impact.	-
								Courtesy Dock - Main	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - Boat Launch - East	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - Boat Launch - West	Add (1) - 6' x 20' dock section.	$15,000
								Government Dock	Impact does not decrease functionality.	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - PVC - Inner	Retrofit PVC boom system to detach from anchors so it can be removed from the water. Provide (2) floats to attach to anchor cables.	$2,000
								Swim Boom System - Wood - Outer	Add (4) - 30' logs to outer wood swim boom system to enlarge swimming area. Move (4) buoy anchors further outward. Add (4) "No Boat" buoys w/ anchors.	$11,200
Plum Point	*PP*	-	-	-	-	X	-		**Total =**	**$12,000**
								Courtesy Dock	Add (1) - 4' x 20' dock section.	$12,000
Keller Ferry	*KY*	6/3/08	1,229'	X	X	-	X		**Total =**	**$34,200**
								Boat Launch	No adverse impact.	-
								Skid Dock - Low-Water	No adverse impact.	-
								Skid Dock - Main	No adverse impact.	-
								Courtesy Dock - Boat Launch	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - East	Add (1) - 6' x 20' wood dock section.	$8,000
								Courtesy Dock - West	No adverse impact.	-
								Service Dock - D	No adverse impact.	-
								Moorage Dock	No adverse impact.	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - Wood - Inner	Inner boom on dry land and outer boom becomes new swim area boundary. No need to extend inner boom.	-
								Swim Boom System - Wood - Outer	Add (4) - 30' logs to outer wood swim boom system to enlarge swimming area. Move (3) buoy anchors further outward. Add (4) "No Boat" buoys w/ anchors.	$11,200
Goldsmith	*GS*	-	-	-	-	X	-		**Total =**	**$15,000**
								Courtesy Dock	Add (1) - 6' x 20' dock section.	$15,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Hanson Harbor	*HH*	6/3/08	1,253'	-	-	-	-		**Total =**	**$0**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
Penix Canyon	*PC*	-	-	-	-	X	-		**Total =**	**$12,000**
								Courtesy Dock	Add (1) - 4' x 20' dock section.	$12,000
Jones Bay	*JB*	6/3/08	1,268'	-	-	-	X		**Total =**	**$34,000**
								Boat Launch	No adverse impact.	-
								Courtesy Dock - Boat Launch	No impact. (dock section added to Courtesy Dock - Campground instead)	-
								Courtesy Dock - Campground	Add (2) - 4' x 20' dock sections. Add (1) new pile.	$34,000
Sterling Point	*SP*	6/4/08	-	-	-	X	-		**Total =**	**$12,000**
								Courtesy Dock	Add (1) - 4' x 20' dock section.	$12,000
Lincoln Mill	*LM*	6/4/08	1,268'	-	-	-	-		**Total =**	**$0**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
Hawk Creek	*HC*	6/4/08	1,281'	-	-	-	X		**Total =**	**$0**
								Boat Launch	No new impact. Shallow bay is limiting factor.	-
								Courtesy Dock - Boat Launch	No new impact. Shallow bay is limiting factor.	-
								Courtesy Dock - Campground	No new impact. Shallow bay is limiting factor.	-

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Seven Bays	*SB*	6/4/08	1,227'	-	X	-	-		**Total =**	**$42,000**
								Boat Launch	No adverse impact.	-
								Skid Dock - Low-Water	No adverse impact.	-
								Skid Dock - Main	No adverse impact.	-
								Dock A	Dock A can be shifted towards the lake along with Dock B, since Dock C is no longer used. This requires construction of (1) new set of stairs w/ handrails and relocation of dock anchors.	$20,000
								Dock B	Relocate along with Dock A. This requires construction of (1) new set of stairs w/ handrails and relocation of dock anchors.	$20,000
								Dock D	No adverse impact.	-
								Dock E	No adverse impact.	-
								Dock F	No adverse impact.	-
								Dock G	Relocate and attach to end of main dock. Relocate dock anchors.	$2,000
								Dock K	No adverse impact.	-
								Main Dock	No adverse impact.	-
Fort Spokane	*FS*	6/4/08	1,247'	X	-	-	X		**Total =**	**$59,500**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock - Boat Launch	Add (2) - 6' x 20' dock sections. Add (1) additional pile.	$40,000
								Courtesy Dock - Picnic - #1	Add (1) - 6' x 20' dock section. (picnic dock near boat launch)	$15,000
								Courtesy Dock - Picnic - #2	Impacted. No space available to extend.	-
								Courtesy Dock - Picnic - #3	Impacted. No space available to extend.	-
								Courtesy Dock - Campground - #1	Impacted. Not advisable to extend, too steep.	-
								Courtesy Dock - Campground - #2	Impacted. Not advisable to extend, too steep.	-
								Courtesy Dock - Campground - #3	Impacted. Not advisable to extend, too steep.	-
								Government Dock	Impacted. Not advisable to extend, too steep.	-
								Swim Beach	No significant impact. Steep bank in swim area. Lower water elevations don't significantly decrease available swim area.	
								Swim Boom System - Wood	No significant impact. Steep bank in swim area. Lower water elevations don't significantly decrease available swim area. Add (3) "No Boat" buoys w/ anchors.	$4,500

