

CONDIT DAM REMOVAL: A DECISION-MAKING COMPARISON
WITH REMOVAL OF ELWHA RIVER DAMS

by

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Abstract

While environmental concerns have played a secondary role in dam removal rationales thus far, the Condit and Elwha removal projects could signal a change in governmental and public priorities in dam management in the United States (Born et al. 1998; Bednarek 2002). For this research, I compared two dam removal projects designed to restore native salmon runs in two rivers in Washington State: the Condit Dam on the White Salmon River and the Elwha and Glines Canyon Dams on the Elwha River. This thesis asks: given choices of preserving dams that produce clean electricity and the well-established lake-based habitats created by their reservoirs or re-establishing a free-flowing river to reestablish fish and wildlife populations, how are decisions made, and what does the process and outcome mean to local communities? Research interview data was used in combination with policy documents to answer three research questions: 1) What factors affect decision-makers' and other stakeholders' support for (or rejection of) dam removal? 2) How did stakeholders' perceptions and opinions play a role in the decision-making process? and 3) What can we learn from problems and successes evident from the dam removal decision processes?

The main factors influencing both the Condit Project and the Elwha Project were environmental (salmon restoration), political (meeting legislative requirements for fish passage), and economic (finding the least cost fish passage alternative). The primary motivation for both projects was salmon restoration via the provision of federally mandated fish passage. The possibility of regaining a valuable resource spurred Tribal, federal, and state agencies to advocate for the removal alternative. Dam owners in both cases desired the least cost option, resulting either in their consent to removal (Condit Project) or selling the dams and relinquishing responsibility to the federal government (Elwha Project). Both took over two decades to complete and were removed in 2011.

Perceptions of the relative importance of removal/retention options and dissatisfaction with the decision-making process led to polarization of the communities affected by the dam removals and contributed to the 20+ year project timelines. In order to promote good will and understanding between decision makers and stakeholders, two lessons can be learned from the Condit and Elwha Projects: 1) actively seek to include both proponents and opponents in decision-making and 2) establish robust

communication among stakeholders and decision makers. Additionally, preliminary evidence indicates that dam removal does result in movement of salmonids to river reaches that had been blocked by dams, and dam removal may also lead to unintended consequences related to local environmental quality and resource access, such as short term air quality concerns and longer term effects on groundwater availability.

Table of Contents

Table of Contents	iv
List of Figures	ix
List of Tables	xi
Acknowledgments	xii
Chapter 1	1
Introduction	1
Dam Building	1
Impact of Dams on River Systems	2
Ecological Impacts of Dam Removal.....	3
Dam Removal	6
Age and Safety	6
Economic Factors	7
Environmental Conservation.....	7
Significance of Condit and Elwha Dam Removal Projects.....	8
Chapter 2	10
Environmental Decision-Making and Research and Analytical Frameworks.....	10
Geography's Role in Environmental Decision Making	10
Analytical Framework	11
Sense of Place in Natural Resources Decision-making	11
Environmental Perception.....	13
Political Ecology.....	13
Economic Considerations in Dam Removal Decision Making.....	15
Dam Removal and the Decision-making Process.....	15
Avenues for Decision Making	15
	iv

Trends in Dam Removal Rationales	16
Public Participation	18
Chapter 3	21
Study Areas	21
The Elwha River Ecosystem and Fisheries Restoration Project	22
Elwha Watershed	23
Terrestrial and Aquatic Resources	26
Salmon and the Dams	27
Timeline of Events: Elwha River Dams	28
Construction and Licensing	28
Congress Intervenes	31
The Condit Dam Removal Project	34
White Salmon River Watershed	34
Terrestrial and Aquatic Resources	38
Salmon and Condit Dam	39
Timeline of Events: Condit Dam	40
Condit versus Elwha Situations	46
Chapter 4	48
Data and Analysis	48
Document analysis	48
Interview Data Coding and Analysis	55
Chapter 5	58
Results Part 1: Elwha River Ecosystem and Fisheries Restoration Project	58
Factors considered: What mattered most	58
Aquatic and Terrestrial Resources	58

Salmon.....	58
Bird and Mammal Species.....	61
Water Resources.....	62
Water Quality.....	62
Recreation.....	63
Economic Resources.....	63
Direct Costs.....	63
The Harbor and Timber Storage.....	66
Hydropower Energy Provision and Costs.....	67
Socioeconomic Impacts.....	68
Cultural Resources.....	71
Communication and General Viewpoints.....	71
Summary.....	74
Chapter 6.....	76
Results Part 2: The Condit Dam Removal Project.....	76
Factors considered important by stakeholders and decision-makers.....	76
Environmental Concerns.....	79
Habitat Characteristics and Biota.....	80
Fish.....	80
Habitat and Species Connections.....	82
Water Quality.....	84
Groundwater.....	85
Plants.....	86
Aesthetics.....	86
Health and Safety.....	87
Recreation Impacts.....	87

Economic Factors.....	88
Direct Costs	89
Electrical Power Production.....	90
Property	91
Infrastructure.....	92
Logistics	93
Recreation—Economic Factors	94
Respondent Opinions and Perceptions.....	96
The Desirability of Removing Condit Dam.....	96
The Decision-making Process	96
Perceived Benefits and Costs.....	97
Summary.....	98
Chapter 7	100
Discussion	100
Introduction	100
Comparing Case Studies: Condit vs. Elwha.....	100
Answering the research questions	102
Factors considered during decision-making	103
Perceptions and Opinions about removing Condit Dam.....	103
Problems and Outcomes: Stakeholder Views	105
Chapter 8	108
Conclusions	108
Planning Future Dam Removal Projects.....	108
What can we learn from the Condit Project process?	109
Personal Observations and Recommendations	112
Additional Research Needs	113

Final Conclusions.....	115
References Cited	116
Appendix A: Parties to the 1999 Settlement Agreement	127
PacifiCorp (former dam owner)	127
Intervenors:.....	127
American Rivers, et al:.....	127
Agencies:	127
Appendix B—White Salmon Watershed Management Committee	128
Appendix C—White Salmon Watershed Management Committee, 2009	129
WSWMC Members and Reviewers:.....	129
Appendix D: Informed Consent Letter	130

List of Figures

3.1.	Relative locations of Condit and Elwha River Dam Removal Projects, Washington State (Data sources: Washington Department of Ecology (2011); StreamNet.org (2010); Kansas State University Geographic Information Systems Spatial Analysis Laboratory).....	21
3.2.	Elwha River watershed (Source: USDA 2014, accessed April 12, 2014).....	22
3.3.	Locations of Elwha and Glines Canyon Dams, Elwha River watershed (Data sources: Washington Department of Ecology (2011); StreamNet.org; Kansas State University Geographic Information Systems Spatial Analysis Laboratory)	24
3.4.	Land use/land cover in Elwha River watershed (data sources: Washington Department of Ecology (2011); Washington Department of Natural Resources (2013); Kansas State University Geographic Information Systems Spatial Analysis Laboratory).....	25
3.5.	Elwha Dam, date unknown (Lundahl and Hales 2013).....	29
3.6.	Glines Canyon Dam, date unknown (from Connelly 2013; photo: Museum of History and Industry).	29
3.7.	Demolition begins October 17 on the Elwha Dam using excavators. Here the machines are slowly removing pieces of the gravity section of the dam “recognizable by its stair-step appearance” (Olympic National Park Dam Removal Blog Archives 2011).....	32
3.8.	Glines Canyon Dam removal in progress, 9 July 2012 (Peninsula Daily News 2012).	33
3.9.	Lake Mills draining (Glines Canyon Dam) (Photo: Erdman Video Systems, Inc., 2013)	33
3.10.	Lake Aldwell (Elwha Dam) finished draining (Photo: Erdman Video Systems, Inc. 2013).	34
3.11.	Condit Dam and White Salmon River Watershed, Washington (data sources: Washington Department of Ecology (2011); Kansas State University Geographic Information Systems Spatial Analysis Laboratory; StreamNet.org (2010))	35
3.12.	Satellite image of Northwestern Lake, impounded by Condit Dam (Source: Google Earth, Accessed April 15, 2014)	36
3.13.	Land use/land cover in White Salmon River watershed (data sources: Washington Department of Ecology (2010; 2011); Kansas State University Geographic Information Systems Spatial Analysis Laboratory; StreamNet.org (2010)).....	37

3.14.	View to south of Condit dam site prior to construction, June 1912. (Source: PacifiCorp 2013) ...	41
3.15.	Condit Dam, construction, January 1913 (source: PacifiCorp 2013).....	42
3.16.	Condit Dam, completed, April 1913 (source: PacifiCorp 2013)	42
3.17.	Northwestern Lake draining following Condit Dam removal, October 30, 2011 (photo courtesy of Wayne Lease)	46
7.1.	Northwestern Lake, December 19, 2008 (photo courtesy of Wayne Lease).....	104
7.2.	Northwestern Lake, June 2002 (photo courtesy of Wayne Lease).....	105

List of Tables

1.1.	Size definitions for American dams (Graf 2005, 6)	8
3.1.	Anadromous fish populations of concern occurring in the Condit Dam removal project area and their status under the Endangered Species Act (ESA) (NMFS 2006, 4).	39
3.2.	Estimated capital costs of relicensing alternatives (FERC 1996, p. 2-24).....	44
4.1.	Key written sources consulted.	49
4.2.	Interview respondent positions, totaling 15 individuals with some holding more than one position. The majority of interviews were conducted by telephone.	51
5.1.	Chances of survival for salmon species according to each mitigation alternative (adapted from Table 5-3, FERC 1991).	61
5.2.	Initial and recurring costs of dam removal (from FERC 1991, Table 2-7).	64
5.3.	Comparative analysis of initial capital costs paired with average annual generation (kilowatt hours) (from FERC 1991, Table 5-1).	65
6.1.	Stakeholder interviewees and cited decision factors. Individuals often cited more than one factor related to support for/opposition to dam removal.	78

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Chapter 1

Introduction

Dam Building

Throughout their lifetimes, dams in the United States have provided services and resources valuable to society: flood control, navigation and transportation, water storage for irrigation and municipal needs, recreation, and fish habitat. In particular, the U.S. Pacific Northwest depends heavily on dams for the production of electricity, with sixty percent of the total power used in the region being produced by hydroelectric dams (Harrison 2008; BPA website). According to the Army Corps of Engineers (US ACE), the U.S. now has over 87,000 dams within its boundaries, most being constructed during the 20th century, as more people settled in the arid western states of the U.S. (US ACE 2013). Dam building surged between 1950 and 1979 (44,615 dams total during this 30-year period), peaking during the 1960s (19,768 dams) (US ACE 2013). More than three times as many dams were constructed during this era than in the previous five decades combined (13,873 dams). The majority of the dams in the State of Washington were built during this period as well. Between 1950 and 1970, 39 percent of the state's dams were constructed (319 dams). Dams built near the turn of the 20th century are relatively few; currently, 3,902 dams nationwide and 62 in Washington State are at or near one hundred years old (US ACE 2013). Elwha, Glines Canyon, and Condit Dams were three of their number until 2011, when their removal began.

Within the last few decades, however, the U.S. has begun to reconsider its pro-dam stance as the ecological impacts of these structures and the financial burden of maintaining aging dams become better understood. Since the 1990s, the number of dams removed has increased as decision-makers continue to demonstrate an interest in this river management option (Graf 2005). To date, the majority of research on dam removal has focused on the biological and geomorphological aspects of each case. Also, those scholars who have addressed the decision-making process have studied smaller¹ dam removals (Born et al. 1998; Pohl 2002). According to Graf (2003, 7) in a report on the status and prospects of dam removal

¹“Smaller” defined as dams less than 25 feet in height and impounding less than one hundred surface acres of water (Born et al. 1998; Graf 2005) (see Table 1.1).

research, "...the cultural and social dimensions of decision-making related to [smaller dams] are not directly transferrable to [larger dams]." The research reported in this thesis is intended to begin to fill this gap in the literature by exploring the decision-making processes behind two recent removal projects for relatively large dams in Washington State—the Condit Dam in south-central Washington and the Elwha and Glines Canyon dams in northwestern Washington. Before reviewing the social aspects of these projects, however, it is important to be aware of the environmental consequences of dams, dam removal, and the reasons why dams have been removed in the U.S.

Impact of Dams on River Systems

Dams alter the biological and physical characteristics of rivers, often placing native species at a disadvantage. Impacts include the alteration of water flow and temperature, nutrient loads, sediment transport and channel degradation, changes in dissolved oxygen levels, and the removal of miles of spawning habitat from the ranges of migratory fish species (e.g., salmon) (Pejchar and Warner 2001, 561-562; Graf 2005). Altered timing and temperatures of flows as they are released by dam managers can "confound emergence or growth cues." A change from a free-flowing river to a reservoir environment results in a subsequent change in species composition favoring the new conditions (Bednarek 2001, 803). For example, a total of more than 450 dams within the Columbia River Basin have significantly altered riverine ecosystems and fish habitat and has contributed to the decline of native salmon species in the region (Columbia Riverkeeper 2013).

Geomorphologist William Graf notes how most of the attention given to the adverse effects of dams in the U.S. has centered on the biological aspects (Graf 2005). In contrast, his work focuses on the downstream impact dams have on the hydrology and channel morphology of river systems, often from the perspective of river restoration (Graf 1996; 1999; 2001; 2005). Graf (1996) promotes geomorphology's role in research into restoration of dammed rivers and explores the changes in social values in favor of restoration which led to the passage of national legislation used in support of dam removal: the Federal Power Act, the Endangered Species Act, and the Dam Safety Act. The National Research Council's 2004 report on *Endangered and Threatened Species of the Platte River* illustrates the interactions between both the biological (vegetation, wildlife) and the physical processes of the river, as well as

describing human influences on the Platte River ecosystem. The report points to the requirement for understanding the “habitat needs of the species and of the complexity of their interactions with natural and human controls” in order to adequately address river management for species preservation (NRC 2004, 32).

Ecological Impacts of Dam Removal

As mentioned by Bruce Babbitt in the 2002 *Bioscience* article “What Goes Up, May Come Down,” more material exists on the ecology of dam removal than on its social consequences. Examples of what researchers have considered important biological and physical responses of rivers after removal are readily available and several are reviewed in this section.

Pringle, Freeman, and Freeman (2000) examined the effects on fish and mollusks of changes in the hydrologic cycle, including those caused by dams. Their research is set in temperate and tropical North and South America. One of the impacts they illustrate included the present-day status of long-range migration of fish. Dams block fish from accessing river reaches above the dam. These fish include salmonids, river herrings, and the American eel. The reduced flooding caused by dams has the consequence of placing at a disadvantage those species depending upon a river’s flood stage for important life stages (e.g., reproduction, rearing). These changes correspond with reductions in fishery production (Pringle, Freeman, and Freeman 2000, 810). Other biological impacts of dams are the reduction in the size of populations and increases in species that are non-native and prefer lake habitat.

One significant benefit provided by reestablishing a free-flowing river is the restoration of fish passage. Opperman et al. (2011) demonstrate this in their study of the Penobscot River Restoration Project in Maine. The Penobscot Project entailed the removal of the two most seaward dams on the main stem of the river (the Veazie and Great Works dams) and the improvement of fish passage around the remaining five dams. As a result, federally endangered species, such as the shortnose sturgeon, striped bass, and other long-distance migrants like the American shad have improved access to the majority of their historic range.

Once upstream access has been provided, however, the question arises as to whether or not fish will actually take advantage of it. Will the river restore itself so that the newly revealed habitat is usable? Gillenwater, Granata, and Zika (2006) and Cheng et al. (2006) attempted to answer this question with

their study of the impact of an environmentally motivated dam removal case on the Sandusky River, Ohio. The former developed a habitat suitability index (HSI) in ArcGIS to calculate spawning habitat suitability for walleye (*Sander vitreus*). Their criteria were the spatial distributions of depth, velocity, and spawning habitat availability (Gillenwater, Granata, and Zika 2006, 311). Their model demonstrated that river discharge was an important factor in determining spawning success. Another report on the same study modeled the same river characteristics and obtained consistent results, adding that water temperature also plays an important role (Cheng et al. 2006). Both reports presented convincing evidence that dam removal on the Sandusky River would result in a drastic increase in habitat availability that would, in turn, result in increased upstream migration by adults, and increased egg deposition and larval output to the nursing grounds.

Bartholow, Campbell, and Flug's (2005) research takes a slightly different direction than the two studies previously described, modeling the relationship between water temperature and fish survival along the Klamath River, which runs through northern California and southern Oregon. The combined water quantity and water quality models estimated river water temperatures both in the presence and the absence of dams (*with dams* and *without dams*). The authors found that the timing of the river's seasonal temperature signature differed between the two scenarios. There was a temporal lag of approximately 18 days in seasonal river temperature changes for *with dams* simulations as opposed to *without dams*. This means, essentially, that an impounded Klamath River was warmer in the winter and cooler in the spring and summer. Without dams on the river, temperatures responded more readily to the temperature of the air and had fewer days above the recommended maximum in the fall. This has implications for Klamath River salmon. In the presence of dams, fall temperatures are warmer than recommended for migration, spawning, and egg incubation. Cooler temperatures in the spring may reduce juvenile growth rates; however, fewer days above the recommended maximum with dams present may be more favorable for the juvenile life stage. Therefore, the authors concluded with the possibility that if dams were removed on the river, adult salmon would be favored by cooler fall temperatures while rearing juveniles may be placed at a disadvantage by even warmer spring and early summer temperatures. They recommend further study to determine the effects of temperature changes caused by dam removal on overall chinook production in the Klamath River.

As touched on in Bartholow, Campbell, and Flug (2005), removing a dam can have both positive and negative impacts on a river's ecosystem. Bednarek (2001) studied the ecological benefits and costs of dam removal. She uses the case studies of dam removals throughout the U.S. to demonstrate potential impacts on biodiversity in a river and its floodplain. Removing the Dead Lake Dam on Florida's Chipola River allowed flow fluctuations to increase (in contrast to its former, more constant managed flow regime), resulting the number of fish species in the river to nearly double. Removal of the Rodman Dam, also in Florida, reconnected the river with its floodplains, restoring riparian vegetation and reinstating some wetlands, which in turn benefited species like black bears and panthers. Removal of the Woolen Mills Dam on the Milwaukee River in Wisconsin restored sediment transport, increasing the gravelly substrate that is the preferred habitat for native smallmouth bass, which also increased. These three cases demonstrate that removing a dam may result in increased habitat diversity and flourishing plant and animal life.

Potential costs of dam removal, which Bednarek (2001) also outlines, include increases in turbidity, which can damage spawning grounds and diminish food quality; sediment stored in the reservoir may be contaminated with toxic substances that will be washed downstream if not managed properly; and lastly, a rapid drawdown of the reservoir may result in the water flowing downstream to become supersaturated with dissolved gas due to its increased velocity and pressure, resulting in gas-bubble disease in fish.