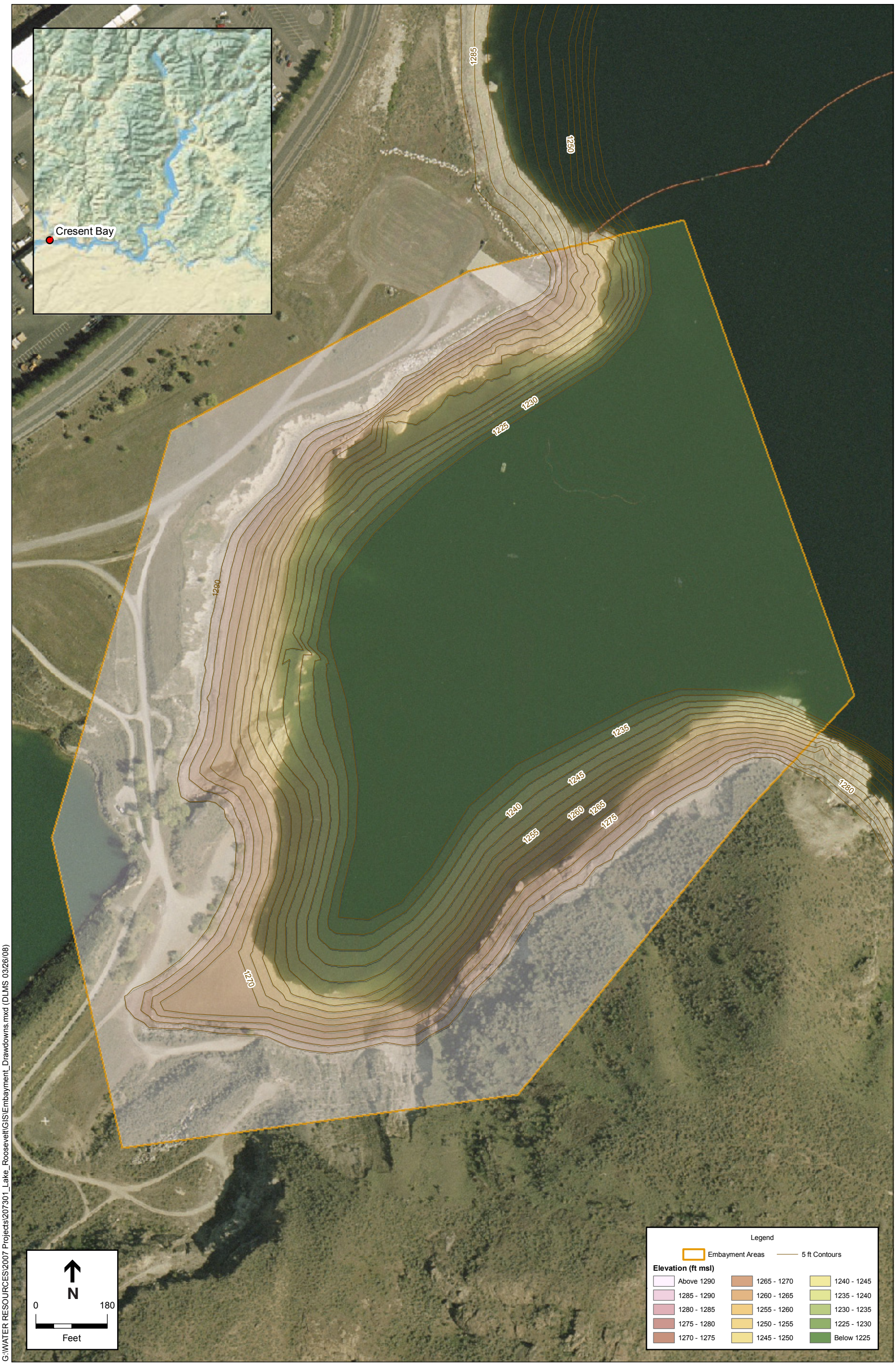
Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Detillion	*DE*	-	-	-	-	X	-		**Total =**	**$24,000**
								Courtesy Dock - West	Add (1) - 4' x 20' dock section.	$12,000
								Courtesy Dock - East	Add (1) - 4' x 20' dock section.	$12,000
Porcupine Bay	*PB*	6/4/08	1,243'	X	X	-	X		**Total =**	**$43,100**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock - Day Use	Add (2) - 6' x 10' dock sections.	$18,000
								Courtesy Dock - Boat Launch	Add (1) - 6' x 20' dock section.	$15,000
								Swim Beach	Add approximately 2,000 square feet plant prohibitory fabric to beach.	$1,500
								Swim Boom System - PVC - Inner	Add (2) PVC boom sections and move shore anchor to extend swim area towards campground.	$1,600
								Swim Boom System - Wood - Outer	Remove (1) wood log from boat beach boom and add to swim boom and move shore anchor 30 ft to extend swim area towards campground. Add (4) "No Boat" buoys w/ anchors.	$7,000
Hunters	*HU*	6/5/08	1,232'	X	-	-	X		**Total =**	**$55,100**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock - Boat Launch - East	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - Boat Launch - West	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - Day Use Area	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - Campground	No new impact. (already out of service by 1,278')	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - Wood	Add (4) log boom sections and (1) anchor w/ buoy. Add (3) "No Boat" buoys w/ anchors.	$10,100
Gifford	*GC*	6/5/08	1,249'	-	-	-	X		**Total =**	**$35,000**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock - Boat Launch - South	No new impact. (already out of service higher than 1,278')	-
								Courtesy Dock - Boat Launch - North	Add (1) - 6' x 20' dock section.	$15,000
								Courtesy Dock - Campground	Add (2) - 8' x 10' dock sections. (Enlarge berths between finger docks.)	$20,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Cloverleaf	*CL*	6/5/08	-	X	-	-	X		**Total =**	**$8,200**
								Courtesy Dock	No new impact. (already out of service higher than 1,278')	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - Wood	Add (5) - 30' logs and (1) anchor w/ buoy to log boom system at center of channel. Relocate shore anchor on south side 50' towards the lake. Add one "No Boat " buoy w/ anchor.	$8,200
Daisy	*DR*	6/5/08	1,265'	-	-	-	-		**Total =**	**$0**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock	No new impact. (already out of service higher than 1,278')	-
Bradbury Beach	*BB*	6/5/08	1,251'	X	-	-	-		**Total =**	**$0**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock	No new impact. (already out of service higher than 1,278')	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - PVC - Inner	No significant impact. Lower water elevations don't significantly decrease available swim area or affect usability.	-
								Swim Boom System - Wood - Outer	No significant impact. Lower water elevations don't significantly decrease available swim area or affect usability.	-