Stanley and Doyle (2003) discuss the ecological risks and costs of dam removal. While plants may easily take root in the soft sediments that are exposed upon the draining of a reservoir, one risk is that invasive species as well as native ones may take root and out-compete the latter. Another cost includes high mortality rates for reservoir species (excepting fish) upon removal. Rates can be as high as 100 percent in some cases. Sediment can also be a source of mortality for fish and invertebrates for several months following the event. While river-based species can benefit from dam removal, dam removal should be considered a trade-off, with one type of ecosystem replacing another. The authors emphasize that, while negative consequences are unavoidable, they may be mitigated through "supplementary management actions, or by carefully choosing the timing and the means by which the dam is removed" (Stanley and Doyle 2003, 21).

Dam Removal

Dam removals can have significant direct and indirect impacts on communities and individuals, as well as ecosystems. Frequently involving a trade-off in the benefits and services received from a river, the decision-making process can easily become contentious, polarizing communities. Some community members believe the benefits of having the dam in place outweigh the economic and environmental costs of maintaining and repairing the structure (Johnson and Graber 2002). Removing the structure could mean that alternative means of flood control, electricity production, and water for drinking, irrigation, or industrial uses would have to be found. Many people hold a strong attachment to what has become a local landmark and are extremely reluctant to see it go. Other people view the dam as having outlived its usefulness and believe that the risks and costs of keeping it in place justify its removal (Born et al. 1998; personal correspondence).

If dams are such an integral part of human settlements throughout the United States, and in the Pacific Northwest in particular, and if their removal can create such dissent, why then would one be removed? What factors would play into such a decision? Age and safety, economic considerations, and environmental factors have all contributed to decisions to remove dams in the U.S. The combination of these factors has led to an increase in the pace of dam removal as policy-makers more frequently consider dam removal as a “policy option” (Pejchar and Warner 2001, 561). I will now briefly discuss the main issues.

Age and Safety

Most of the nation’s dams are 40-70 years old, and many dams licensed by the Federal Energy Regulatory Commission (FERC, or “the Commission”) are in the process of renewing their operating licenses (US ACE 2013). As dams age and deteriorate over time, safety becomes a major concern. For the U.S. as a whole, 31 percent (27,132 out of 87,359 dams) are rated as having a “Significant” or “High” downstream hazard potential by the Corps of Engineers (US ACE 2013). Out of Washington State’s 798 dams, 471 (59 percent) are rated as such (US ACE 2013). Elwha Dam was one such dam. The initial structure failed in 1912, soon after its construction, flooding homesteads of the Lower Elwha Klallam Tribe downstream of the dam – with tribal members “barely [escaping] the wall of water released” – and

eliminating people's livelihoods (Joint Hearing Report 1992, 105). In 1978, the dam failed to pass FERC's safety inspection. After the Tribe simulated a design flood and further demonstrated the "catastrophic consequences" dam failure would have on the Elwha Reservation and the flood risk the dam still posed, "FERC issued an emergency dam safety order requiring the repairs recommended by the Tribe" (Busch 2008, 3).

Economic Factors

Many dam owners have chosen dam removal over repair and maintenance, in no small part because the latter is shown to be prohibitively expensive (Born et al. 1998; Graf 2001). Born et al. (1998, 369) found that a dam, on average, costs three times as much to repair as to be removed. The authors also noted that "a lack of recognized economic use" contributes to dam owners' choice of removal over maintenance, and that government funding has been instrumental in removal decisions in Wisconsin. In the state of Wisconsin, inspections led by the "state agency dam safety program has led to the removal of more than 30 dams in the past few decades" (Born et al. 1998, 360). Other economic factors considered by dam owners include concerns about financial liability for loss of life, environmental degradation and property damage caused by dam failure.

Environmental Conservation

In addition to concerns about cost and structural safety, environmental restoration is among the leading rationales for decommissioning dams in the United States (Born et al. 1998; Pohl 2002; Johnson and Graber 2002). Riverine ecosystems in the U.S. have been greatly altered as a result of dam development (Giller 2005; Graf 1999). When mitigation measures (e.g., altering the timing of flow releases, installation of fish ladders, etc.) are not realistic or viable options for restoring the desired measure of ecological function to a river system, dam removal can become an appealing option.

Most dams removed to date have been of the smaller variety, impounding 10 to 100 acre-feet of water on average (Bednarek 2001, 811; Poff and Hart 2002, 665; Graf 2005, 6) (see Table 1.1 for dam size definitions based on storage capacity). Dam removals in the Pacific Northwest are significant not for their number, but for the size of the dams removed. These include removals of the Elwha and Glines Canyon dams on the Elwha River (Egan 2007) and the Condit Dam on the White Salmon River in

Washington State. On October 24 of 2011, a hole was blasted through the base of Condit Dam, breaching it and initiating the removal process, which is expected to be complete in 2014; it measured 125 feet high and 471 feet wide and impounded $13.33 \times 10^5 \text{ m}^3$ (1,081 ac-ft) of water with a 13-foot drawdown² (Bonham 1999, 19; Gottlieb 2009; Washington Department of Ecology 2012). The Elwha and Glines Canyon dams on the Elwha River near Port Angeles, Washington, measured 108 feet and 209 feet high, respectively, and impounded $9.99 \times 10^6 \text{ m}^3$ (8099 ac-ft) and $5.12 \times 10^7 \text{ m}^3$ (41,508 ac-ft) of water, respectively, before removal began in mid-September 2011 (Duda, Freilich, and Schreiner 2008, 3; NPS 2013). They are three of the largest dams to be removed in U.S. history (see Graf 2006, 336). One of the primary reasons their removal was to restore riparian connectivity for endangered salmon populations (Shaffer et al. 2008; Becker 2006; Gowan, Stephenson, and Shabman 2006; Duda, Freilich, and Schreiner 2008; Ward et al. 2009; Blumm 2013). The second major reason for removal, particularly in the Condit case, was financial. Dam owner PacifiCorp sought the most cost-effective avenue for providing required fish passage (FERC 1996; Bonham 1999; Becker 2006).

Size	Reservoir storage (ac ft)	Reservoir storage (m ³)
Small	$10^0 - 10^2$	$10^0 - 10^5$
Medium	$10^2 - 10^4$	$10^5 - 10^7$
Large	$10^4 - 10^6$	$10^7 - 10^9$
Very large	$>10^6$	$>10^9$.

Table 1.1. Size definitions for American dams (Graf 2005, 6)

Significance of Condit and Elwha Dam Removal Projects

In this thesis, the process of decision-making, viewpoints of stakeholders and outcomes to date are explored for the Condit Dam removal project and compared to the case of the better-known Elwha River dam removal project. Decision-making and decision relationships to broader stakeholder positions in the case of such large river restoration projects have only been investigated to a minimal extent thus

²Drawdown is “the release of water from a reservoir for power generation, flood control, irrigation or other water management activity” (StreamNet.org, accessed April 16, 2014)

far, due to their rarity. Awareness of the various factors, including ecological, economic, and social issues, decision-makers and stakeholders considered important in these two cases will add to our understanding of environmental decision-making and relationships to environment. In order to accomplish this, my primary research questions are these:

- What factors affected decision-makers' and other stakeholders' support for (or rejection of) dam removal?
- How did decision-maker perception and opinion play a role in removal decisions? and
- What problems and 'successes' can be identified in the process?

Developing a greater understanding of the opinions and perceptions held by individuals on both sides of the argument in the Condit Project may improve communication between parties in future dam removal cases. The mistakes and successes of the Condit Project—what did and did not go as planned, what decision-makers and stakeholders would like to have seen go differently—should help project managers plan proactively and improve upon the process of major environmental restoration decisions, particularly consideration of removing moderate- to large-sized dams.

Dams present a variety of challenges, both to natural ecosystems as they are built and operate, and to social systems as removals are considered and pursued. Chapter 2 elaborates on the process of dam removal further, not only explaining the *why* of dam removal in the U.S., but also how such decisions are made; describes recommendations for successfully involving the public in decision making procedures; and explains the framework with which I approach the results of my research. The remainder of this thesis describes the study areas and research process, presents the analyses of the two dam removal projects, and discusses the findings and their significance.

Chapter 2

Environmental Decision-Making and Research and Analytical Frameworks

While decisions to dam rivers and modify their flow goes back centuries, our understanding of the full impact of dams and potentials for restoring rivers and their associated ecosystems to an approximation of their prior state has mostly been built since the latter 1900s. This chapter outlines the role of the discipline of geography in environmental decision making, describes my framework for data analysis, and examines the status of river/dam studies and decision-making in the U.S. in order to set the context for decisions to remove the Elwha River dams and the Condit Dam and this study. Explicit connections with other realms of study, including environmental perception and sense of place, are made here as well.

Geography's Role in Environmental Decision Making

Geography's central concern with human-environment interactions is increasingly relevant to decision makers and the public as environmental change and degradation escalates across the globe. Inherent to the implementation and interpretation of my research is a geographic perspective—a recognition of the critical role the concepts of place and scale play in human-environment interactions (National Research Council 1997). One of geography's long-held goals is to understand through systematic analysis the "social, economic, political, and environmental processes" which define a place, and how a place, in turn, shapes the processes that occur there (National Research Council 1997, 30). My thesis analyzes how these processes shaped decision making in the Condit and Elwha dam removal projects and assesses how they differ according to their respective locations. Spatial scale, from the global down to the local, is understood to influence processes and phenomena as well. With Condit Dam removal, federal legislation (i.e., Federal Power Act, Endangered Species Act) imposed management requirements on a river in Washington State which resulted in a dramatic change in the landscape and the possible uses of that resource. This impacted the economies and potentially the future demographics of two counties and several towns in the local area.

In addition to place and scale, geographers also study how human-environment interactions are influenced by human perceptions and attitudes (National Research Council 1997). In fact, “[s]ome of geography’s most influential contributions have documented the roots and character of particular environmental views (National Research Council 1997, 33). Along with analyzing the political and economic influences on a specific example of human shaping of the environment—dam removal in Washington—this thesis explores individuals’ perceptions and opinions about the dams and removal decision processes.

Analytical Framework

In approaching this research, several guiding concepts were useful in explaining relationships between stakeholders and views of/attitudes toward dam removal and decision-making. These included sense of place, environmental perception, political ecology, and economic considerations (especially cost-benefit analyses). These concepts will be referred back to when I discuss my results in Chapter 7.

Sense of Place in Natural Resources Decision-making

The study of “sense of place” focuses on individuals’ and groups’ perceptions of and attachments to a particular geographic location (Cheng, Kruger, and Daniels 2003). It is based on the premise that a “place” is not comprised simply of a group of objects set physical location, but is instead imbued with layers of socially and politically constructed meanings (Cheng, Kruger, and Daniels 2003). The meaning of a place determines what behaviors are perceived as acceptable within the boundaries of that space. Conflict arises when multiple meanings converge on a single location or when that meaning is changed. Cheng, Kruger, and Daniels (2003) and Cantrill and Senecah (2001) assess the role and importance of incorporating place meanings and people-place relationships in natural resource decision making. This perspective is captured, to an extent, through my second research question: How did decision-maker perception and opinion play a role in dam removal decisions?

Cheng, Kruger, and Daniels (2003) draw on the disciplines of phenomenology and environmental cognition to explain the concept of sense of place. From their analysis of place-based literature, they conclude that “people’s perceptions and evaluations of the environment”—the meaning assigned to a place—“are expressions of place-based self-identity”, an identity which people may alternately seek to

protect or to transform (Cheng, Kruger, and Daniels 2003, 96). It is unsurprising, then, that emotions run high when a change is proposed in the management of a natural resource with which individuals or social groups identify. When place-based identities are not taken into account during decision making, this can lead to misunderstandings and unnecessary conflict. A sense of place perspective, therefore, can be used by decision makers to gain a better understanding of their constituents and, through careful observation, create a more nuanced approach to natural resource politics that gives voice to meanings and perspectives of overlooked (Cheng, Kruger, and Daniels 2003).

Cantrill and Senecah (2001) focus on the self-identity aspect of the sense of place (“sense of self-in-place”) perspective; in other words, peoples’ “perceptions of who [they] are given where [they] live” (Cantrill and Senecah 2001, 185). The authors’ case study of New York State’s Adirondack Park illustrates the importance of considering a community’s sense of self-in-place, centering on the influence of past experiences on present responses to changes in Park management. Their case study of the efforts of the Adirondack Park Agency (APA) in 1990 to improve park management illustrates this point well. What began as a well-intentioned effort to control development and protect Park wilderness areas become a hostile debate between Park residents³ and Park authorities. Due to a lack of local input as well as a failure to account for the negative political history between Park residents and government officials dating back to the Park’s conception, the APA’s communicative practices merely served to reinforce how residents perceived themselves in relation to the governmental powers that be – invisible and powerless, with no legitimate place within the Park. As a result, plans for changing Park policies came to a standstill due to strong opposition from locals and their supporters. “A commission’s work and a report’s recommendations are only as good as they can be implemented. Implementation is only as good as support among stakeholders who have the power to oppose;” a good first step in ensuring the success of any project is to “be mindful” of people’s senses-of-selves in their place (Cantrill and Senecah 2001, 197).

³The mixed-use nature of the Park distinguishes it among parks in the U.S. When Adirondack Park was established in 1892, the boundary line of the Park (known as the “Blue Line” for the color of the ink used on the map) was drawn to include human communities already in existence. State-owned lands comprise about 50 percent of the Park area (Cantrill and Senecah 2001).

Environmental Perception

Sarakinos and Johnson (2003) discuss the role of stakeholder perceptions in dam removal decision making. Influencing the level of support a proposal receives are the values assigned to various aspects of the landscape (e.g., recreational opportunities; waterfront access; aesthetic appeal) as well as stakeholder expectations of how dam removal will impact those values. If removal is expected to harm that which stakeholders hold in high regard, resistance will be met. These authors recommend public education and ideas from social marketing to dispel any possible misconceptions about removal and to diminish resistance to the idea of such a project.

Johnson and Graber (2002) promote social marketing as a tool for creating change in the behaviors and practices of individuals and communities in favor of “ecologically sustainable practices.” Crucial to its success is a thorough understanding of stakeholder concerns and perceptions. In cases of dam removal and river restoration, social marketing is used to identify barriers to community members’ acceptance of removal as a viable management alternative. Common barriers include concerns about losing recreational opportunities, potential declines in property values, and uncertainty about what the impoundment will look like after removal. Less obvious barriers include feelings of fear, helplessness, and a sense of loss which are especially prevalent when the decision to remove a dam originates from outside the community. “Only when those barriers are identified can it be ascertained whether the human and financial resources exist to overcome them” (Johnson and Graber 2002, 736). According to the authors, locating those resources involves conducting ecological and social science research and disseminating, or marketing, the findings amongst stakeholders and decision makers to effect changes in perception and behavior.

Political Ecology

Political ecology is a place-based, holistic approach to explaining ecological change in the context of political and economic processes. Politics describe how people control and influence each other and the environment; economics describes how people depend on each other and upon nature to gain the resources (including financial) necessary to make a living; and ecology describes the composition and availability of the biotic and abiotic resources within a given region (Peterson 2000; Paulson, Gezon, and

Watts 2003). The interaction of these three, interdependent processes influences what factors are considered in resource management decisions, while at the same time revealing where priorities lie among decision makers.

Peterson (2000) uses a political ecology approach in his analysis of the interactions of political and economic activities and salmon in the Columbia River Basin. Impacting the number of salmon in the region is the widespread presence of dams, tribal and international fishing rights, and land use change. As salmon declined, economic activities were forced to change. Limited resources were stretched further with the 1973 judicial ruling (Boldt Decision) enforcing the fishing rights of native peoples in the United States required a declining fishing industry to share up to half their total catch of salmon and the associated profits; the Pacific Salmon treaty between the U.S. and Canada had to be renegotiated in the early 1990s to reflect values which emphasize salmon conservation rather than international fishing rights; and land use practices such as logging, agriculture, and dam operations have been constrained by policy restrictions aimed at conserving salmon populations in the Pacific Northwest region of the United States. Peterson's documentation of the dynamics of political, economic, and ecological interactions reveals the shift in policy priorities towards environmental conservation and the ecological impetus behind it.

Paulson, Gezon, and Watts (2003) use case studies to promote the use of a multi-scalar approach to political ecology analyses of environmental change. This is particularly pertinent to my research as I analyze decision making from the national to the individual level. The authors summarize several political ecology case studies that examine stakeholder/decision maker interactions in resource management situations. One case study they cite used interview and written data to reveal the connection between international-scale oil and gas production and company-level restructuring in the late 1990s. They make the case that "environmental changes happening in the United States need to be situated within broader political economic contexts..." (Paulson, Gezon, and Watts 2003, 212). Another case study analyzed relationships between local-scale farmers and the National Forest Department in Pakistan, demonstrating that environmental issues are as much a struggle over their socially constructed meanings as they are over material resources (Paulson, Gezon, and Watts 2003).

Economic Considerations in Dam Removal Decision Making

The 2002 report on dam removal and decision making issued by The Heinz Center effectively summarizes the role of cost-benefit analyses in dam removal decision making processes. Such analyses are widely used in prioritizing the relative merits of dam retention and removal, and are often among the primary concerns among stakeholders and decision makers; they allow decision makers to measure the positive and negative impacts of removal in monetary terms. Negative impacts may include costs of planning, designing, and implementing the project. Positive impacts would include income from river-based recreation and restoration of commercial fisheries. Other financial considerations in dam removal include deciding who pays and how much. Will costs be born solely by the dam owner, or will tax payers share the burden? Costs may be divided up geographically as well: “those who bear the costs are seldom in the same location as those who benefit” (Heinz Center 2002, 78). In some cases, it will be the community as a whole who benefit while the dam owner pays for the project and shoreline property owners are forced to move. In other cases, it may be taxpayers who bear the financial burden for the project while the dam owners avoid being held financially and/or legally liable for the structure.

Dam Removal and the Decision-making Process

Avenues for Decision Making

Several avenues, or channels, exist through which decisions regarding dam removal may be made. The fates of large dams are often determined in a court of law (e.g., Ninth Circuit Court of Appeals), though several notable cases have been decided through the legislative process, by a federal agency, and through negotiated settlements (Johnson and Graber 2002). For example, Congress took over the Elwha Project with the passage of the Elwha Act of 1992 (P.L. 102-495); FERC required the Edwards Dam in Maine to be removed at the owner’s expense; and with the Condit Dam removal was chosen through the 1999 Settlement Agreement (Elwha Act 1992; Bonham 1999; Settlement Agreement 1999). In the case of smaller dams, debates over removal versus maintenance are more often decided by “the private dam owner, agency personnel or elected officials” and heavily influenced by the “local ‘court of public opinion’” — stakeholders, government agencies, citizen groups, and business interests

(Johnson and Graber 2002, 731). In the case of the Gold Hill Dam, the city government of Gold Hill, Oregon decided on dam removal with widespread public support (Blumm and Erickson 2012).