French Rocks	*FR*	6/6/08	1,265'	-	-	-	-		**Total =**	**$12,000**
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock	Add (1) - 4' x 20' dock section.	$12,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Kettle Falls	*KF*	6/5/08	1,234'	X	-	-	X		**Total =**	**$6,000**
								Boat Launch	No adverse impact.	-
								Skid Dock - Boat Launch - South	No adverse impact.	-
								Skid Dock - Boat Launch - North	No adverse impact.	-
								Government Dock	Add (1) - 4' x 10' dock section.	$6,000
								Swim Beach	No new impact. (already out of service higher than 1,278')	-
								Swim Boom System - Wood	No new impact. (already out of service higher than 1,278')	-
								Fuel Station Dock System	No adverse impact.	-
								Boat Repair Dock	No adverse impact.	-
								Main Access Dock	No adverse impact.	-
Kamloops Island	*KI*	-	-	-	-	-	X		**Total =**	**$0**
								Courtesy Dock	No new impact (per NPS, no site visit).	-
Kettle River	*KR*	-	-	-	-	-	X		**Total =**	**$0**
								Courtesy Dock	No new impact (per NPS, no site visit).	-
Napoleon Bridge	*NB*	6/5/08	1,280'	-	-	-	-		**Total =**	**$0**
								Boat Launch	No new impact.	-
Marcus Island	*MI*	6/5/08	1,281'	X	-	-	X		**Total =**	**$0**
								Boat Launch	No new impact.	-
								Courtesy Dock	No new impact. (already out of service higher than 1,278')	-
								Swim Beach	No new impact.	-
								Swim Boom System - Wood	No new impact. Shallow bay. Safe to swim beyond boom because boats won't be using ramp in the area at low lake levels.	-
Summer Island	*SI*	-	-	-	-	X	-		**Total =**	**$0**
								Courtesy Dock	No new impact (per NPS, no site visit).	-
Evans	*EV*	6/5/08	1,280'	X	-	-	X		**Total =**	**$21,000**
								Boat Launch	No new impact.	-
								Courtesy Dock - Boat Launch	No new impact.	-
								Courtesy Dock - Campground	Add (1) - 6' x 20' dock section.	$15,000
								Swim Beach	No adverse impact.	-
								Swim Boom System - PVC - Inner	No adverse impact. PVC will lay on beach, outer boom becomes new swim area limits.	-
								Swim Boom System - Wood - Outer	Add (4) logs to boom, move (2) existing anchors and add (2) anchors.	$6,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
									Total for All Facilities =	**$495,300**
Snag Cove	*SN*	6/5/08	1,277'	-	-	-	X		**Total =**	**$12,000**
								Boat Launch	No significant impact. Lengthening not justified.	-
								Skid Dock	No adverse impact.	-
								Courtesy Dock	Add (1) - 4' x 20' dock section.	$12,000
North Gorge	*NG*	6/5/08	1,280'	-	-	-	X		**Total =**	**$0**
								Boat Launch	No new impact.	-
								Courtesy Dock - West	No new impact. (already out of service higher than 1,278')	-
								Courtesy Dock - Boat Launch	No new impact. (already out of service higher than 1,278')	-
China Bend	*CB*	6/5/08	1,280'	-	-	-	-		**Total =**	**$0**
								Boat Launch	No new impact.	-
								Courtesy Dock	No new impact.	-

Map Folio
Lake Roosevelt Embayments



FILE NAME: MF_Fig01_Cresent_Bay.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 1

Cresent Bay Elevation Contours

FILE NAME: MF_Fig02_Swawilla_Bay.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 2

Swawilla Bay Elevation Contours

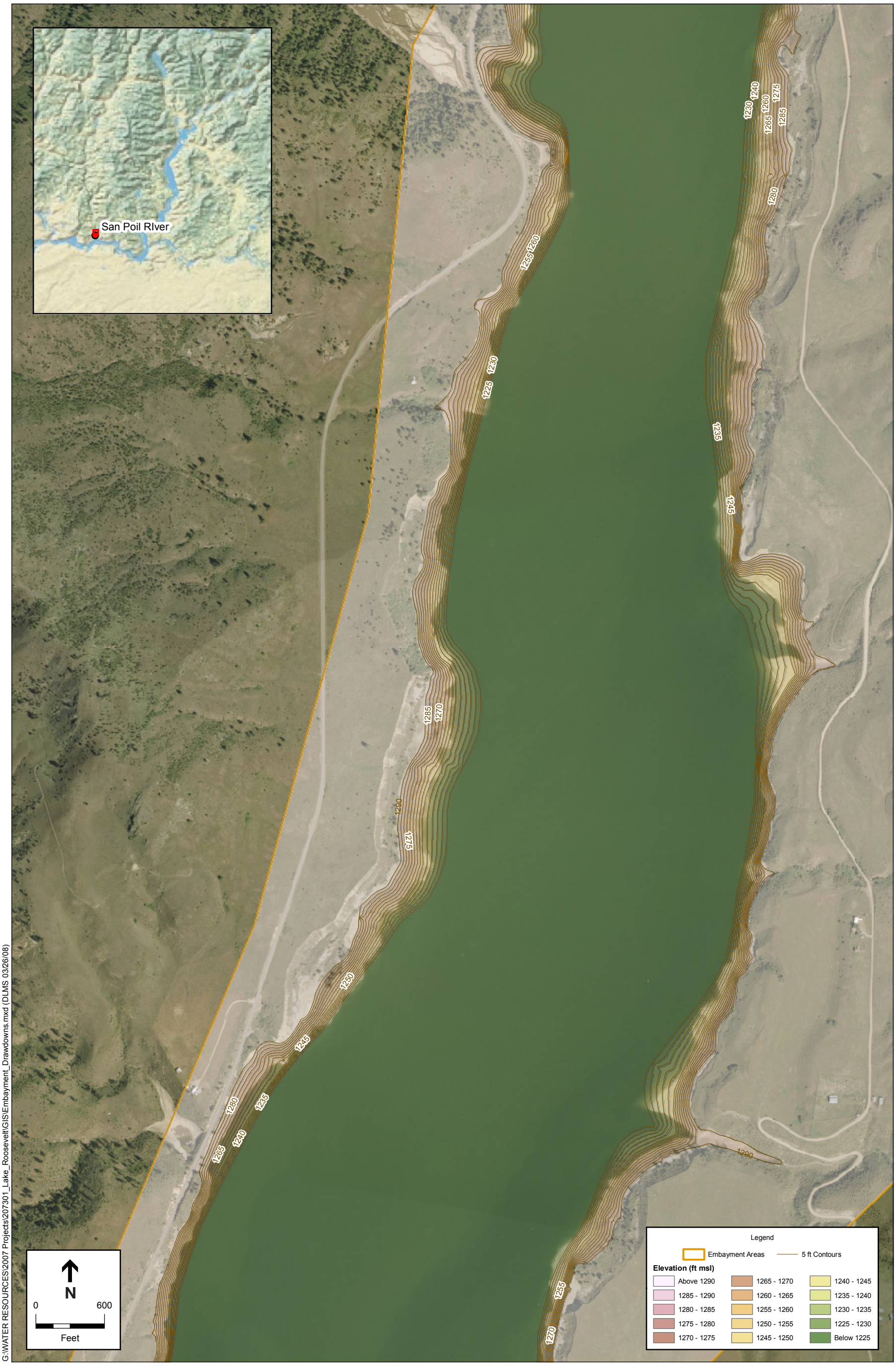
FILE NAME: MF_Fig03_SanPoilRiver_South.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 3

San Poil River (South) Elevation Contours



FILE NAME: MF_Fig04_SanPoilRiver_Central-S.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 4

San Poil River (Central South) Elevation Contours

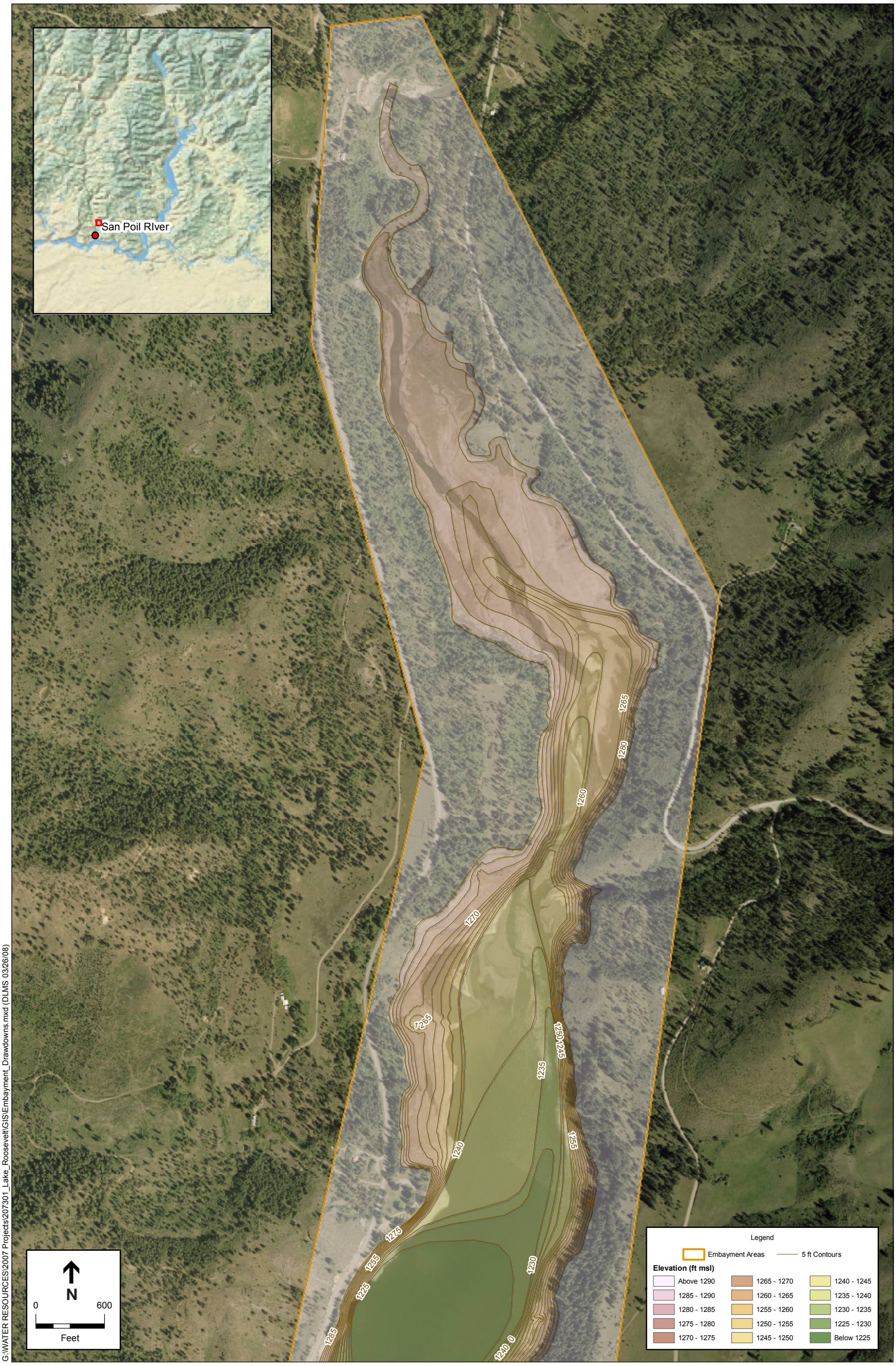
FILE NAME: MF_Fig05_SanPoilRiver_Central-N.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 5