Trends in Dam Removal Rationales

The decision-making process for dam removal may be initiated for a variety of reasons. Public or private dam owners may decide to remove an impoundment because of liability concerns. If a dam were to fail, owners would be liable for environmental and property damage, in addition to related deaths and injuries. In other instances, a dam has been abandoned, hydropower production is economically inefficient, or the cost of repairing a failing dam is too expensive. Safety and, increasingly, environmental concerns so far have been the primary reasons for dam removal, and the majority of the structures removed have been of the smaller variety (Bednarek 2001; Born et al. 1998; Graf 2001; Pohl 2002; Pess et al. 2008).

Pohl (2002) tracked the leading rationales for dam removal in the United States by constructing a database of 153 dam removals. Removing a dam to improve or restore species and/or habitat (environment) turned out to be the leading rationale, with safety following behind a close second, and economic rationales placing third (60, 52, and 27 dams, respectively). Size also played a role. Larger dams were usually removed for economic or safety reasons, while environmental concerns were more frequently cited for smaller dam removal projects. Rationales varied geographically, as well. California led states in removing dams for environmental reasons. Great Lakes and northeastern states varied and rationales depended on the agency in charge or the program funding the project. Safety and economic factors were most influential in Wisconsin, while the “Growing Greener” program of the Pennsylvania Department of Environmental Protection made the environment the primary factor in decision-making.

Other scholars have also studied the various reasons why dams are removed and have noted recent trends. Doyle, Harbor, and Stanley (2003) developed a prioritization scheme for understanding the many different reasons behind dam removal and creating an effective decision-making tool for agencies to use as more dams are considered for removal. Factors the authors recommend for such a scheme include: 1) safety and liability (risk and structural integrity of the dam); 2) economics (cost-benefit analysis); 3) stream (flow) restoration; 4) species population enhancement; and 5) restoration project enhancement. Additionally, potential negative impacts of dam removal should be included in the analysis

of the project. These include assessing the risk of damaging endangered species, releasing chemical pollutants into a river system, and of released sediments damaging important infrastructure downstream (e.g., flood-control levees, bridges). Both pre- and post-removal data collection and analysis is recommended for accurate assessment of the project's success or failure.

A catalyst for dam removal is the relicensing process. When a dam nears the expiration date of its license, FERC takes into consideration whether or not the dam still serves the interests of the public. Is it still safe? Is it detrimental to the environment? Does it continue to serve the purpose for which it was built? These are factors the Commission takes into consideration (Graf 2005). Following the Electric Consumers Protection Act of 1986, FERC is additionally required to consider the dam's impact on fish and wildlife (Bonham 1999; Graf 2005; Becker 2006). The Elwha and Glines Canyon dam removals in Washington State, described here in this thesis, and the removal of the Kennebec River's Edwards Dam in Maine are good examples of this.

The same year the Electric Consumers Protection Act was passed, the Lower Elwha Klallam Tribe, along with several major environmental groups, filed a motion before the Commission asking for the removal of the Elwha and Glines Canyon Dams, which were up for review for relicensing. Their desire was to see migrating salmon populations restored to their historic habitat (Pohl 2002; Abbe 2004; Shaffer et al. 2008; Gowan, Stephenson, and Shabman 2006). The legislation authorized acquisition of the two dams, and a feasibility study regarding the possibility of their removal. FERC played a larger role in the 1997 case of the Edwards Dam removal when it ordered that the dam be removed at the owner's expense. Again, fisheries restoration served as the primary motivation (Pohl 2002). These two cases are consistent with Pohl's assertions that environmental concerns are increasingly cited as dam removal rationales.

Pejchar and Warner (2001, 565, 567-568) recommend a set of considerations for policy-makers presented with a dam-removal proposal:

- 1) Ecological considerations: "...to what extent [is] the dam degrading habitat quantity and quality"?
- 2) Dam safety and function: is it fulfilling its original purpose? Is the structure sound?
- 3) Political and social processes: stakeholders must be consulted and the political will of governmental agencies considered.

4) Obtaining adequate funding: what are the costs of removal and who will bear them?

The checklist serves as a basic guide that may be easily applied to regions throughout the U.S. and other parts of the globe. Baish, Sheila, and Graf (2002) suggested four steps, reflecting overlapping considerations with Pejchar and Warner (2001), before a decision on dam removal is reached: 1) goals for the project are defined, 2) major issues and concerns are identified by a variety of stakeholders, 3) technical data is assembled, forecasting possible impacts of the project on the surrounding natural and human community, and 4) the public is consulted in the assessment of the project and a legal review of the proposal and its impacts on regional and national water development is performed. With such complexities to consider, the decision-making process for dam removal can take years to conclude. If, and when, permission for removal has been granted, monitoring the physical, biological, economic, and social impacts commences (Baish, Sheila, and Graf 2002).

Public Participation

Several authors offer suggestions for ensuring that dam removal decisions are arrived at and implemented in an equitable manner, ensuring a smooth transition in river management paradigms. One suggestion is to make the decision-making process for dam removal participatory, as a matter of policy, a matter of ethics regarding self-determination, a matter of making use of local knowledge, and a matter of potentially greater public acceptance of eventual decisions (Baish, Sheila, and Graf 2002; Doyle, Harbor, and Stanley 2003; Dungumaro and Madulu 2003). It should involve representatives from “official” parties like government agencies, utilities, and major industries that rely on power generated by the dam (e.g., paper mills, saw mills), as well as members of the public (beginning with the surrounding towns and counties that are most affected by the project, and expanding outward, geographically, to the state and even national level). Removing a dam takes away valuable consumer services; in the case of the White Salmon River watershed, consumers lost a fossil-fuel-free producer of electricity and a water source for agricultural irrigation (FERC 1996). Therefore, stakeholders from both sides of the debate should have an integral role in the discussion and an equal place at the table.

Rowe and Frewer (2000) conducted a preliminary assessment of some of the more formalized methods of public participation and suggest criteria with which to judge the quality of their results. They

tested the applicability of their criteria by surveying the academic literature on various public participation methods. These methods include negotiated rule making (as seen in Molle 2004), focus groups, and public hearings.

Public hearings, one of the most widely used tools in public participation, scored the lowest in both acceptance and process criteria. Communication seems mostly one-way with little debate with the various stakeholders involved. The intent often seems to be to inform, rather than discuss. Focus groups do better regarding public acceptance of outcomes, but do less well in overall effectiveness in decision implementation. Negotiated rule making scores highly on its influence on decision making, resource availability to participants, and task definition; its disadvantage lies in the lack of transparency and representativeness (Rowe and Frewer 2000). Rooted in democratic ideals, the aim in involving the public in policy making is to increase transparency in regulatory procedures and to build trust in managers and officials. The approach used in a given situation will likely be a mix of several different methods to fit the context. The effectiveness of such measures will depend on the environmental and contextual factors at play (e.g., national political styles, government expectations, and local mechanisms for participation) (Rowe and Frewer 2000).

Seven attributes are suggested by Carnes et al. (1998) to measure the success of public participation in an environmental management problem: 1) the decision-making process allows full and active stakeholder representation; 2) the decision-making process is accepted as legitimate by stakeholders; 3) the agency⁴ and other stakeholders understand each other's concerns; 4) the public has trust and confidence in the agency and its facility; 5) key decisions are improved by public participation; 6) key decisions are accepted as legitimate by stakeholders; and 7) the agency's site specific mission is accomplished. Stakeholders were asked to define attributes of successful public participation in U.S. Department of Energy Office of Environmental Management toxic waste cleanup activities, and to give recommendations on how to measure those attributes. The first three attributes listed above ranked among the top five "most important" attributes of success for nearly every stakeholder group represented in the study. These attributes are interactive and should be taken as a whole for full effectiveness. The

⁴While Carnes et al. (1998) specified DOE in their description, it is given here as "the agency" to reflect potentially broader applicability of these findings.

end conclusion is that stakeholders need to be actively consulted and involved throughout the decision-making process if public participation is to be a success.

While the case study described above is highly context-dependent and contains situations and circumstances very different from the dam removals examined in this thesis, the lessons learned through these and other studies of public participation may be modified and applied to the negotiations that took place during the Condit Dam removal.

In summary, sense of place, environmental perception, economic, and political ecology concepts help to guide analysis of dam removal considerations and experiences of stakeholders. Decisions to remove dams are affected by several concerns, generally linked to these concepts, including consideration of risk, costs, and environmental conditions. Such decisions are connected to social judgments and in many countries require public participation in the process. This participation may be more or less successful depending on perceptions of stakeholders, both local residents and decision-makers, and modes of engagement may affect success.

Chapter 3 describes the ecosystems of the White Salmon River and Elwha River watersheds. Historical events and decision-making also are outlined.

Chapter 3

Study Areas

The focus of this thesis is on the process and experiences with removal of Condit Dam on White Salmon River, in south-central Washington State. The removal project of Glines Canyon Dam and Elwha Dam in northwestern Washington is particularly well-suited as a comparative case study for the removal of Condit Dam, which took place approximately 290 miles to the southeast of Port Angeles, near the City of White Salmon, Washington (Figure 3.1). Occurring in separate settings, each with unique ecological contexts and political histories, decision-making and responses for any specific action will not occur in precisely the same manner. Here, descriptions of the different contexts for removal of Elwha River dams and the Condit dam provide a fuller explanation of the differences in how and why dam removal was selected as the best fish passage alternative for each case. Because attention to dam removal on the Elwha came earlier and these dams have had greater attention than Condit Dam, they are described first.



Figure 3.1. Relative locations of Condit and Elwha River Dam Removal Projects, Washington State (Data sources: Washington Department of Ecology (2011); StreamNet.org (2010); Kansas State University Geographic Information Systems Spatial Analysis Laboratory)

The Elwha River Ecosystem and Fisheries Restoration Project

The site of the Elwha Project, involving the removal of two large dams, is on the north side of the Olympic Peninsula, near Olympic National Park and the City of Port Angeles. Both dams were on the Elwha River, with Glines Canyon Dam located in Olympic National Park, and removal of both structures began in September 2011. The Elwha Project was intended to restore native salmon fisheries and was in the works throughout the same time period as the Condit Project. It is located in a remote area surrounded by wilderness with relatively few settlements nearby (Figure 3.2; Abbe 2004; Allaway 2004; Haring 2003). The project is part of what seems to be a trend in public policy and opinion regarding rivers and dams: environmental rationales for dam removal have become more common during the past two decades (Pohl 2002; Johnson and Graber 2002; Gowan, Stephenson, and Shabman 2006).

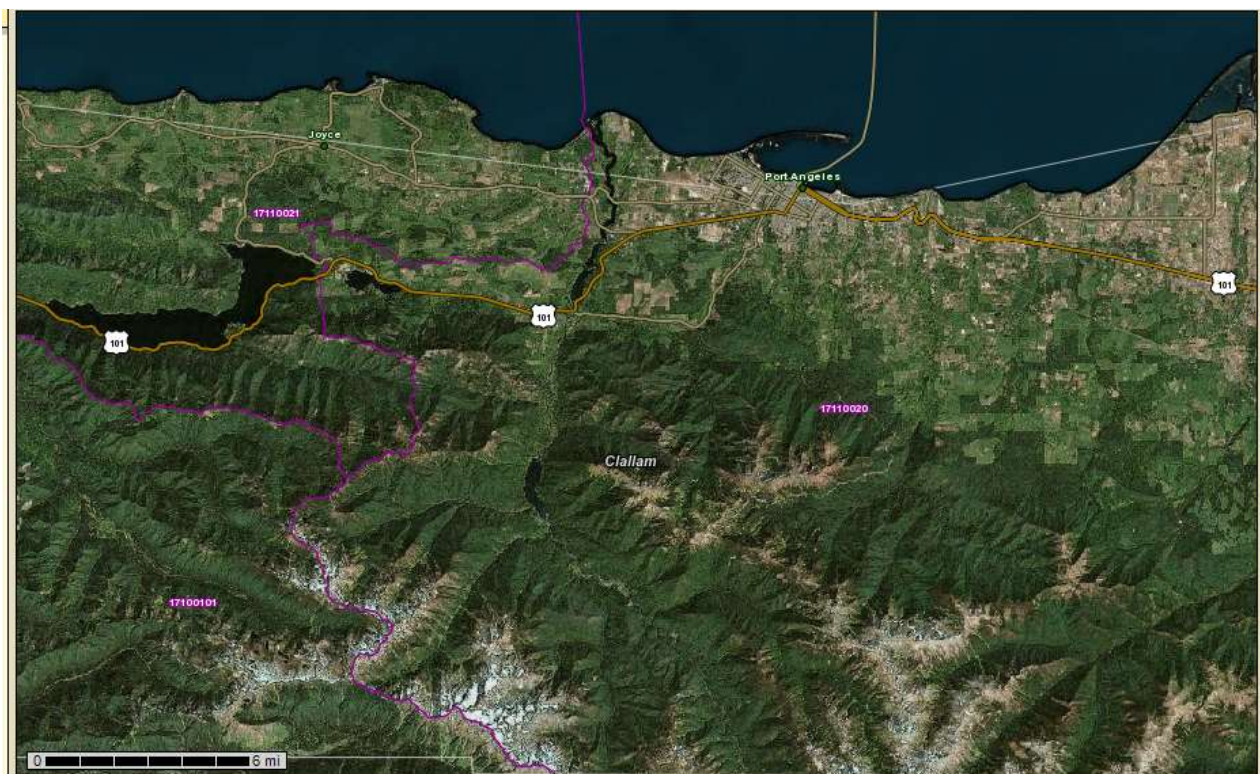


Figure 3.2. Elwha River watershed (Source: USDA 2014, accessed April 12, 2014)

Elwha Watershed

The Elwha River is contained within a 321 square mile watershed, the fourth largest on the Olympic Peninsula; 83 percent (267 square miles) of the watershed is in the nearly pristine wilderness of the Olympic National Park (Figure 3.3; NPS 1996; Abbe 2004; Allaway 2004). First established as the Olympic Forest Reserve in 1897, the Park's location upstream of the dams is ideal for ecosystem restoration, increasing the chances for success upon the removal of the Elwha and Glines Canyon Dams. Were the dams to have been placed higher up within the watershed, the system would have been modified to an even greater degree than it is today, thereby lowering the likelihood of full rehabilitation (Pringle 2001).

Land use within Park boundaries is restricted to hiking, recreational fishing, camping, and whitewater boating (Figure 3.4). Outside Park boundaries, in the middle and lower reaches of the Elwha River, land is owned both publically and privately. Public landowners include the U.S. Forest Service (USFS), Washington Department of Wildlife (WDW), Washington Department of Natural Resources (WDNR), Olympic National Forest (ONF), and Clallam County. These agencies and the County manage their lands in order to protect and preserve fishery and wildlife resources, in part. WDNR, ONF, and private timber companies also manage land for timber production (FERC 1991). Apart from timber companies, land is owned privately by area residents in the lower portion of the watershed. Residential areas may be described as low- or moderate-density with zoning designed to allow people to live in a "rural setting, free from encroachment of future commercial and industrial uses" (FERC 1991, 3-75). The City of Port Angeles is the most densely populated portion of the watershed. The only other major settlements in the area include the Lower Elwha Indian Reservation and the City of Sequim.



Figure 3.3. Locations of Elwha and Glines Canyon Dams, Elwha River watershed (Data sources: Washington Department of Ecology (2011); StreamNet.org; Kansas State University Geographic Information Systems Spatial Analysis Laboratory)

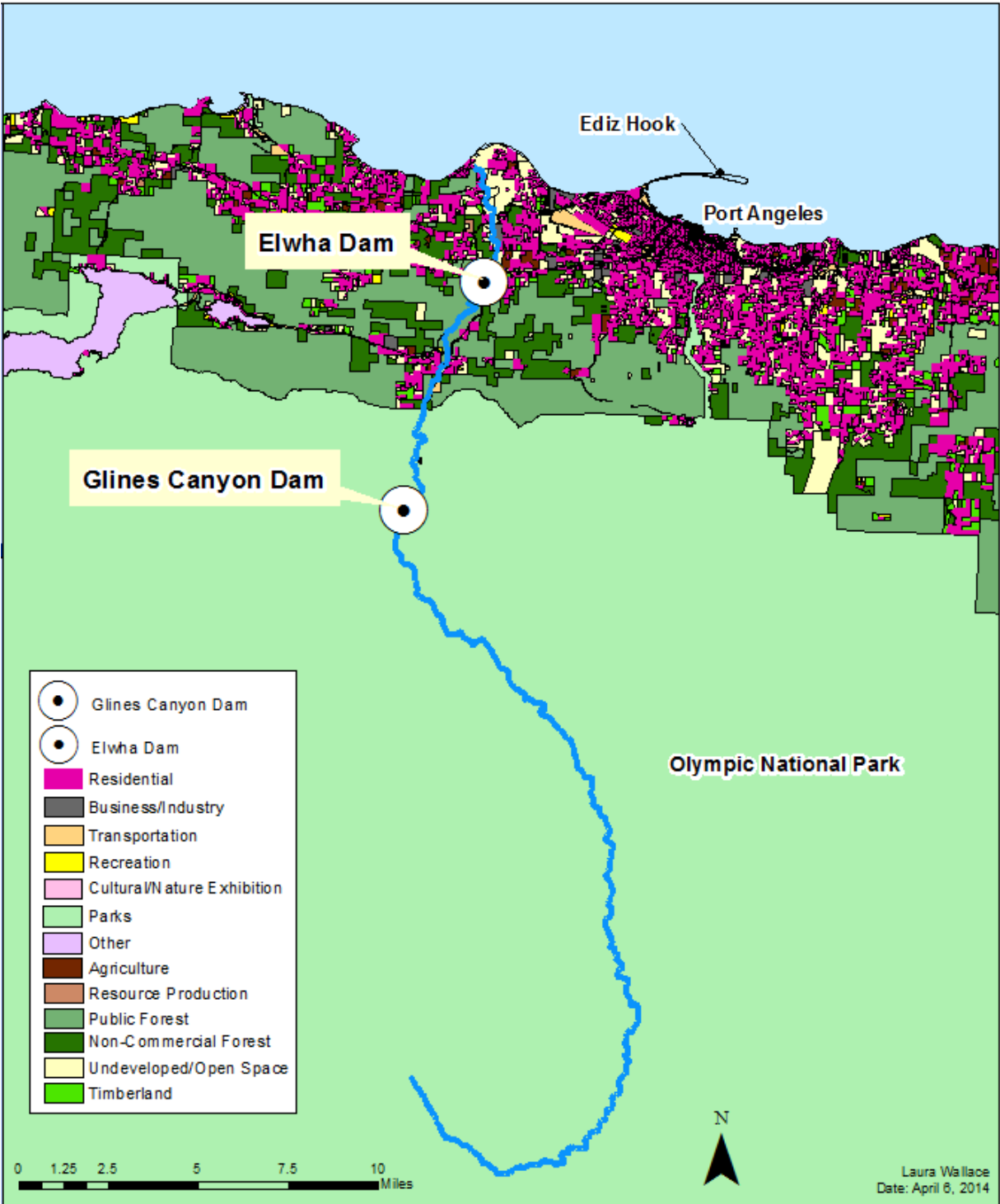


Figure 3.4. Land use/land cover in Elwha River watershed (data sources: Washington Department of Ecology (2011); Washington Department of Natural Resources (2013); Kansas State University Geographic Information Systems Spatial Analysis Laboratory)

The Elwha River watershed's topography is characterized by high relief with basaltic canyons and gorges with dramatic cliff faces of more than 150 feet (45.7 meters) high on its floodplain (NPS 1996; Egan 2007). The main stem of the Elwha River flows for 45 miles (72.4 km) with a steep drop of 8,000 feet (2,438 meters) in elevation from its headwaters on Mount Olympus to sea level, where it drains approximately 20 percent of the total park area into Freshwater Bay on the Strait of Juan De Fuca just west of Port Angeles (NPS 1995; Egan 2007; Busch 2008). Its waters are classified as Class AA by the Washington Department of Ecology, meaning they are of extremely high quality with "relatively low concentrations of dissolved and suspended sediment loads, nutrients, and organics" (NPS 1996, 33). Sand, silt, cobbles and boulders make up the riverbed upstream of the area that had been Lake Mills (impounded by Glines Canyon Dam); downstream of Lake Mills the river channel in the middle stretch is armored, containing only larger cobbles and boulders due to finer sediments being trapped behind Glines Canyon Dam for a century. With sources of fine sediment being restricted to the lower five miles of river, sediment discharge was been reduced by an estimated 280,000 cubic yards (214, 075 m³) annually to 5,900 cubic yards (4,510.8 m³) per year (to about two percent of pre-dam volume) (Allaway 2004, NPS 1996). Erosion and steepening of the shoreline and delta has resulted, even to the point where the Army Corps of Engineers spent \$100,000 annually to control the erosion of Ediz Hook, a sand spit protecting Port Angeles Harbor (NPS 1996, Egan 2007, Allaway 2004). River and outlet conditions will change with dam removals now that sediment is allowed to reach the delta, replenishing the beaches and estuary (DOI, Commerce, and LEKT 1994).

Terrestrial and Aquatic Resources

The Elwha River basin is inhabited by several species unique to this region of the country and some that are endemic to the Olympic National Park. Mammals include Roosevelt elk (*Cervus canadensis*), Columbia black-tailed deer (*Odocoileus hemionus columbianus*), and Olympic marmot (*Marmota olympus*); black bear (*Ursus americanus*), river otter (*Lontra canadensis*), and beaver (*Castor canadensis*) are other examples. Wolves (*Canis lupus*) were extirpated from the region by farmers, hunters, and ranchers by the early 1900s. A small sample of the 260 avian species that call this watershed home includes the belted kingfisher (*Megaceryle alcyon*), the bald eagle (*Haliaeetus leucocephalus*), and the common merganser (*Mergus merganser*) (NPS FEIS 1996). Pacific salmon

species include pink salmon (*Onchorynchus gorbuscha*), sockeye salmon (*O. nerka*), chum salmon (*O. keta*), coho salmon (*O. kisutch*), and spring and summer/fall chinook salmon (*O. tshawytscha*). Other anadromous⁵ fish found here include winter and summer steelhead (*O. mykiss*), sea-run cutthroat trout (*O. clarkii*), and native char such as Dolly Varden trout (*Salvelinus malma malma*). Aside from the well-known anadromous salmonids, beardslee rainbow trout (*Oncorhynchus mykiss irideus f. beardsleei*), crescenti cutthroat trout (*Oncorhynchus clarki clarki f. crescentii*), and bull trout (*Salvelinus confluentus*) are endemic to the ONP (Egan 2007, Allaway 2004).

Salmon and the Dams

Since their construction, the Elwha and Glines Canyon Dams, with Lakes Aldwell and Mills, respectively, have affected river and terrestrial habitats, and fisheries, including blocking 90 percent of high quality habitat in the main stem of the Elwha River and its tributaries (NPS 1995; Neubacher 2005; Busch 2008; Pess 2008). A river that once hosted countless salmon and provided much of the food for the Port Angeles community and the Lower Elwha Klallam Tribe became a shadow of its former self. Cut off from their spawning grounds upstream of the dams, the number of salmon the river was able to support dropped dramatically. Populations immediately began to decline, resulting in all 10 native stocks being listed as “critically low or extirpated” from the Elwha River basin (Pess et al. 2008, 73). In the 1996 Final Environmental Impact Statement, the National Park Service described their decline as “substantial” and fish harvests as “depressed” (NPS 1996, 87-88). This significantly affected the Lower Elwha Klallam Tribe, who historically have inhabited the area and maintain strong social, economic, and spiritual ties to Elwha River basin salmon. The decline of the salmon “severely impacted the tribe’s social and economic well-being” (NPS 1996, 88). Even though the tribe owned a hatchery to help supplement the river’s losses, it could produce only a fraction of the salmon that were present before the dams. In the 1990s, the most recent period of data availability, tribal fishermen brought in less than \$1,000 per year, and approximately 90 percent of fishermen earned less than \$15,000 per year by fishing (NPS 1996).

⁵Salmon and other anadromous species spend portions of their life in freshwater streams, and significant periods of growth in the open ocean. Species with “spring,” “fall,” or “winter” included in their name return from the ocean to their natal streams to spawn during that season.

Timeline of Events: Elwha River Dams

Construction and Licensing

Built in order to boost economic development throughout the North Olympic Peninsula region, the Elwha Dam, placed at river mile 4.9 of the Elwha River⁶, was constructed from 1910 to 1913 and reached 33 meters in height upon completion (Figure 3.5). From 1925-1927, the 64-meter-tall Glines Canyon Dam (Figure 3.6) was built at river mile 13.4 on the Elwha (Duda, Freilich, and Schreiner 2008). Both were created for providing power for the Daishowa America Mill in Port Angeles, Washington, generating a combined average of 18.7 megaWatts (MW) of power (DOI, Commerce, and LEKT 1994). In 1968, the owner of both dams (at the time Crown Zellerbach, but purchased in 1987 by James River Corporation) applied to FERC to license the Elwha Dam for the first time; in 1973, it applied to relicense the Glines Canyon Dam (DOI, Commerce, and LEKT 1994; NPS 1995). From 1976 onward the latter project operated on annual licenses. In 1979, FERC decided that the Elwha and the Glines Canyon Dams function hydraulically, electrically, and operationally as one dam, and so decided to process the two licenses together (DOI, Commerce, and LEKT 1994).

⁶River miles (or kilometers) indicate the distance upstream from the river's mouth, where it enters a larger stream, a lake, or the ocean. On the Elwha, river miles are upstream from its entry into the Strait of Juan de Fuca.



Figure 3.5. Elwha Dam, date unknown (Lundahl and Hales 2013)



Figure 3.6. Glines Canyon Dam, date unknown (from Connelly 2013; photo: Museum of History and Industry).

By the beginning of the 1980s, both dams were operating under annual licenses held by Crown Zellerbach Corporation, and people were beginning to question the environmental ethics and the national policy implications of having an impounded river within the boundaries of a National Park (Gowan, Stephenson, and Shabman 2006). Controversy arose around the dams, being described as “extremely contentious and drawn out” (Busch 2008, 5).

According to the Federal Power Act, as amended by the Electric Consumers Protection Act of 1986 (Public Law 99-495) and the U.S. Department of Energy Organization Act of 1977 (PL 95-91, Stat. 556), the Federal Energy Regulatory Commission has the authority to issue construction and operating licenses for non-federal hydroelectric dams. The controversy over Glines Canyon Dam stemmed from its location and the date of its initial operating license. In 1926, a year before completion, Glines Canyon Dam received its license allowing it to operate for the next 50 years. This is significant because five years prior to this, in 1921, Congress removed national parks and monuments from FERC’s jurisdiction through an amendment to the Federal Water Power Act (FWA), and placed them instead within Congress’s jurisdiction to authorize the construction of any dams within those lands, but Glines Canyon was not affected because Olympic National Park boundaries did not extend as far as the dam. The FWA was further amended in 1935 to prohibit FERC from issuing a license for any new project on National Park lands.

The problem arose when Glines Canyon Dam became a part of Olympic National Park in 1940 when President Roosevelt extended Park boundaries. It was unclear, however, whether the 1921 and 1935 amendments to the FWA also prevented the Commission from re-issuing licenses for existing projects (FERC 1991). When FERC’s authority to issue a new license came under fire in 1986 from the Department of the Interior and the Lower Elwha Klallam Tribe, and again in 1988 from Conservation Intervenor⁷, FERC maintained its regulatory authority over the project until such time as Congress directed otherwise. Their stated reason was that they would “provide a centralized forum for considering the future” of both the Glines Canyon and the Elwha dams (FERC 1991, 1-2 to 1-3). Meanwhile, in

⁷A cooperating group of conservation organizations, including Olympic Park Associates, Seattle Audubon Society, Friends of the Earth, and the Sierra Club, that actively advocated dam removal.

December 1987, James River Corporation purchased the dams from Crown Zellerbach (DOI, Commerce, and LEKT 1994, 156).

Congress Intervenes

Throughout the 1980s and into the early 1990s, FERC had not been fulfilling its obligations to adequately protect fish and wildlife affected by projects they licensed and Congress's patience was wearing thin (Egan 2007). Despite the passage of the Electric Consumer Protection Act in 1986 and other legislation, which were intended to protect fish and wildlife impacted by dams, FERC had continued to give power production greater consideration than those of fish, wildlife, energy conservation, and other non-power factors. Additionally, they were uncooperative with other agencies (e.g., Departments of the Interior, of Commerce, and of Agriculture) and Congress' patience was wearing thin (Egan 2007).

Increasingly apparent holes in U.S. energy policy as well as the desire of the FERC relicensing parties (including James River and Daishowa America) to avoid a court battle made a legislative decision very appealing. In 1992, the debate over who would decide what would happen to Glines Canyon Dam came to an abrupt halt with the passage of the federal Elwha River Ecosystem and Fisheries Restoration Act (P.L. 102-495) ("the Elwha Act"). It transferred authority over the river, including both dams, to Congress. The Elwha Act gave the Secretary of the Interior the authority to acquire both the Glines Canyon and the Elwha Dams if such an action was necessary to fully restore the Elwha River ecosystem and native anadromous fisheries⁸ (Egan 2007).

Upon investigation into possible alternatives to structure removal, *The Elwha Report of 1994* declared that, indeed, the only possible way to fully restore the ecosystem would be to deconstruct the dams (DOI, Commerce, and LEKT 1994; Abbe 2004)⁹. In 1996, a Record of Decision was signed in favor of removing the dams, and in February of 2000 Federal acquisition of the Elwha and Glines Canyon Dams was completed (Abbe 2004). Finally, on September 15, 2011, Glines Canyon dam removal broke ground (ONP 2011). As of September 20, 2013, the Elwha Dam is completely removed and work

⁸Congress authorized the purchase of the Elwha River dams at \$29.5 million dollars (Elwha Act 1992, Sec 3(a)). A revised estimate, accounting for inflation, came to \$182.5 million in 2005 (NPS 2005, 206).

⁹The study was mandated by the Elwha Act of 1992 (P.L. 102-495) and was to be coordinated and prepared by the NPS and submitted by the Secretary of the Interior in 1994 (DOI, Commerce, and LEKT 1994).

continues on the Glines Canyon structure (ONP, Dam Removal Blog, 2013); (see Figure 3.7, Figure 3.8, Figure 3.9, and Figure 3.10). Removal of Glines Canyon Dam is scheduled for completion by September 2014 (ONP 2013). Shaffer et al. remarked that “Dam removal on the Elwha River...will be the focus of the single largest river restoration action in the country” (Shaffer et al. 2005, 1).



Figure 3.7. Demolition begins October 17 on the Elwha Dam using excavators. Here the machines are slowly removing pieces of the gravity section of the dam “recognizable by its stair-step appearance” (Olympic National Park Dam Removal Blog Archives 2011).



Figure 3.8. Glines Canyon Dam removal in progress, 9 July 2012 (Peninsula Daily News 2012).



Figure 3.9. Lake Mills draining (Glines Canyon Dam) (Photo: Erdman Video Systems, Inc., 2013)



Figure 3.10. Lake Aldwell (Elwha Dam) finished draining (Photo: Erdman Video Systems, Inc. 2013).

The Condit Dam Removal Project

White Salmon River Watershed

Events and decisions for the Condit Project took place within approximately the same time frame as the Elwha Project with the shared purpose of restoring native salmon runs. Condit Dam straddled the border between Klickitat and Skamania counties in southern-central Washington State, approximately 3.3 miles (5.3 km) upstream of the confluence of the White Salmon and Columbia Rivers (Figure 3.11 and Figure 3.12) (FERC 1996; Becker 2006, 3; Silver, Hudson, and Whitesel 2010). Fed by snow and glacier melt, the White Salmon River flows for 45 miles (72.4 km) and drops 7500 feet (12,070 km) down the south slope of nearby Mount Adams until it enters the Columbia River at river mile (RM) 167 (river kilometer 269)¹⁰, near White Salmon, Washington (FERC 1996, 3-1, 3-2; Haring 2003, 29). Its tributaries include Buck Creek, Trout Lake Creek, Spring Creek, Rattlesnake Creek, Cascade Creek, and others (FERC 1996; Haring 2003; Wellner 2007; Silver, Hudson, and Whitesel 2010). While the dam was in

¹⁰River miles on the White Salmon are upstream from its confluence with the Columbia.

place, its reservoir, Lake Northwestern, extended for over a mile and a half upstream of the dam and covered 92 acres (PacifiCorp 2009, 5).

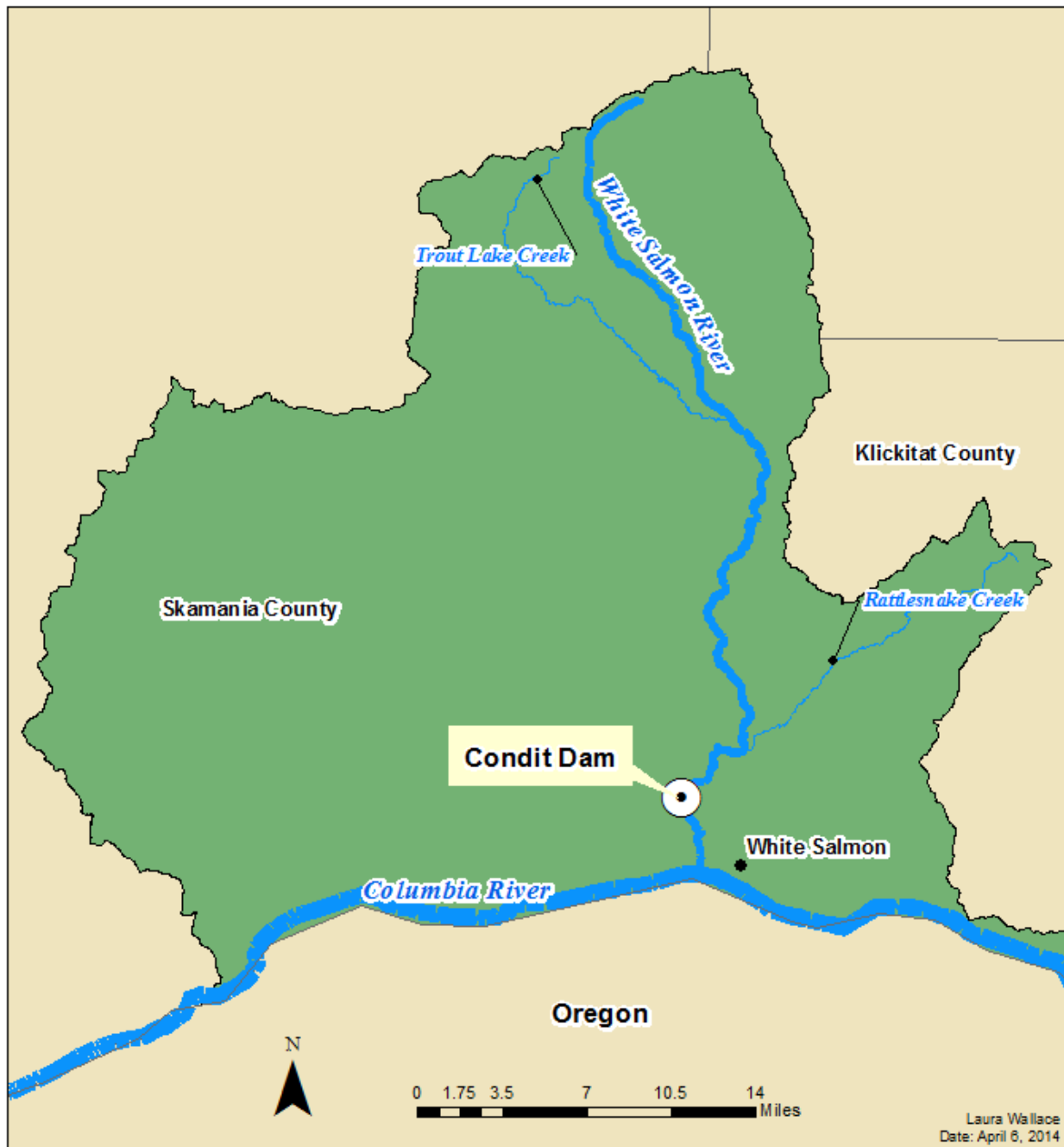


Figure 3.11. Condit Dam and White Salmon River Watershed, Washington (data sources: Washington Department of Ecology (2011); Kansas State University Geographic Information Systems Spatial Analysis Laboratory; StreamNet.org (2010))



Figure 3.12. Satellite image of Northwestern Lake, impounded by Condit Dam (Source: Google Earth, Accessed April 15, 2014)

Half the White Salmon River watershed is owned by the federal government. Washington State's Department of Natural Resources (DNR) manages an additional 20 percent. The rest is owned by timber corporations (20 percent) and private landowners (10 percent) (FERC 1996; Rawding 2000, 3). The surrounding terrain is craggy and dramatic, characterized by steep canyon walls, flat narrow valleys, and multiple waterfalls as the river wends its way through the watershed (FERC 1996). Approximately 95 percent of the basin's 250,459 acres is forested (Haring 2003). The upper portion of the watershed resides in the Gifford Pinchot National Forest (GPNF), and between RM 5.0 and 12.7 (river km 8.0 and 20.4) the river upstream of the dam site is a designated "scenic river" under the Wild and Scenic Rivers Act. From RM 3.3 (river km 5.3) downstream to where the White Salmon River meets with the Columbia River, it flows through the Columbia River Gorge National Scenic Area (CRGNSA) (FERC 1996; Haring 2003, 31). The remaining five percent of the watershed is characterized as pasture, hay, rural residential, and including a few small towns, such as White Salmon, BZ Corner, Trout Lake, and Husum. Water is drawn from the White Salmon River to irrigate hay and pasture land, as well as fruit orchards like the Mt.