San Poil River (Central North) Elevation Contours



FILE NAME: MF_Fig06_SanPoilRiver_North.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 6

San Poil River (North) Elevation Contours

FILE NAME: MF-Fig07_JumpCanyon.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 7

Jump Canyon Elevation Contours

FILE NAME: MF_Fig08_WelshCreek.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 8

Welsh Creek Elevation Contours

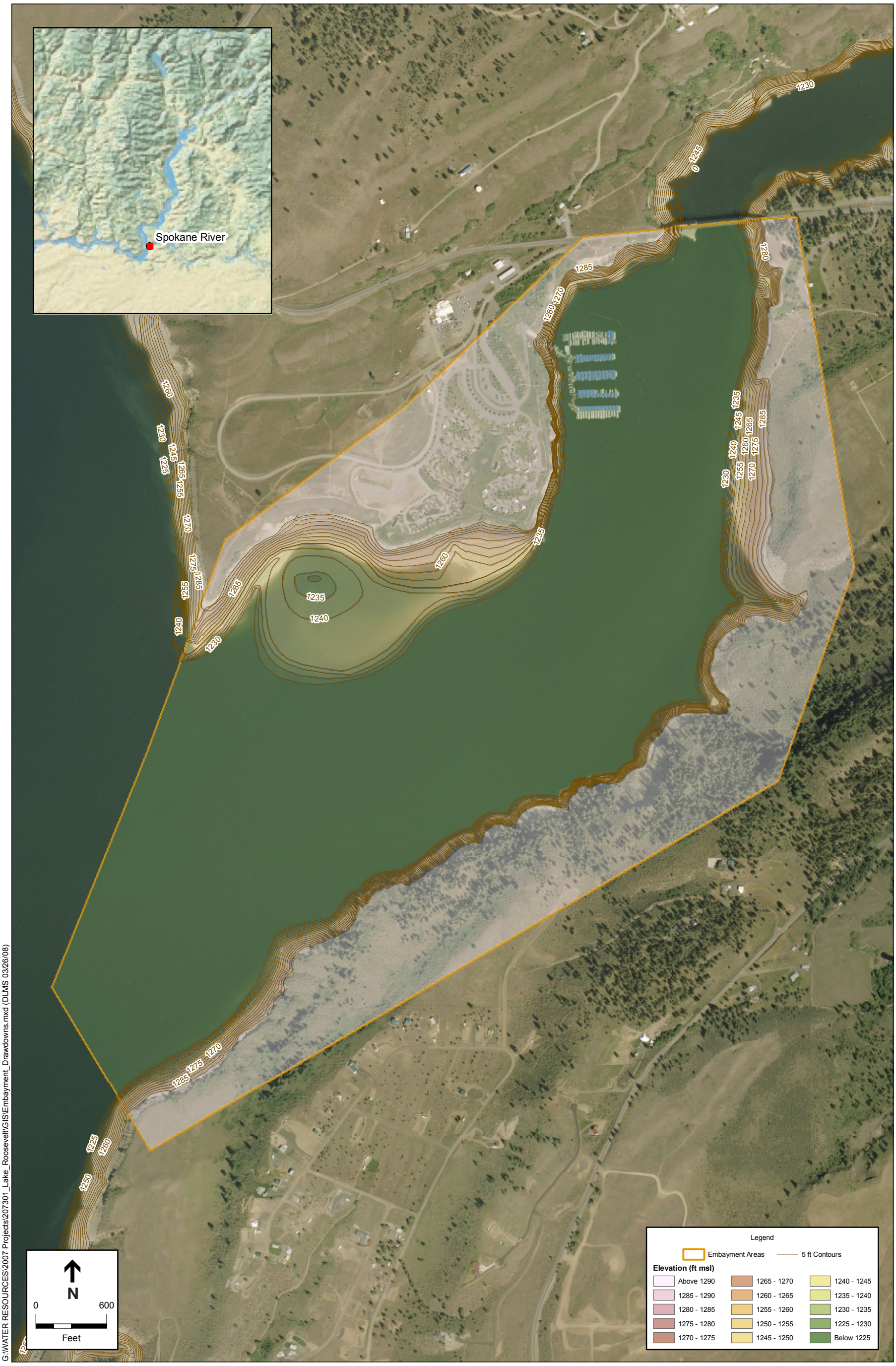
FILE NAME: MF_Fig09_HawkCreek.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 9