Adams Orchard, which is the major producer of pome fruit in the area (apples, pears) (Figure 3.13; Wellner 2007; PacifiCorp 2009; Haring 2003). Besides timber and agriculture, recreation is another major user of natural resources in the area. According to the U.S. Forest Service, approximately 12,000 commercial and independent whitewater boaters arrive during the recreation season to enjoy the challenge of the White Salmon River's rapids, pushing off from BZ Corner and landing at a popular point at Northwestern Lake (FERC 1996, vii). It is believed that the newly unrestricted section of the White Salmon River will offer "some of the finest whitewater river running experiences in the Northwest" (Becker 2006, 4).

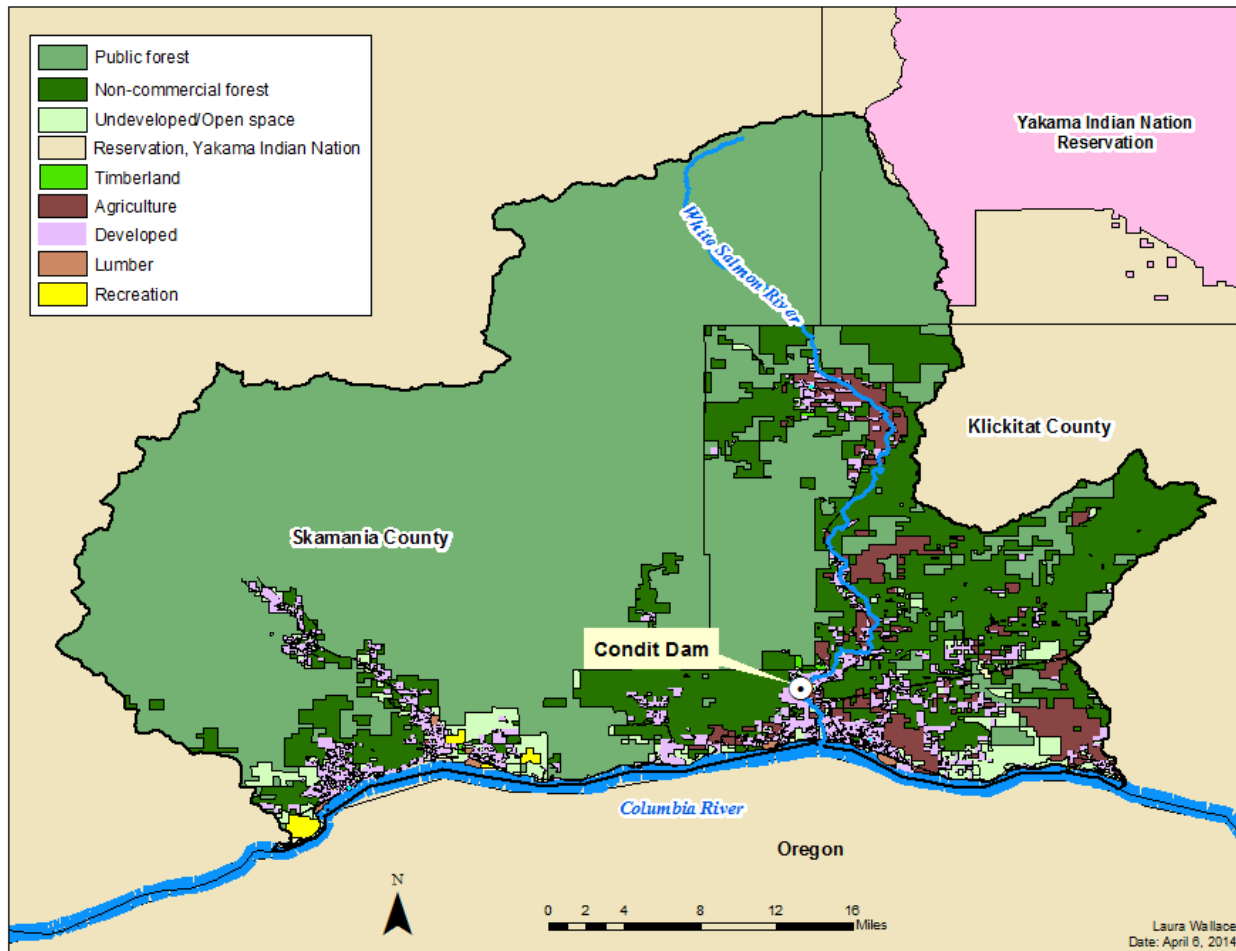


Figure 3.13. Land use/land cover in White Salmon River watershed (data sources: Washington Department of Ecology (2010; 2011); Kansas State University Geographic Information Systems Spatial Analysis Laboratory; StreamNet.org (2010))

Terrestrial and Aquatic Resources

The White Salmon River watershed supports a wide variety of terrestrial wildlife species native to the area. Mammals found in the area include black-tailed deer (*Odocoileus hemionus*), beaver (*Castor canadensis*), mink (*Mustela vison*), river otter (*L. canadensis*), and the western grey squirrel (*Sciurus griscus*) which is listed as “threatened” under the Washington State Endangered Species Act (FERC 1996, 3-39 – 3-40). Several bird species found in the Project area include the bald eagle (*H. leucocephalus*), pileated woodpecker (*Dryocopus pileatus*), Vaux’s swift (*Chaetura vauxi*), tern species (*Podicipedidae spp.*), great blue heron (*Ardea herodias*), and osprey (*Pandion haliaetus*) (FERC 1996, F-3; PacifiCorp 2009, 23-25).

While the dam was still in place, fish species diversity was decidedly greater in the river below the dam than it was in Northwestern Lake and further upstream. A total of 16 species have been found downstream of the dam, including spring and fall Chinook (king) salmon (*Oncorhynchus tshawytsch*), Coho (silver) salmon (*O. kisutch*), winter and summer steelhead (*O. mykiss*), and bull trout (*Salvelinus confluentus*). Upstream of the dam were significantly fewer species. These included cutthroat trout (*O. clarkii*), rainbow trout (*O. mykiss*), non-native brook trout (*S. fontinalis*), and sculpin (*Cottus bairdii*) (Rawding 2000, 5). Endangered species include several subspecies of lower Columbia River Chinook salmon (*O. tshawytscha*), middle Columbia steelhead (*O. mykiss*), lower Columbia coho salmon (*O. keta*), Columbia bull trout (*S. confluentus*), and others (Wellner 2007; Silver, Hudson, and Whitesel 2011). A list of salmon and steelhead species of concern may be found summarized in the table below (Table 3.1).

Species	Salmon & Steelhead ¹¹
<i>Onchorynchus tshawytscha</i>	Lower Columbia River (LCR) Chinook salmon
	Upper Willamette River (UWR) Chinook salmon
	Upper Columbia River spring Chinook salmon
	Snake River (SR) spring/summer Chinook salmon
	SR fall Chinook salmon
<i>O. kisutch</i>	LCR Coho salmon
<i>O. nerka</i>	SR sockeye salmon
<i>O. keta</i>	Columbia River chum salmon
<i>O. mykiss</i>	LCR steelhead
	UWR steelhead
	Middle Columbia River steelhead
	SR Basin steelhead
	UCR steelhead

Table 3.1. Anadromous fish populations of concern occurring in the Condit Dam removal project area and their status under the Endangered Species Act (ESA) (NMFS 2006, 4).

Salmon and Condit Dam

Before the dam’s placement, the White Salmon River supported large populations of wild fish. This natural resource was so abundant that the river was able to support two native fishing villages (Becker 2006). Due to the absence of any kind of fish passage at the dam, however, one hundred years later most of the river’s wild salmon runs are endangered, and its spring Chinook salmon population is already extinct, “due in large part to Condit Dam” (Bonham 1999, 2). In an attempt to mitigate the impact of the dam on the White Salmon River’s native fish stocks, the U.S. Fish and Wildlife Service installed a fish hatchery for spring Chinook salmon nearby. While it operated with some success, it has not resulted in self-sustaining populations, at least when the dam was still in place (Haring 2003). Now that the dam has been removed, this is expected to change. Salmon now have 14 miles of river habitat restored to them, and steelhead are reconnected to 33 miles of their original habitat. The hope is that this will result in the restoration of pre-dam abundance and diversity (Wellner 2007; Susewind 2010).

¹¹All species listed below are classified as “Threatened” under the Endangered Species Act except for the Upper Columbia River spring Chinook salmon (*O. tshawytscha*) and the Snake River sockeye salmon (*O.nerka*).

Timeline of Events: Condit Dam

In 2010, Washington waterways contained 763 dams, over 60 of which measured more than 100 feet (30.5 m) in height. Before being dismantled, the Condit Dam was one of these, measuring 125 feet (38.1 m) high and 471 feet (143.6 m) long (FERC 1996, 2-4; Becker 2006, 3; Army Corps of Engineers 2010). Condit Dam was built on the White Salmon River, a tributary of the Columbia River, in southern Washington in 1913 by the Northwestern Power Company (Figure 3.14, Figure 3.15, and Figure 3.16). It provided power to a local paper mill—Crown Columbia Paper Mill in Camas, Washington—and was “to anticipate the energy needs of a growing regional population,” selling any surplus energy to other users in the Northwest (Becker 2006, 3; see also Bonham 1999). Originally, fish ladders were installed, but they were washed out by floods in 1914 and 1918. After the second failure, the Northwest Electric Company (the dam owner which later became PacifiCorp Electric) was obliged by the Washington State Fisheries Department to help construct a fish hatchery in order to mitigate the loss of fish passage. Efforts to provide fish passage around the dam were eventually abandoned after experiments with a fish elevator failed to be effective (Haring 2003; PacifiCorp 2011).



Figure 3.14. View to south of Condit dam site prior to construction, June 1912. (Source: PacifiCorp 2013)



Figure 3.15. Condit Dam, construction, January 1913 (source: PacifiCorp 2013)



Figure 3.16. Condit Dam, completed, April 1913 (source: PacifiCorp 2013)

Nearly fifty years later, in 1963, then-owner of Condit Dam, Pacific Power and Light Company (now PacifiCorp Electric) applied to the Federal Power Commission (now FERC) for a license of operation for the 14.7-megawatt (MW) Condit Dam, pursuant to section 15 of the Federal Power Act (FPA). On December 31, 1968, the Pacific Power and Light Company (PPL) was granted their license, effective retroactively on May 1, 1965, and set to expire nearly 30 years later on December 31, 1993.

In 1980, PPL was ordered by FERC, in accordance with their 1968 license, to conduct a study investigating various options for installing some form of fish passage at the dam. After doing so, the company chose the trap-and-haul method as their preferred fish passage alternative, at the same time calling into question the cost effectiveness of restoration and the quality and quantity of the upstream habitat. PPL expressed concern about how returning salmon to this part of the river would affect the resident trout population (a factor in the “scenic” designation of the reach upstream of Northwestern Lake to Gilmer Creek under Section 10 of the Wild and Scenic River Act) (FERC 1996; Bonham 1999). Desiring more to be done on behalf of the salmon, in their Columbia River Basin Fish and Wildlife Plan of 1982, the Northwest Power Planning Council¹² called for FERC to require PPL to construct fish passage facilities by November 15, 1985. The Plan’s instructions to install fish passage were never acted upon (Becker 2006).

In December 1991 PacifiCorp applied to FERC to renew the Condit Dam license without including the installation of fish passage among the list of proposed improvements to the hydroelectric project, though increased capacity and generation were requested (FERC 1996; Bonham 1999; Becker 2006). Around this time, seeing an opportunity to restore connectivity to the White Salmon River and encourage the growth of native salmon fisheries, the group of organizations supporting dam removal—known in legal documents as the Intervenor¹³—petitioned FERC to require fish passage structures to be installed or for the Condit Dam to be removed entirely (Settlement Agreement 1999). In both the DEIS and FEIS (1995 and 1996, respectively), FERC echoed this, stating and restating that, while PacifiCorp did not have to decommission and remove the dam, fish passage facilities were a requirement (FERC 1996; PacifiCorp

¹²The Northwest Power Planning Council was formed in 1981 by the Pacific Northwest Power Planning and Conservation Act of 1980 to act as “an interstate policy-making and planning body for electrical power development and fish and wildlife resource protection in the Columbia Basin” (Bonham 1999, 6).

¹³See Appendix A.

1999; Bonham 1999; Wellner 2007; FERC 2010; PacifiCorp 2011). PacifiCorp protested that FERC’s preferred alternative, at an estimated \$33 million in deconstruction costs, was “uneconomic” (Settlement Agreement 1999, 2). Certainly, project retirement with dam removal appeared even less appealing at an estimated cost of nearly \$60 million (1996 dollars). The table below lists the estimated construction/demolition costs of each fish passage alternative according to FERC’s 1996 analysis, including PacifiCorp’s original proposal of continuing operations without fish passage (Table 3.2; FERC 1996).

Alternative	Construction/Demolition Cost (1996 \$, millions)
PacifiCorp's proposal (no fish passage)	9.391
PacifiCorp's proposal with modifications	33.409
Project retirement with dam removal	58.796
Partial dam removal with upstream diversion	67.066
No-action alternative	0

Table 3.2. Estimated capital costs of relicensing alternatives (FERC 1996, p. 2-24)

Seeking a more affordable option, PacifiCorp eventually agreed to begin negotiations to discuss the feasibility of dam removal as a solution. The process lasted from 1997 to 1999. In January 1997, PacifiCorp filed a request for the temporary suspension of relicensing proceedings with FERC in order to take the time to review dam removal alternatives with Intervenor. By March of the same year, PacifiCorp joined with the Yakama Nation and the Columbia River Intertribal Fisheries Commission (CRITFC) in hiring an independent engineering firm as a consultant to perform a separate cost estimate and to explore what it would take to engineer such a project. Two years later, an additional engineering report (prepared by R.W. Beck with assistance from a firm hired by American Rivers), and two requests for the postponement of relicensing proceedings later, PacifiCorp and the Intervenor (together, “the Parties” to the legal agreement) had put together a comprehensive plan to retire and remove Condit Dam entitled “Condit Hydroelectric Project Settlement Agreement” (1999 Settlement Agreement).

FERC issued a declaratory order in December 2001 and a clarification order in 2002 which stated that FERC considered the 1999 Settlement Agreement to be an application to surrender PacifiCorp’s Condit Dam license with “a future effectiveness date” (FERC 2010, 1; see also Becker 2006; Wellner

2007). Also in 2002, PacifiCorp asked FERC to keep the relicense application in reserve in case the company couldn't meet the legal and administrative requirements of dam removal (e.g., permitting and construction contracts) or if a court or administrative order were to prevent PacifiCorp from implementing the requirements of the settlement, removal plan, or surrender order by December 31, 2005. FERC denied this request, saying that even in the event that costs were unexpectedly high, they would not replace their license surrender proposal with their relicense application (FERC 2010). As it turned out, PacifiCorp was able to continue dam operations until October 1, 2011, through annual licenses which, FERC reasoned, gave "PacifiCorp considerable time to fund removal costs...and otherwise resolve many of the permitting and cost contingencies on which the surrender proposal might depend" (FERC 2010, 15, 67).

The 1999 Settlement Agreement originally listed October 2006 as the official date of deconstruction, but this would be delayed annually until 2010, when FERC accepted their Agreement (FERC 2010). The permitting process, particularly requirements under Section 401(a)(1) of the Clean Water Act for obtaining state water quality certification for the project, is what caused the long delay. PacifiCorp initially applied for water quality certification on June 15, 2001, and simultaneously withdrew and resubmitted their application each year when Ecology rejected their application as insufficient. Their application for Section 401 water quality certification was finally accepted on October 12, 2010 (Suswind 2010, 1; FERC 2010, 14). In the interim, FERC published its Final Supplemental Final Environmental Impact Statement (FSFEIS) in June of 2002. The Washington State Department of Ecology also published its Final State Environmental Protection Act (SEPA) Supplemental Environmental Impact Statement (FSEIS) in 2007 addressing a few additional considerations required by the SEPA (e.g., sedimentation and turbidity in the White Salmon and Columbia Rivers, impacts on fish, and impacts on surrounding land use) (Wellner 2007). FERC accepted PacifiCorp's application to surrender its operating license in 2010, and demolition on Condit Dam began in October 2011. Deconstruction was completed one year later on September 15, 2012 (Florip 2012) (Figure 3.17. Northwestern Lake draining following Condit Dam removal, October 30, 2011 (photo courtesy of Wayne Lease).).



Figure 3.17. Northwestern Lake draining following Condit Dam removal, October 30, 2011 (photo courtesy of Wayne Lease).

Condit versus Elwha Situations

The Condit Project and the Elwha Project are similar in several respects. First, the Federal Energy Regulatory Commission (FERC) was the federal agency originally in charge of overseeing the relicensing and/or decommissioning process for both sets of dams. Both sets of dams were built in the early part of the twentieth century, set in mountainous and thickly forested areas (Duda, Freilich, and Schreiner 2008). Their purposes were to generate electricity to supply local paper mills (the Elwha River dams continued to do so throughout their lifetime) (DOI, Commerce, and LEKT 1994; Becker 2006). At none of the three dam sites were there provisions for fish passage, and as a result, once-abundant salmon and steelhead runs had dwindled to a fraction of their former sizes and were in danger of becoming extinct in those waterways (Pess et al. 2008; PacifiCorp 2009). Native peoples traditionally used both streams as sources for salmon and other fish (Becker 2006; Busch 2008).

Although there are commonalities between the Condit and Elwha Project dam removals, several differences do exist between the two. The Elwha River is much closer to the coast, and drains directly into the Strait of Juan de Fuca. The White Salmon River, however, is located approximately 150 miles

directly east from the coast, and is a tributary of the larger Columbia River which forms a natural boundary between the states of Oregon and Washington. Land use and land cover differs, as well. While both dam projects produced hydropower electricity for municipal and industrial consumers, one significant difference between the two watersheds is the diversion of flows for crop irrigation in the White Salmon River watershed (FERC 1996; Rawding 2000; Haring 2003; Abbe 2004; Ward et al. 2009). The Elwha River is situated in a forested area with high rainfall and no significant agriculture. The generation of electricity was the sole reason for impounding the Elwha River (see Abbe 2004; Allaway 2004; Ward et al. 2009).

The Condit and Elwha dams, surrounding areas, and dam removal projects thus have differences, in spite of being located in the same state and having similar time frames. The bases for final decisions to remove the dams, although both had initial requests from tribal groups, were connected to dam operators and political situations. The next chapter describes the research procedures for exploring differences in decision-making, local experiences with decision processes, and results of dam removals.

Chapter 4

Data and Analysis

Document analysis

A qualitative analysis of pertinent literature was conducted in order to construct an accurate picture of the decision-making process as it occurred over time and of the regulatory constraints with respect to the removals of Condit Dam and Elwha and Glines Canyon dams. An extensive and in-depth review of written sources occurred during the process of writing this thesis, and formed the basis of Chapter 3 above, as well as contributing to development of interview materials and interpretation of interview data.

Texts used in this document review included governmental documents, such as environmental impact statements issued by the Federal Energy Regulatory Commission and the Washington State Department of Ecology as required by the National and State Environmental Protection Acts (NEPA and SEPA); legal documents, such as the 1999 Settlement Agreement between PacifiCorp and the Intervenor and the 2010 Settlement Agreement between Klickitat and Skamania Counties and PacifiCorp regarding the resolution of “all issues and disputes” between the counties and PacifiCorp; Bonham’s 1999 analysis of section 18 of the Federal Power Act and how it shaped the relicensing and eventual decommissioning process of Condit Dam; Becker’s 2006 report on the impacts of the “new procedural rights which the 2005 Federal Power Act amendments grant to utilities which oppose fish passage at dams” on future efforts to remove dams and to require dam owners to provide fish passage as a condition of relicensing; and various permit applications and project management reports issued by PacifiCorp (Table 4.1). Personal correspondence submitted to me by interview respondents and written comments submitted during the NEPA and SEPA environmental review process to FERC and Ecology were also reviewed and supplemented other documents.

<i>Condit Hydroelectric Project: Final Environmental Impact Statement (FERC 1996)</i>
<i>Final State Environmental Protection Act (SEPA) Supplemental Environmental Impact Statement (FSEIS) (DOE 2007)</i>
<i>Condit Hydroelectric Project Settlement Agreement (Settlement Agreement 1999)</i>
<i>Klickitat and Skamania Counties' Settlement Acceptance re Condit Dam Project: CROSS Exhibit No. 51.01C (Whittaker 2010)</i>
<i>The Condit Dam Removal and Section 18 of the Federal Power Act: A coerced settlement (Bonham 1999)</i>
<i>The Challenges of Dam Removal: The history and lessons of the Condit Dam and potential threats from the 2005 Federal Power Act amendments (Becker 2006)</i>
<i>Washington State Joint Aquatic Resources Permit Application (JARPA) form (PacifiCorp 2009)</i>
<i>The Elwha Report: Restoration of the Elwha River Ecosystem and Native Anadromous Fisheries. A report submitted pursuant to Public Law 102-495. Appendices E through M (DOI, Commerce, and LEKT 1994).</i>
Personal correspondence submitted by interview respondents

Table 4.1. Key written sources consulted.

Interviews

Primary data collection involved conducting semi-structured interviews with decision-makers and engaged stakeholders in the Condit project during the summer and fall of 2012¹⁴, with a review of decision-related reports and research preceding and informing interviews. The latter method was also applied to develop the comparison case of the Elwha Project, with Egan (2007) providing secondary data regarding interviews on the Elwha dams. This comparison allowed me to identify similarities and differences between the two cases with implications for dam removal decision-making processes. “Decision-makers” particularly included government agency officials; engaged stakeholders included representatives of community organizations and individuals who had significant input into the decision process. Further description of the research approach used here, and the benefits of semi-structured interviews and resultant data, are described below.

When selecting interview respondents, it is important that they share “critical similarities related to the research question” (DiCicco-Bloom, and Crabtree 2006, 317). Potential key informants were

¹⁴Kansas State University Institutional Review Board approvals for human subjects-related research were received prior to conducting the interviews.

identified from the organizations, agencies, and individuals who were actively involved in the decision-making process of the Condit Project, and have in some form contributed to various watershed management plans and assessments, environmental impact statements, several have jurisdiction in area land planning and management, and some were involved in negotiations (in and out of court) with the Settlement Agreement parties. The sample is not representative of the entire population of the White Salmon River watershed, but instead it gives insight into the thoughts and experiences of participants in the Condit Dam removal decision process (Bradshaw and Stratford 2010). Initial respondents were identified based on background research into the decision process, including review of the 1999 *Condit Hydroelectric Project Settlement Agreement*, *The White Salmon River Watershed Anadromous Fish Passage Inventory 2009-2011 Survey Report*, and the 2007 *Condit Dam Removal Final SEPA Supplemental Environmental Impact Statement* (FSEIS). The interviewees came from a purposeful sample of people who were either directly involved in the decision-making process, or who had leadership positions in citizen action groups (including both local homeowners and NGOs) or local governmental organizations (Table 4.2 and Appendices A, B, and C). One respondent co-authored the environmental review document issued by the Washington Department of Ecology. Two others were founding members of the White Salmon Conservation League (WSCL), a coalition of citizen stakeholders advocating for the preservation of the Northwestern Lake ecosystem and retention of Condit Dam. One was a former Klickitat County Commissioner who had been highly involved in the proceedings. Yet another had managed the Yakama Nation's Fisheries Resource Management Program. All were chosen for their knowledge and level of involvement in dam removal proceedings.

Interviewee Roles/Positions
Former member of the Underwood Conservation District and the Husum/BZ Community Councils
Co-founders of the White Salmon Conservation League (WSCL) ¹⁵
Northwestern Lake cabin owners (past and present)
Employee of the Yakama Nation's Fisheries Resource Management Program
Executive staff of the Washington Department of Ecology
Two local residents involved in the proceedings
Co-author of the Final State Environmental Policy Act (SEPA) Supplemental Environmental Impact Statement (FEIS) (Ecology 2007) ¹⁶
Executive staff for American Whitewater (AW)
Homeowner near the former Lake, co-founder of WSCL
Drafter of WSCL comment letters submitted to FERC
Biologist for the National Marine Fisheries Service (NMFS) (1990-1993)
Employee of the Columbia Fish and Wildlife Authority (exact position unspecified)
Former Klickitat County commissioner involved in official proceedings with PacifiCorp
Stakeholder who intervened in 1999 in protest to the Settlement Agreement (1999) on behalf of the Husum/BZ Community Councils (FERC 2010).
Employee of Klickitat County government

Table 4.2. Interview respondent positions, totaling 15 individuals with some holding more than one position. The majority of interviews were conducted by telephone.

Potential respondents were first contacted via telephone or email. Originally, I had contacted 25 individuals for interviews; however, some were either unavailable for an interview or had less involvement in the project so as to exclude them from the interview process. Upon agreement to participate in the project, a letter of informed consent was sent to them (via email) introducing myself, the purpose of the research project, and their rights as a participant (Appendix D). On this form, respondents were also given the option of specifying their desire to remain anonymous or of indicating willingness to be identified in research reporting. Interviewee identities are indicated only if permission has been granted, and even

¹⁵WSCL was organized to represent the concerns and interests of those who wished to keep Northwestern Lake and its habitats—to oppose dam removal.

¹⁶This individual, though not involved in Settlement Agreement discussions, was included as a respondent because he was actively involved in forming the basis of Ecology's official stance on dam removal as co-author of the EIS.

then only a part of the time. This was to protect their privacy and to prevent unintentional harm to their standing in their community or organization (DiCicco-Bloom, and Crabtree 2006). Using the “snowball”, or “chain,” sampling technique led me to other key informants pertinent to this research (Bradshaw and Stratford 2010, 75). This method has the potential to result in a population sample biased toward one perspective. I attempted to guard against this when inquiring of respondents about other potential interview participants by asking for referrals from either side of the argument.

In spite of having a list of contacts balanced evenly between the pro- and anti-dam removal perspectives, I was unable to reach two individuals involved in advocating for dam removal. As a result, the final set of interviews did have more respondents from the anti-removal than the pro-removal viewpoint. Nine respondents were opponents of removing Condit Dam and six were proponents of its removal. This skews the data in favor of removal opponents, potentially leading to misunderstandings over the relative importance of each factor among removal proponents and opponents. I take care to account for this in the interpretation of my results, particularly when calculating the proportion of proponents and opponents and analyzing implications regarding the priorities and perceptions of each subset of respondents. Four of the nine opponents owned a home or cabin near the dam and reservoir and two others are former cabin owners. I did not intentionally set out to select people from this geographic area; however, I decided to include them in the interview process based on referrals from other decision-makers and because I believed they would likely have much to tell in terms of their experiences and points of view after years of living in close proximity with the dam removal project. While opponents’ desire that the dam would remain in place was not fulfilled in the end, they did help shape the decision-making process itself. A total of fifteen individuals were interviewed; achievement of ‘information saturation’ determined the final number of interviewees (i.e., virtually no new information was obtained by the final few interviews).

Many of the individuals involved in the decision-making process for the Condit Dam removal project are fairly widely dispersed throughout the states of Washington and Oregon. Ten interviews were conducted via telephone August 6-21; five were conducted in person October 29th and 30th during a week-long stay in White Salmon, Washington, in 2012. Those conducted in person, I feel, flowed the most naturally; however, due to constraints on time and funding, I was only able to interview a limited

number of people in person. In order to ensure accuracy and provide the opportunity for including direct quotes in the thesis, I verified with the informant that the use of a recording device during the interviewing process was permissible before the interview began. During the interview process, I manually recorded notes of the informant's responses in a designated notebook, as well as using a recording device; 14 interviews out of 15 were recorded in this manner; however, due to technical difficulties with one, there was no audio recording and handwritten notes were used for analysis. The transcript for this interview was submitted to participant for checking in the same way as the remaining 14 (see below).

One advantage of interviews is that they allow respondents to describe events from their own perspective, in their own words. This can be especially gratifying for those who feel that their opinions are neglected by decision-makers. This was the case with several respondents I interviewed. A semi-structured interview format allowed me more flexibility in the order in which I posed the questions than structured interviews would have; yet it also gave me the power to redirect a conversation if the respondent veered too far away from the research topic, contrasting with informant-directed unstructured interviews (Dunn 2010). It is the equivalence of meaning, rather than wording, which "helps to standardize the semi-structured interview and facilitate comparability," ensuring validity and reliability (Dunn 2010, 330). The researcher is also able to probe for more information and to seek clarification for vague or confusing answers from participants (Barribal and While 1994).

Most interviews lasted about 30 minutes, though they ranged from 20 to near 45 minutes.

Interview questions included the following:

- What was your role, related to the Condit Dam decommissioning and removal?
- Would you describe your experiences with the decision-making process (*if applicable*).
- Did you support the Condit Dam removal? Why or why not?
- What factors did you consider when deciding whether or not to support the removal of the dam?
- To what extent did stakeholder involvement (non-governmental organizations, businesses, citizens, governmental agencies, etc.) and opinion play a role in your final decisions and efforts?
- What do you think are some of the benefits of dam removal? Problems or risks? (This question may not be necessary depending on answer to previous question.)

- How did your opinion of the project evolve, or change, over time as it moved forward?
- How do you think the removal of the dam will affect the surrounding communities?
- The Condit Dam provided services to industries and residents in the area. In your opinion, are the benefits of dam removal sufficient reason for removing the dam? Please explain.
- In a similar case of dam removal, under what conditions would you support or not support the project?
- What would you like to have seen go differently during the project?
- Name one or two regulations/regulatory requirements that had the most influence on your agency's/organization's actions throughout the decision-making process, up through and until dam removal took place.

During the interviews, the order of the questions asked was determined by which direction the respondent seemed to be going with his or her comments. If it seemed more appropriate to skip to a different question and return to earlier-listed question topics later in the interview, I did so. I also asked clarifying questions or had respondents elaborate on a comment if I thought it would provide a better understanding of the dam removal process and stakeholder/decision-maker views. Not all questions were asked specifically of each study participant: in answering certain questions, some respondents also addressed the content of other questions, making it unnecessary and redundant to ask every question listed. Data collection was considered complete when no new themes emerged during interviews or document analysis, a state called saturation (DiCicco-Bloom, and Crabtree 2006).

Accuracy and completeness of data was ensured through digital audio recording of each interview (Barribal and While 1994). Accuracy was further confirmed through "participant checking," in which I sent a typed transcript of the interview to each respondent (Dunn 2010, 123). Those who so wished returned their transcripts to me, verifying accuracy, clarifying any phrases or words that I indicated had remained unclear on the recording, and including any grammatical changes they wished to make in the event I included quotes from their interview in my thesis. Some researchers believe that poor grammar and 'ers' and 'ums' should remain in the transcript in order to capture the mood of the respondent and vernacular of the region. However, others have noted the anxiety and embarrassment of respondents about errors in grammar and false starts. The impact of their words rather than nuance of

expression is of greater concern to many informants (Dunn 2010). I found this to be the case for my interview participants as well.

Interview Data Coding and Analysis

Using *nVivo*TM 10 data analysis software allowing for the use of both qualitative and quantitative methods, I analyzed interview transcripts by developing a preliminary list of codes for considerations of decision makers and stakeholders regarding their positions with respect to dam removal based on qualitative analysis of related literature. This list of codes is based on prior analysis of environmental impact statements, legal documents, and journal articles, as well as interview transcript data. By using these codes, with additions of new themes identified through further examination of interview responses (transcripts) with *nVivo*, information regarding the factors most often considered by involved stakeholders and decision-makers during the dam decommissioning process was extracted.

The number and proportion of respondents who mentioned each factor were calculated (analyzing the respondent pool as a whole, and as separate groups based on support for or opposition to the removal of Condit Dam). Value judgments about dam removal itself and about how the decision to decommission and remove Condit Dam was made were also analyzed. The most common sentiments among pro-removal and anti-removal respondents, respectively, were identified. I assessed the quality of communication within and between all the parties involved (both for and against the project), based partly on comments made by respondents expressing whether or not they felt like they were listened to or their input mattered to PacifiCorp and the agencies in charge, and partly on my impressions of the level of dissatisfaction felt by respondents towards the decision making process. Analysis of the influences on decision making for the Condit Dam removal project was based on initial qualitative analysis of the official administrative record (i.e., legal briefs, agency/organizational reports, major relevant legislation) to record how local, state, and federal government regulations affect the decision making process, and on interview transcripts recording key informant opinions and considerations. The timeline (reported in Chapter 3) was modeled after Gowan, Stephenson, and Shabmans' (2006) pattern modeling approach to building an historical narrative of dam removal decision-making. I limited my analysis to the years between 1960 (when PPL was ordered by FERC to begin exploring fish passage alternatives for Condit Dam) and 2012

because this traces the decision-making process from its beginning—the decade when the Condit and Elwha dams were receiving new licenses—to its conclusion: dam removal.

Coding of transcripts was done using Dunn's (2010) series of steps for coding these types of data: 1) develop a preliminary coding system; 2) prepare the transcript for analysis; 3) ascribe codes to text; 4) retrieve similarly coded text; and 5) review the data by themes. For the first step, key words and themes indicating respondents' opinions and the factors they considered regarding the decision to remove Condit Dam were identified. I established a preliminary list of "nodes," or categories¹⁷, which corresponded with the factors interview respondents considered during the decision-making process of the Condit Dam removal. Preliminary codes included: economy, jobs, water quality, salmon, electricity, hydropower, cost, and benefits. The list of codes was expanded throughout the process as relevant themes and sub-themes became apparent within the data. Possible factors leading to the removal of a dam were counted, such as "irrigation" or "salmon." For value judgment-related content, use of the automated word search function in *nVivo* met with limited success as each respondent had their own unique way of wording things and there were as many key terms as there were respondents. Therefore, I manually located phrases and statements expressing similar ideas and thoughts to identify common opinions, perceptions, and value judgments; these were assigned to the node "Perception, Priorities, and Opinions".

For the second step, preparing the transcripts for analysis (and prior to coding interview transcripts), I reformatted each interview transcript so that the questions were in numerical order in *Microsoft Word 2010*. During the third and fourth steps—ascribing codes and retrieving similarly coded text—this allowed use of the auto-coding function in *nVivo*, which organized the responses by question. Short passages of transcripts were manually coded, enabling organization by category/node.

Using *nVivo*, the number and proportion of people who mention each factor were calculated, both aggregately and based upon their stance on the Condit Project (whether or not they supported the dam removal). This was done in order to determine the level of influence of each factor in the Condit Project's decision making process and to identify any commonalities between respondents. Value judgments and commonly expressed sentiments among pro-dam removal and anti-dam removal respondents were

¹⁷*nVivo* uses the term "node" for category identification.

identified qualitatively, but relative importance of various themes among the key informants also is indicated via count data. Though the number of respondents is small (n=15), this particular sample of the population was purposefully targeted for their knowledge of and level of involvement in the Condit Project. Additionally, after 15 interviews no new themes emerged, indicating that the data I sought had been obtained.

The following chapters describe results from secondary sources, including written reports and research done by Egan (2007) and others, for Elwha Dam and Glines Canyon Dam removals and results from primary data (interviews) and secondary sources for Condit Dam removal. Chapter 5 describes the results for the Elwha Project. It is followed by results for the Condit Project in Chapter 6.

Chapter 5

Results Part 1: Elwha River Ecosystem and Fisheries Restoration Project

Factors considered: What mattered most

The factors considered by involved stakeholders and decision-makers in the Elwha Project were identified by reviewing environmental impact statements and the academic literature. In this chapter, I detail these factors as well as explore the opinions of the people engaged in the decision-making process as revealed in documents, particularly Egan's 2007 dissertation and the 1992 Joint Hearing Report on the Elwha Project. The information presented here serves as a comparison with the Condit Project.

Aquatic and Terrestrial Resources

Salmon

Anadromous fish, or the lack thereof, are what led to the removal of the Elwha and Glines Canyon Dams. Since no form of fish passage had been installed when they were first built, salmon and steelhead runs had decreased dramatically, to the point of becoming threatened with "extinction," or actually having been extirpated in some cases (Busch 2008). A "run" of salmon or steelhead refers to the population of fish that return from the ocean together to their natal stream during the same season each year to spawn (e.g., spring and fall Chinook). It is a site-specific population and is genetically distinct from other runs. When one is extirpated (becomes locally extinct), that genetic material is lost, diminishing the genetic diversity of the species as a whole (Price et al. 2008). During FERC relicensing proceedings, it was well known that some sort of fish passage would have to be installed. Upon review of the options available (e.g., fish ladders, trap-and-haul) and the financial commitment that would be required, James River, the owner, became more open to the idea of removing them completely to restore fish passage.