Hawk Creek Elevation Contours



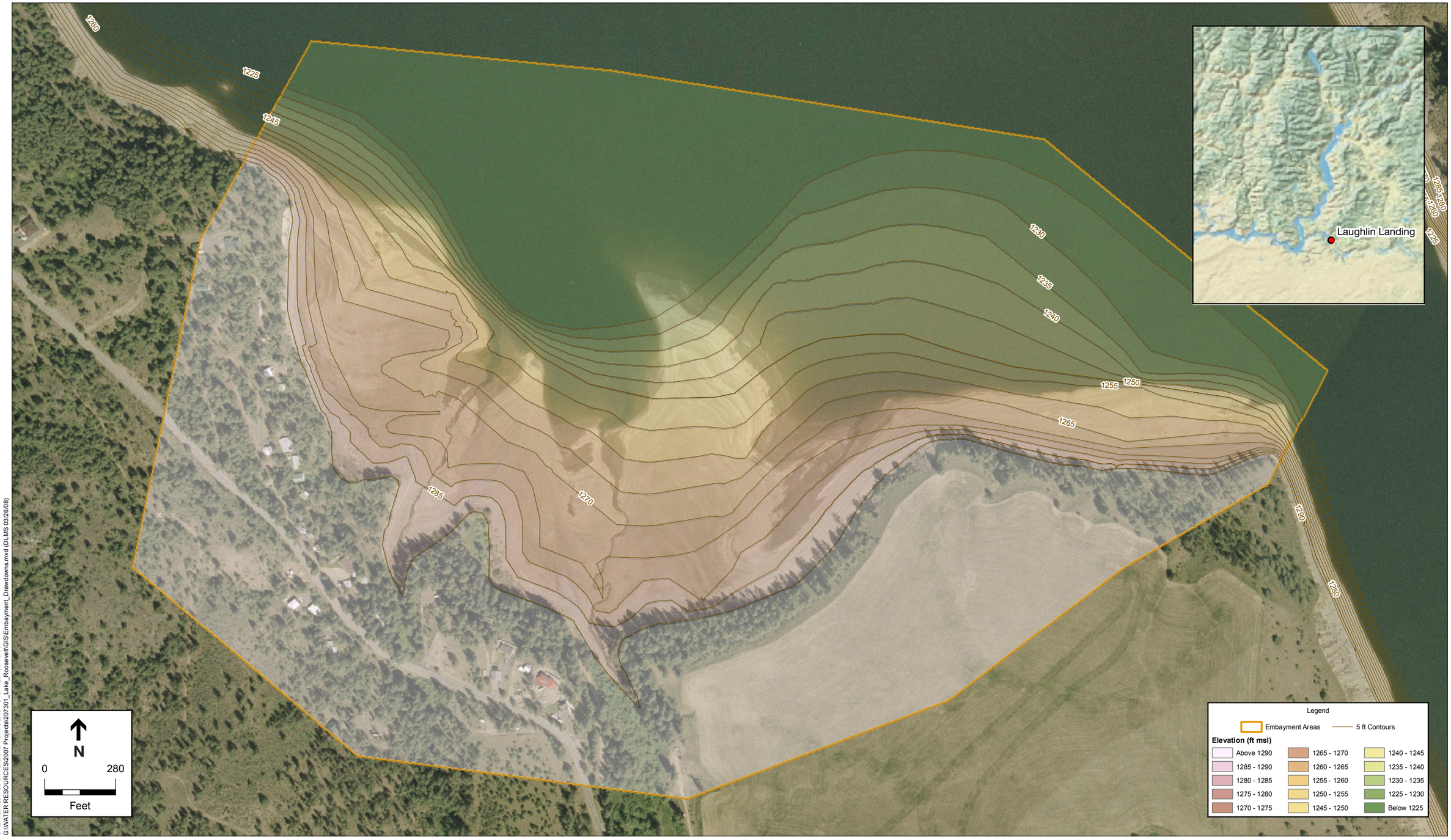
FILE NAME: MF_Fig10_SpokaneRiver.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 10

Spokane River Elevation Contours



FILE NAME: MF_Fig11_LaughlinLanding.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 08/18/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 11

Laughlin Landing Elevation Contours

FILE NAME: MF_Fig12_NineMileBay.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 12