Fish passage alternatives in the U.S. Fish and Wildlife Service's Fisheries Assistance Office report (1985) were evaluated based on the likelihood of success in passing different species of salmon around the dams and the costs of each passage alternative. At first, federal and state natural resource

agencies (e.g., National Marine Fisheries Service and Washington Department of Fisheries¹⁸) were reluctant to support dam removal as a fish passage alternative due to their lack of confidence in its “...engineering feasibility, cost, and, conflicts with existing management objectives” (Gowan, Stephenson, and Shabman 2006, 512).

The Lower Elwha Klallam Tribe (LEKT) intervened in the FERC licensing and relicensing proceedings of the Elwha and Glines Canyon Dams (the former in 1976, the latter 1986). Their first concern was the long-term detrimental impacts the dams and their operations had been having on native anadromous fish resources since the dams were built in the early 20th century. Another impact the LEKT wished to rectify was the damage done to their shellfish harvest by the “profound erosion of the Elwha tribal beaches” (Egan 2007, 106-107). It was the hope for a better future, with the belief that salmon runs would increase, that led to the 1986 intervention call for the removal of the dams. The LEKT was the first party to call for dam removal. Frances Charles (Tribal chairperson of the Lower Elwha Klallam Tribe; as quoted by Egan 2007) stated it in these words:

I hate to think of the future, especially for our children, if our resources aren't there--the fish, the nature, the wildlife, the plants—which have always been provided for us. Our ancestors were raised to protect the river. They raised us to protect the river. We must be even stronger in the future—protecting what was given to us for our children, and for our children's children—and valuing what we have.

The Point No Point Treaty Council (PNPTC) also intervened in 1986 to protect treaty-reserved rights for the Klallam and Skokomish tribes of the North Olympic Peninsula (Egan 2007, 107). Tribal fishing rights played an instrumental role in making dam removal a serious consideration in Congress. Dam owners, the paper mill, and federal agencies came to realize that retaining and relicensing the dams would expose them to being held liable in court for damage to anadromous fisheries and for failing to uphold Tribal treaty-reserved fishing rights (Egan 2007, 149).

Later that year, a coalition of environmental groups also filed for intervenor status and called for the dismantling of the dams (the ‘Conservation Intervenor’ group was composed of the Seattle Audubon Society, Friends of the Earth, Olympic Park Associates, and the Sierra Club) (Gowan, Stephenson, and

¹⁸The Washington Department of Fisheries and the Washington Department of Game were merged into a single entity—Washington Department of Fish and Wildlife—in 1994, according to the WDFW website (<http://wdfw.wa.gov/about/> , accessed 9/30/13).

Shabman 2006, 512). The Secretary of the Interior, acting in his role as trustee for the LEKT, supported the Tribe and concerns about providing passage for what were tribal resources held in trust by the DOI (i.e., native anadromous fish) and also entered a request to intervene in the FERC process. It was not until 1989 that the Department of the Interior, along with its fellow members of the Joint Fisheries and Wildlife Agencies (JFWA)¹⁹ would firmly and publicly be in support of dam removal as the preferred alternative for fish passage (Gowan, Stephenson, and Shabman 2006).

Re-establishing native anadromous fish runs in the Elwha River was also a significant interest for state and federal government entities. The National Park Service Organic Act of 1916 gave the Olympic National Park the responsibility of protecting system resources, and the Boldt Decision of 1974²⁰ meant that the LEKT would be claiming a significant portion of the Elwha River's salmon stocks (Egan 2007, 117). Taking steps to ensure the recovery of native anadromous fish stocks would help fulfill these obligations. Congress, as well, wanted native salmon runs to be healthy and abundant again, instructing the Secretary of the Interior that “full restoration of the Elwha River ecosystem and native anadromous fisheries” was the goal in purchasing the Elwha and Glines Canyon Dams (Elwha Act 1992, Section 3(a)).

According to Egan (2007), FERC tended to be more concerned with maintaining hydropower than with maintaining native fisheries, often treating the latter as a secondary issue. This is not unexpected given that they are an energy agency, not a wildlife agency. However, this went against the requirements of the 1986 Electric Consumers Protection Act which required them to give equal consideration to non-developmental values, such as fish and wildlife protection, during licensing (Bonham 1999, 15). To their credit, though, in their Draft Environmental Impact Statement (DEIS) FERC did analyze the impacts to anadromous fish in the Elwha River that each mitigation alternative would have, including those of dam removal (FERC 1991; see Table 5.1). The agency found that removing both the Elwha and Glines Canyon dams would provide the best chances for full restoration of the river's fish runs. The second best option, according to the analysis, would have been to remove only the Elwha Dam, as that would have

¹⁹Joint Fisheries and Wildlife Agencies (JFWA): the government agencies, NGOs, PNPTC, and the Lower Elwha Klallam Tribe promoting full dam removal

²⁰Judge Boldt's 1974 ruling on the *U.S. v. Washington* case (384 F. Supp. 312 (1974)) protected treaty-reserved fishing rights of American Indian tribes, “establish[ing] that the tribes were entitled to one-half of the annual harvestable salmon and steelhead runs” (Egan 2007, 72).

allowed fish to access the middle reach of the river unimpeded; the option of removing only Glines Canyon Dam would still have exposed fish to mortality associated with fish passage facilities downstream (FERC 1991, 5-5; see Table 5.1).

Species	Applicant's Proposal	Removal of Both Dams	Glines Canyon Dam Removal	Elwha Dam Removal
Fall Chinook	Fair	Excellent	Excellent	Good
Spring Chinook	Poor	Good	Good	Fair
Coho	Fair	Good	Good	Good
Winter Steelhead	Good	Excellent	Excellent	Excellent
Summer Steelhead	Fair	Good	Good	Good
Pink	Poor	Good	Poor	Fair
Chum	Poor	Good	Poor	Fair
Sockeye	Poor	Poor	Poor	Poor

Table 5.1. Chances of survival for salmon species according to each mitigation alternative (adapted from Table 5-3, FERC 1991).

Bird and Mammal Species

Government agencies, such as the Department of the Interior, and the LEKT noted the benefits dam removal would have on local terrestrial species. With the restoration of anadromous fisheries would also come the restoration of Elwha Valley wildlife species that consume salmon and steelhead as part of their diet (DOI, Commerce, and LEKT 1994). Species include black bear, mink, river otter, belted kingfisher, and bald eagle (NPS 1995, 68). While waterfowl that prefer a lake habitat would be put at a disadvantage, at least until wetlands had a chance to develop, species that prefer a riverine environment would benefit from removing the dams. These species include the common merganser, hooded merganser, and the wood duck. Upland bird species, such as the ruffed grouse would increase as stands of conifer, mixed conifer/deciduous, and hardwood trees would developed in the lowland areas. In time, as trees matured and then died, large snags would develop, providing habitat for cavity nesters such as the pileated woodpecker, among others (DOI, Commerce, and LEKT 1994, 63-64).

Concern about how the loss of the reservoirs would affect the trumpeter swans that used Lake Aldwell (impounded by Elwha Dam) and Lake Mills (Glines Canyon Dam) formed part of the argument used by the opposition to object to dam removal. It is interesting to note, however, that the Programmatic

EIS stated that Lake Aldwell was “only recently utilized by the swans” (recent relative to 1995, at least, when the EIS was published). The habitat was not considered particularly high quality nor was it their natural habitat, apparently. The NPS did not know why the swans had moved there for wintering habitat or what usually triggers their movements from site to site (NPS 1995, 68). It may be that their preferred winter habitat had been eliminated or become unsuitable and they were pushed to what was, for them, marginal habitat. If that was the case, then the elimination of the reservoirs may indeed place this population at a disadvantage. To address these concerns, the Elwha Report recommended the inclusion of plans to create wetland and pond areas to replace some the habitat they lost (DOI, Commerce, and LEKT 1994, 42).

Water Resources

Water Quality

Washington Department of Ecology intervened in the Elwha Dam licensing proceedings on December 26, 1976, in order to fulfill their responsibilities to such matters as water quality and quantity, and to stream flow. The agency was instrumental in the construction of the National Park Service’s 2005 Supplemental EIS which focused on “water quality protection and enhancement” (Egan 2007, 108). In its 1991 Draft EIS, FERC considered the maintenance of the Elwha River’s excellent (Class “AA” Waters) water quality ranking as an important factor in choosing between dam removal and James River Corporation’s proposal. Benefits of high water quality include the health of anadromous and resident fish populations, drinking and industrial water supply for the City of Port Angeles (heavily reliant on the Elwha), sport fishing, swimming, and the aesthetic value it lends to the watershed (FERC 1991, 5-9). Dam removal would increase the turbidity levels of the river water during construction as well as a few years following the project, which would not only require additional treatment before it was distributed to industrial and municipal users, but it would also adversely impact the Washington Department of Fisheries²¹ fish rearing facility (FERC 1991, 5-10).

In 1992, Mayor Hallett raised this issue in his testimony at the joint hearing for the Elwha Report (Joint Hearing Report 1992). The Department of the Interior paid attention to these concerns and, with

²¹Washington Department of Fisheries is now a part of the state’s Department of Fish and Wildlife.

funding from the Environmental Protection Agency and the National Park Service, had the Port Angeles Water Treatment Plant (PAWTP)²² built for the city, completed in April 2010. The Elwha Water Treatment Plant²³ was completed in February 2010, as well; its purpose is to provide treatment for the industrial water supply used by the Daishowa America and Rayonier mills, and for flood protection (Egan 2007; NPS 2013).

Recreation

During the environmental review process, the project's impacts on recreational opportunities connected to the river were also considered. In the long-term, recreational fishing opportunities (including both marine and freshwater) would increase as the number of fish available for harvest also increased. Whitewater boating would also have an extended stretch of river to raft and kayak, amounting to 5.3 river miles (8.5 river km); flatwater opportunities would be eliminated with the draining of Lake Mills and Lake Aldwell (DOI, Commerce, and LEKT 1994, 43). Visitors to the Elwha sub-district of Olympic National Park would be inconvenienced, in the short-term, by construction during the first four years of the project (2011-2015); park closures would occur during the final year of the dam removal. The increase in turbidity during construction would make the middle and lower reaches of the river less attractive to whitewater boaters, and anglers would have a more difficult time catching fish. Road noise, dust, and vehicle emissions would likely deter hikers from using the trails in the Elwha River Valley (FERC 1991, 4-128).

Economic Resources

Direct Costs

As reported in the 1991 DEIS, FERC performed an analysis of the initial and recurring costs of dam removal (in 1990 dollars). Expenses they identified include "river diversion, sediment stabilization, demolition and removal of the structures, revegetation, and fish production facilities for supporting the restoration program," as well as costs associated with providing replacement power once the dams

²²Water at the PAWTP is filtered through sand to remove impurities and treated with chlorine gas to treat it for bacteria (water-technology.net).

²³Water at the EWTP is filtered through the water intake structure (ONP 2013b).

ceased electricity generation during removal. Removal costs were further itemized by dividing removal costs up by dam, with Elwha Dam at \$23,927,000 and Glines Canyon at \$37,248,000. On-going, or recurring, costs identified in the EIS include those associated with fish restoration, revegetation, and the loss of power production (FERC 1991, 2-22; see Table 5.2). These initial capital costs were also compared with those of the three other mitigation alternatives analyzed in the DEIS: 1) removal of Elwha Dam only, with modifications (including a trap-and-haul system implemented and an Eicher²⁴ screen installed to allow for downstream passage of out-migrating juvenile salmonids) to Glines Canyon Dam; 2) removal of Glines Canyon Dam only with modifications added to Elwha Dam (i.e., a fish ladder); and 3) the applicant's (James River's) proposal to retain both dams (see Table 5.3).

Cost Category²⁵	One-Time Costs	Annual Costs
Elwha Project removal	\$23,927,000	\$30,000
Glines Canyon removal	37,248,000	45,000
Fish restoration	3,070,000	240,000 ²⁶
Subtotal, initial capital cost	64,245,000	
Foregone power generation		
Outage during removal²⁷	11,061,000	
Loss of the projects²⁸		16,512,000

Table 5.2. Initial and recurring costs of dam removal (from FERC 1991, Table 2-7).

²⁴The Eicher screen is a “passive pressure screen” designed to protect salmon from turbines in hydroelectric dams by diverting them away from them (Eicher 1982; Taft 2000, S353).

²⁵Estimated in 1990 dollars.

²⁶First 10 years. (FERC 1991, Table 2-7)

²⁷Based on forecasted cost of purchased power in 1994 (1994 dollars)

²⁸Fifty-year levelized cost, in 1996 dollars (FERC 1991, Table 2-7).

Alternative	Initial Capital Cost (\$1990)	Average Annual Generation (KWh)
Applicant's dam retention proposal	14,670,000	168,000,000
Removal of both dams	64,245,000	0
Glines Canyon removal and Elwha modified	49,138,000	68,000,000
Elwha removal and Glines Canyon modified	30,372,000	100,000,000

Table 5.3. Comparative analysis of initial capital costs paired with average annual generation (kilowatt hours) (from FERC 1991, Table 5-1).

Although full dam removal appeared to be the most expensive option, at least in terms of initial capital costs, the owner of the two dams eventually became amenable to this alternative, desiring to avoid additional costs associated with being held liable in the event that fish passage structures failed to enable the restoration of endangered salmon and steelhead (Egan 2007). James River Corporation's²⁹ testimony at the Joint Hearing for the Elwha River Ecosystem and Fisheries Restoration bill (H.R. 4844) in July 1992 noted that one of the reasons for their support of the bill (though they still preferred the dam retention alternative to dam removal) was that it "places the burden for dam removal precisely where it belongs—on the United States." They made it clear that, if the dams were to be removed, they would not be the ones paying for it or shouldering the legal responsibilities and liabilities that went along with it, and they should be sufficiently compensated for the dams. Since the bill committed to this, James River supported the legislation (Joint Hearing Report 1992, 147).

The Mayor of the City of Port Angeles, James Hallett, spoke on behalf of his constituents in the 1992 Joint Hearing of the bill for the Elwha Ecosystem and Fisheries Restoration Project Act. The first of the city's concerns was the issue of paying for initial and on-going costs of the dam removal and of building and operating the water treatment facility that would be needed for handling of sediments from the reservoirs. He noted that Port Angeles³⁰ had enough difficulty in trying to pay for maintaining two

²⁹James River, an international manufacturer of disposable paper products, merged with Fort Howard Corp. in 1997 (Fort James Corp.), and acquired by Georgia-Pacific Corp in 2000 (Reuters 1997, article in the *L.A. Times* newspaper)

³⁰The city is generally known simply as "Port Angeles."

dams; they could ill afford to pay for an expensive engineering and ecosystem restoration project³¹ they had not requested. The Mayor assured the presiding Congressional subcommittees that the city would accept whatever decision the federal government reached regarding the Elwha and Glines Canyon dams, but could not take sole responsibility for the costs (Joint Hearing Report 1992, 97). He reminded the parties presiding over the hearing that the bill specified that the Secretary of the Interior was to bear the responsibility and costs of designing, constructing, and operating the water treatment facilities as long as such treatment was necessary (Joint Hearing Report 1992, 100). Port Angeles seemed resigned to whatever decision the federal government made through Congress, whether that be dam retention plus fish passage provisions or simply dam removal.

The Harbor and Timber Storage

Ediz Hook is a narrow piece of land that extends three miles into the Strait of Juan de Fuca, creating Port Angeles Harbor. The Harbor is the only one of its kind on the north shore of the Olympic Peninsula, and the reason for Port Angeles' existence. Understandably, the city places a very high value on this spit of land and has taken great pains in the past to ensure its continued existence. The land was ceded to the federal government in 1856 and the matter of just compensation for it was settled in court in 1976. Also in 1976, the city contributed \$424,000 of the initial construction costs of an effort to reinforce it, conducted in partnership with the federal government, and was still contributing to the annual maintenance costs as of 1992 (testimony of J. Hallett, Joint Hearing Report 1992, 102).. Because of this, Mayor Hallett maintained that the spit should not be designated "solely for Tribal economic development," but should be preserved for the benefit of all in Port Angeles, including the LEKT (Joint Hearing Report 1992, 103). The City of Port Angeles was also concerned about how a change in ownership of Ediz Hook would affect ITT Rayonier³², one of the local mills and one of the largest employers in the area (430 jobs in 1992) (Joint Hearing Report 1992, 103).

ITT Rayonier's interest in who ended up with the ownership and/or management of Ediz Hook was the continued availability of water storage and handling for logs in the lots off the hook in the Harbor.

³¹Port Angeles Water Treatment Plant was estimated at \$10+ million to build, and \$500,000 per year to operate; the Elwha Water Treatment Plant was estimated at \$20+ million to build, and \$2 million per year to operate (Joint Hearing Report 1992, 100).

³²ITT Rayonier, Inc. announced the closure of its mill on the Olympic Peninsula in 1996 (NPS 1996, 171).

The pulp mill was already experiencing a financial squeeze in the early 1990s with the collapse of the regional timber industry in the decade before, and was finding it necessary to source logs for fiber from places outside the Olympic Peninsula, such as Alaska and British Columbia, Canada. Royce Daniel, General Manager of Port Angeles Pulp Mill, in his letter to the Port Angeles City Manager (submitted among comments on the bill), used the word "devastating" in describing the effect of losing water-based log storage. Rayonier would then have to use dry land storage for their logs, a cost that would be "prohibitively expensive": "Combined with other factors impacting the current competitive environment, the elimination of this water storage could threaten the mill's 430 jobs and the economic benefits they provide to the entire community" (Joint Hearing Report 1992, 104).

Hydropower Energy Provision and Costs

As a regulator of privately owned hydroelectric projects in the U.S., FERC was, of course, concerned with how the loss of the dams would impact the electrical supply of the Port Angeles area. The dams' turbines acted as stabilizers, controlling electrical voltage as electricity flows to Port Angeles along the BPA transmission line, as it tends to fluctuate. Capacitor banks would be installed to stabilize the voltage, but this would be less effective, creating "...an associated increased potential for voltage stability problems" (FERC 1991, 4-196).

FERC wanted to select a mitigation alternative for fish passage that would ensure the "[c]ontinued use of the Elwha River's hydroelectric potential to provide renewable, nonpolluting electrical energy" (FERC 1991, 5-8). This objective would obviously be compromised were the agency to select dam removal as its preferred alternative. Sources of potential replacement power included coal-fired power plants, combustion turbines, and cogeneration installations, all of which are associated with air pollution, acid rain and acid deposition, greenhouse gas emissions, and in the case of coal plants, would have "land disposal impacts" (FERC 1991, 5-14). FERC was reluctant to recommend removing the dams even though this would be the best option for fisheries recovery. They emphasized that such action would entail foregoing hydroelectric power generation, require a large amount of money and technical expertise to implement, and would have "very substantial adverse impacts during and immediately after removal." Ultimately, FERC failed to recommend any particular course of action and instead summarized the costs

and benefits of each option--as the agency saw them--and left the choice up to the public (each summary begins with "If the public interest dictates...") (FERC 1991, 5-25 and 5-26).