Nine Mile Bay Elevation Contours

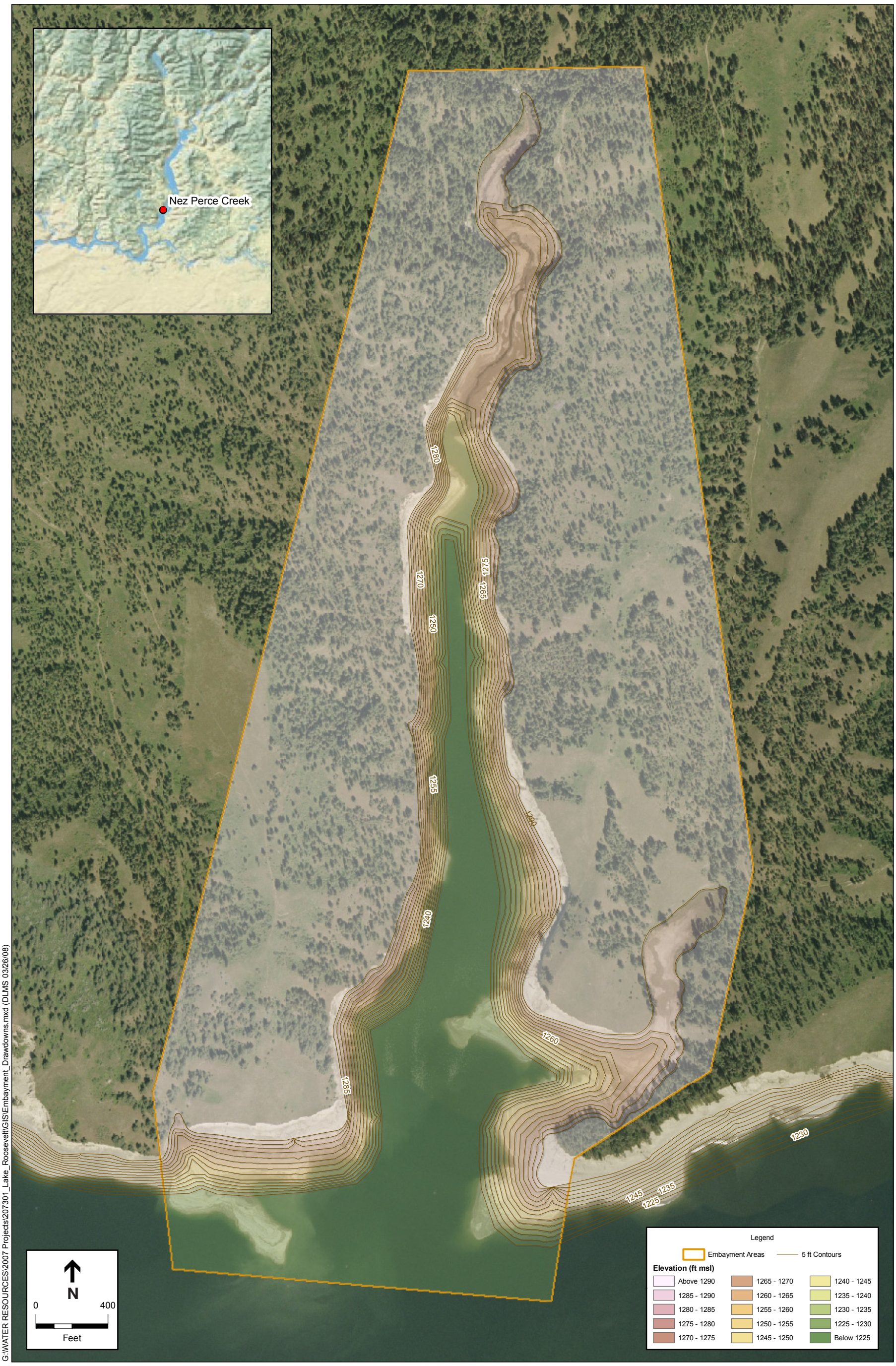
FILE NAME: MF_Fig13_WilmontCreek.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 13

Wilmont Creek Elevation Contours



FILE NAME: MF_Fig14_NezPerceCreek.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Map Folio Figure 14

Nez Perce Creek Elevation Contours

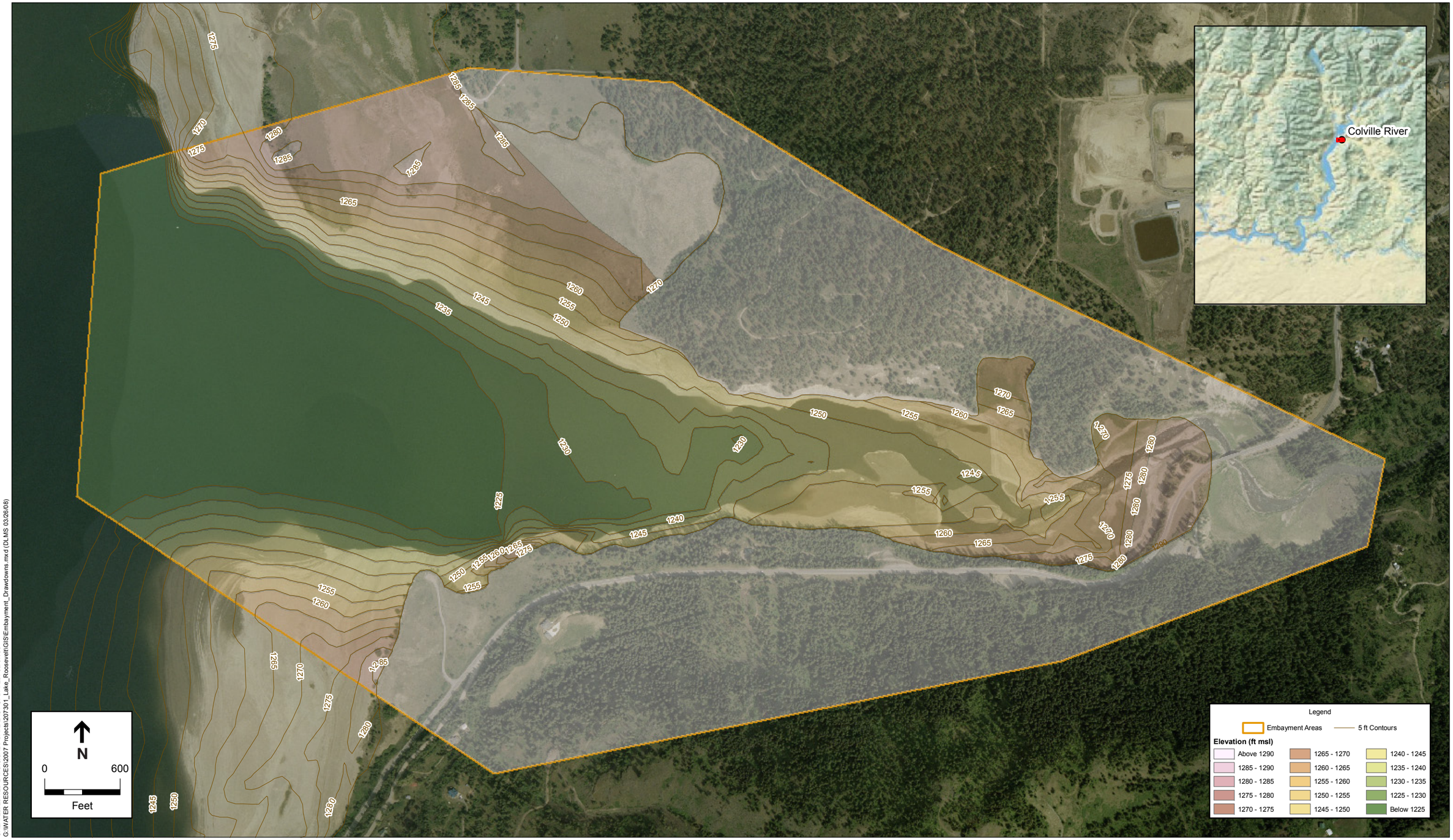
FILE NAME: MF_Fig15_HallCreek.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 15

Hall Creek Elevation Contours



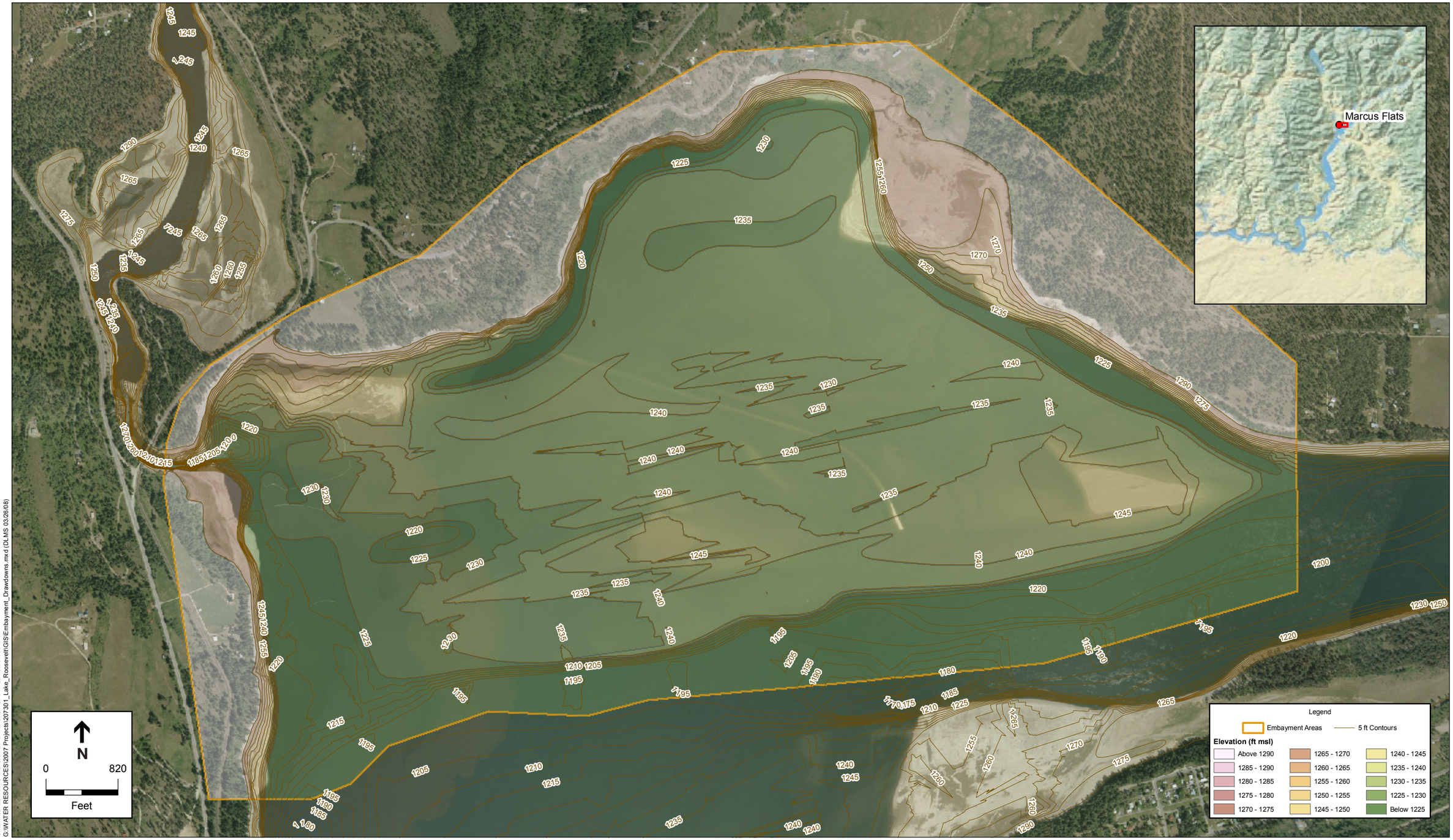
FILE NAME: MF_Fig16_ColvilleRiver.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 16

Colville River Elevation Contours



FILE NAME: MF_Fig17_MarcusFlats.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 17

Marcus Flats Elevation Contours

FILE NAME: MF_Fig18_KettleRiver.ai / Embayments
CREATED/EDITED BY: GIS/JAB / DATE LAST UPDATED: 05/07/08
G:\WATER RESOURCES\2007 Projects\207301_Lake_Roosevelt\GIS\Embayment_Drawdowns.mxd (DLMS 03/26/08)

SOURCE: Environment International, 2007; ESA Adolfson, 2008

Lake Roosevelt . 207301

Map Folio Figure 18

Kettle River Elevation Contours