Daishowa America Paper Mill was also understandably concerned with losing access to a cheap source of electrical power and being able to remain in business. The Elwha and Glines Canyon dams provided approximately 40 percent of the Daishowa America mill's total needs for electrical power at a projected rate of less than half that of other sources. This "competitive advantage," as FERC called it, would be lost in the event of dam removal. Lumber mill energy costs would rise (although the increase would be about the same as they would be under James River's mitigation plans of installing fish ladders and fish screens), and production at the mill would likely be forced to decrease if an alternative source of power was not chosen. The Daishowa concerns about replacing their power source were addressed when the Elwha Act (1992) included provision of a "priority firm rate" – a rate below market price – for the mill (Joint Hearing Report 1992, 135; Elwha Act 1992, Sec 5(b)).

Socioeconomic Impacts

In addition to concerns about direct costs described above, James River opposed Interior's decision to change the debate from one of relicensing to one of dam removal based on its being "made without public process or notice" (Joint Hearing Report 1992, 143). Its preferred outcome for the dams remained their relicensing and continued operation throughout the decision making process. However, James River also saw the value in a legislative decision to settle the fate of the dams. Corporate representatives described their situation as the dams' owner during the jurisdiction dispute as being "in the middle of a turf fight between FERC and the Department of the Interior" (specifically, the National Park Service) with each agency arguing over who had jurisdiction over the Glines Canyon Dam, a fight which would prove fruitless in reaching any resolution to the fish passage debate (Joint Hearing Report 1992, 146). Therefore, they concluded that the bill for the Elwha Act (P.L. 102-495) would end the debate, avoiding years of costly litigation, and allow for the most equal and fair solution for all stakeholders involved (Joint Hearing Report 1992, 139). In the end James River accepted the decision to remove the dams as long as the rights and interests of the company in the hydroelectric projects were respected. In his testimony at the Joint Hearings on the Elwha Act bill in 1992 (p. 139), Robert J. Morgan, vice president and resident manager of James River Corporation at the time, stated:

We have sought only to protect our existing and legitimate interests as an in-holder and private property owner. So long as those interests are reasonably treated we can accept a resolution of Elwha River issues in either the regulatory or the legislative arena.

James River's conditions for supporting the Elwha Act was, as the dams' owner, fair compensation for the projects and being able to fulfill their contractual obligation to provide power to the Daishowa America paper mill before surrendering ownership (Joint Hearing Report 1992, 146). While they disagreed with some parts of the bill, on the whole they supported it as the most balanced and effective way of solving the puzzle of "all of the various interests, objectives and rights in this complex and unique situation" (i.e., fish passage, tribal treaty rights, electrical power supplies, etc.) (Joint Hearing Report 1992, 147). One factor James River described as "crucial" in forming its decision to support the Elwha Act, was that the bill set no precedent that would later threaten the business. The company desired to ensure long-term economic stability "to a region and to a business which can afford few additional hardships" (Joint Hearing Report 1992, 148). A trend of dam removals would threaten that stability. At the time, it seemed like environmental causes were being furthered at the economy's expense, at least to economic interests. Since the Elwha Project seemed more like an exception to the rule, James River was willing to support it (Joint Hearing Report 1992, 148).

The executive vice president of Daishowa America, Steve Taniguchi, also testified at the 1992 joint hearings. While Daishowa believed that FERC would have eventually ruled in favor of relicensing the dams, corporate officers, like those of James River, dreaded a prolonged debate in the courts. Seeing no benefit of this to the Port Angeles community, its employees, or to any of the goals the Elwha Act bill desired to accomplish, the company was motivated "to accept the invitation of members of Congress...to enter discussions on this issue" (Joint Hearing Report 1992, 135). Regarding their opinion on the decision-making process, Taniguchi's statement indicated a level of respect for it as it had been conducted: "My experience with you and members of the House and with your professional staff has increased my confidence in and respect for the legislative process" (Joint Hearing Report 1992, 135).

Protecting the area's economic well-being was top priority in crafting the Elwha Act legislation for Thomas Jensen and Michael Weland (former Majority Counsel to the Senate Committee on Energy and Natural Resources and Subcommittee on Water and Power, and the former Director of Oregon's

Department of Fisheries and Wildlife, respectively). The uncertainty of the continued operation of Daishowa America Paper Mill placed over four hundred jobs at risk, something “that neither Port Angeles nor their Congressional members could afford to lose” (Egan 2007, 151). Fortunately, the mitigation measures entailed in the dam removal project meant the creation of over 100 jobs in Clallam County – jobs they sorely needed, given an 11.3 percent unemployment rate. The building of the Elwha Water Treatment Plant employed 117 workers and the Port Angeles Water Treatment Plant employed 76. Other mitigation projects funded by the 2009 federal stimulus package created an additional 150 to 200 jobs beginning in 2009 and lasting through 2011 (Gottlieb 2009). While Daishowa America stood to lose with dam removal, those standing to gain the most with dam removal would be commercial, sport, and (especially) tribal fishers.

The Friends of the Earth gave the significant contribution of recreational and commercial fishing to the Northwest economy as a reason for their support of dam removal (Joint Hearing Report 1992). FOE representatives referred to a study done by the Oregon Rivers Council that found that 60,000 “direct jobs” and \$1 billion per year in personal income were provided by the fishing industry (Joint Hearing Report 1992, 90). The Implementation EIS produced by the National Park Service also touted the benefits dam removal would have on recreation and the local economy, particularly in Clallam County. The document’s Impact Summary Chart indicated an estimate that an expected increase in tourists and recreationists (by 734,000 annual visitor nights) would generate “business expenditures of \$28.5 million annually. Related payroll income [would be] increased by \$4.6 million annually” (NPS 1996, 52).

Dam removal would mean the chance for the Lower Elwha Klallam Tribe’s economy to recover, at least in part, from the damage done to it when the dams were built. The tribal economy has been characterized by “high unemployment, low incomes, and few economic assets,” but with the return of greater numbers of salmon, economic gains for tribal and non-tribal fisheries would increase (FERC 1991, 5-12). The Implementation EIS referenced an independent analysis of comparative economic advantage showing that the LEKT was in “severe economic distress...and its members have no economic resource except fish over which they can exert sufficient control to achieve an improved economic return.” The Elwha River, at least at the time of the EIS’s publication, provided 20 percent of total tribal fishing revenue, and about 60 percent of active tribal fishers grossed less than \$1,000 in 1988.

Spokespersons of the LEKT themselves strongly asserted the “extreme importance” of the river’s fisheries to the tribe (NPS 1996, 170). It seems to be a matter of choice as to which part of the economy dam removal proponents and opponents wished to favor.

Cultural Resources

The Elwha River and its salmon runs play a large role in the culture of the Lower Elwha Klallam Tribe. Tribal members have resided in the Elwha River valley since prehistoric times and have strong ties to the land, especially to the river and its salmon and steelhead (Abbe 2004). With the construction of the dams in the early 1900s sacred sites were inundated by the reservoirs, particularly the area under Lake Aldwell (DOI, Commerce, and LEKT 1994; Abbe 2004, 14). Villages, fish camps, archaeological features, tribal history, and culture are “all integrally connected to the watershed and river system” (DOI, Commerce, and LEKT 1994, 122).

The cultural trade-off would be the historic value of the dams and associated facilities, which were listed under the National Register of Historic Places. Under the dam removal alternative, this value would be forfeit (FERC 1991, 5-14). However, the National Register recognizes that the dams have negatively impacted the resources of the river and the LEKT. The loss of the structures’ historic value would be mitigated through Level I documentation for the Historic American Engineering Record (HAER) “and interpretation of the dams on-site and at other sites to be determined” (DOI, Commerce, and LEKT 1994, 44).

Communication and General Viewpoints

Several Washington State natural resource agencies collaborated in writing a comment letter regarding the September 1993 public review draft of *The Elwha Report* and its findings. The document presented an environmental analysis of “dam removal, water quality protection, and fisheries and habitat restoration,” and outlined the Secretary of Interior’s plan for removing the dams (DOI, Commerce, and LEKT 1994, xii, Appendix M). The agencies included the Department of Ecology, the Department of

Energy, and the Department of Wildlife³³. Ecology and Energy departments, each speaking on their areas of expertise, cautiously supported the analyses and findings of the *Report*. Energy pointed out that, given “variations in population, technology, and the economy” projected forward into the next decade, demand for electricity would also change; therefore, the rate of acquisition and type of replacement energy might end up being different than originally projected in the analyses (DOI, Commerce, and LEKT 1994, 449, Appendix M). Ecology also agreed that the “recommended...actions identified in the report appear, overall, to be compatible with the policy of the Shoreline Management Act, as well as floodplain management considerations...” (DOI, Commerce, and LEKT 1994, 449, Appendix M). Thus, they expressed cautious support of the *Report’s* findings that dam removal was necessary and feasible. WDFW representatives were a bit more frank in stating their opinion about the *Report*. Phrases such as “good job” and “feel very strongly” appear in their comments; they expressed appreciation for the incorporation of suggestions they had submitted previously, and the thought that went into assessing the appropriate methods of ecosystem restoration: “We feel this report has done a good job of identifying the pros and cons of each scenario which will lead to a well-informed decision” (DOI, Commerce, and LEKT 1994, 449, Appendix M).

Dr. Brian Winter, Team Leader of the Elwha Restoration Interagency Team and employee of Olympic National Park, authored a *Seattle Times* editorial piece in October 1993. In it, he described the Elwha River dam removal project as correcting a mistake (DOI, Commerce, and LEKT 1994, 239). Others who gave their support to dam removal in their comment letters to the Elwha Report (1994) include the Sierra Club, Friends of the Earth, and Trout Unlimited. The latter called the Elwha Act a “win-win legislative settlement” and placed their full support behind the option of removing both the Elwha and the Glines Canyon dams. Not only would fish and wildlife have a chance to recover, but the removal project would be instructive for future ecosystem restoration projects, serving as a “demonstration project” as to how to deal with dam removal and all of the technical details such as sediment removal, turbidity, and stabilization” (DOI, Commerce, and LEKT 1994, 425, Appendix M).

³³ Washington Dept. of Game (WDG) became the Dept. of Wildlife (WDW) in 1987 and was then merged with the Dept. of Fisheries (WDF) in 1994 to form the Dept. of Fish and Wildlife (WDFW). Even though the Elwha Report was published in 1994, the document refers to WDFW as WDW.

The Lower Elwha Klallam Tribe was most emphatically in favor of dam removal. Despite the Point No Point Treaty of 1855, which guaranteed the tribe's right to harvest fish at "usual and accustomed grounds and stations," the LEKT had been prevented from accessing several important fisheries along the river due to the presence of the dams. The dams also led to the severe decline of the river's salmon runs, the basis of the tribe's subsistence economy. In addition to this, the threat of the failure of the Elwha Dam was a constant fear for tribal members living downstream of the dams. The dam was patched after its first failure in 1912, which families living in the path of the "wall of water" barely escaped (Joint Hearing Report 1992, 105). "We have subsidized the cheap power with our lives, our jobs and our way of life" (DOI, Commerce, and LEKT 1994, 421, Appendix M). For them, it was more than time for the dams to come out.

During the relicensing process throughout 1980s, major stakeholders JFWA and James River and Daishowa America Paper Mill communicated through FERC, the agency leading decision making at the time. Gowan, Stephenson, and Shabman (2006) portray a situation where the two sides' arguments and counter-arguments over the fate of the dams were presented mainly through the technical analysis reports presented to FERC, as well as a series of public meetings in 1986. Each was trying their best to convince the ruling agency that their point of view was the most valid. Following the passage of the Elwha Act in 1992, avenues for official communication included testimonies given during the 1992 Joint Hearing on H.R. 4844: A Bill to Restore Olympic National Park and the Elwha River Ecosystem and Fisheries in the State of Washington.

Communication between Conservation Intervenor groups and the general public was subject to similar issues and contentions as those in the Condit case (described in Chapter 6). Dam removal opponents in the Elwha River case expressed dissatisfaction with the decision making process, feeling excluded and their input circumvented. The Citizens Advisory Group (CAG) was formed in 1996 to remedy this. It represented community interests and gave citizen stakeholders a role in the decision-making process. The group brought together multiple viewpoints to create a "consensus opinion" on what should be done to restore the Elwha River. In order to maximize the committee's credibility, members from the local community were selected that were not a part of any major stakeholder group (e.g., state or federal agencies, the LEKT). The CAG held multiple public meetings and one workshop wherein they

reviewed the environmental impact statements to form their own informed opinion(s) on the project and to see if there were any holes in the analyses on file and plans in the works. Ultimately, they supported dam removal as the preferred alternative for restoration of the Elwha River Basin in their own Supplemental Environmental Impact Statement, though they did propose that the dismantling of the dams be done one at a time, with a break in between in order to monitor the environmental impacts. Admittedly, their role in decision-making was relatively minor and somewhat late in the game; however, by bringing together stakeholder groups, conducting town meetings, and putting together their own report on dam removal, they managed to make Congress take into account the concerns of the citizens of Port Angeles and the rest of Clallam County (Egan 2007). The final CAG Report was in favor of dam removal, and although the methods they recommended for project implementation were rejected in the end as too expensive and unfeasible, expressing their views and having them considered “calmed some of the sentiments among those who opposed dam removal as expensive and largely untested, especially at the scale of the Elwha Projects” (Egan 2007, 188).

Summary

The Elwha and Glines Canyon Dams were removed a variety of reasons. The most influential factor that shaped the Project was fish, namely salmon. Restoring access to the river beyond the dams would allow Elwha River salmon and steelhead runs to recover. This would, in turn, allow the U.S. to honor their promise to the Lower Elwha Klallam Tribe to allow them to take fish “...at usual and accustomed grounds and stations” as specified in the 1855 Point No Point Treaty (Egan 2007, 252). Olympic National Park would be allowed to fulfill its mission of protecting Park resources, and conservation groups would be pleased to see the fish saved from extinction. Predators dependent upon salmon such as black bear and bald eagles would also recover in number, and the newly exposed soil of the reservoirs would host conifer, mixed/deciduous, and hardwood trees that would serve as habitat to birds such as the ruffed grouse and the pileated woodpecker.

Two water treatment plants were built to manage suspended sediment in the water column so that the excellent quality of municipal and industrial water supplies would be protected (Elwha Water Treatment Plant and the Port Angeles Water Treatment Plant). Removal of the dams would also extend the number of river miles whitewater boaters and kayakers would have access to, though increased

turbidity in the short-term might deter recreational boaters as well as fishermen from using the river temporarily. Recreation would also cease during park closures throughout the first four years of the Project. Arrangements were made with the Bonneville Power Administration to supply replacement power to the Daishowa America and ITT Rayonier mills at a rate comparable to what they had been purchasing power from James River Corporation.

Protecting Ediz Hook, the sand spit responsible for creating Port Angeles Harbor, was high on the priority list of Port Angeles city officials. Removing the dams would once again allow sediments to replenish the Hook and ensure the continued existence of the economically important Harbor. Finally, culturally important sites along the River and essential fishery resources of the Lower Elwha Klallam Tribe would be restored to them (providing food and generating much needed income for Tribal members).

The Federal Energy Regulatory Commission was hesitant to recommend full dam removal due to the economic impact to James River and the Daishowa America Mill. In their 1991 Draft Environmental Impact Statement, they listed the pros and cons of other fish passage alternatives. They seemed most in favor of the fish ladder with modifications³⁴ option, and were optimistic about the chances of a successful restoration of Elwha River salmon and steelhead runs without dam removal. They were less optimistic about successful fisheries recovery if only one dam was removed and the other was retained, even if it were modified with for upstream and downstream fish passage (FERC 1991, 5-25). The option offering the best chance for the restoration for nine out of ten runs of salmon and steelhead was the removal of both dams (NPS 1995).

The following chapter documents the results of my analysis of key informant interviews and published documents sources in order to provide a detailed description of the priorities and concerns of stakeholders and decision makers in the Condit Project. Following description of the results for the Condit Dam analysis, Chapter 7 will tie together the processes and experiences attached to both the Elwha and Condit dam removal projects.

³⁴FERC-recommended modifications to the fish ladder alternative included supplementing Eicher screens at the Elwha Dam with intake screens (in case the former did not work as James River expected it to) and altering the design of the fish ladder to allow for safer passage of fish (FERC 1991, 5-25).

Chapter 6

Results Part 2: The Condit Dam Removal Project

Factors considered important by stakeholders and decision-makers

Through my examination of the Condit Project, my aim is three-fold: to discover the factors which influenced decision-makers and other stakeholders and which shaped the decision making process; to understand their opinions and perceptions; and to learn from any identifiable mistakes and successes of both the Condit and the Elwha cases. Again, key informants were selected to represent the thinking behind the decision to remove the dam and decisions to support or oppose dam removal during the decision-making process (Table 4.1). These informants included fisheries biologists involved in the decision making process; former members of local government bodies (e.g. Kilckitat County; Husum/BZ Community Councils); leaders of local non-profit organizations; and residents representing local homeowners' associations. As mentioned in Chapter 4, the number of removal opponents and proponents is weighted towards the former category. However, I have remained cognizant of the potential bias this could contribute to my analysis and have done my best to account for it so as to present a balanced picture of the priorities and viewpoints of the stakeholders and decision makers interviewed here.

After a thorough analysis of interview transcripts and categorizing responses according to topic, I was able to identify two main factors or themes that stakeholders thought were important in the case of the Condit Dam decommissioning and removal project: 1) environmental concerns and 2) economic, or financial, concerns (Table 6.1). Environmental and economic factors are listed separately in this chapter for the sake of clarity. In reality, however, they are closely linked; actions in favor of the former affect the latter, and vice versa. For instance, the dam was removed to restore salmon habitat, which required a financial commitment from the dam's owner to implement and which would impact the local economy as recreational opportunities changed. Two other factors mentioned less often, but still deserving of attention, were the cultural resources of the White Salmon River watershed and the logistics, or practicalities, of implementing Condit's removal. In reality, the cultural resources that were emphasized by interview respondents are environmental or natural resources traditionally used by native people;

because of this overlap, I have incorporated comments related to these resources throughout the “Environmental Concerns” section of this chapter. However, this is not meant to diminish the importance of cultural values in respondents’ decisions regarding the Condit Dam removal. Salmon, for instance, continue to provide the basis for the cultural sense of place and spiritual identities of indigenous nations throughout the Columbia River Basin, and are a prominent symbol of the identity of the Pacific Northwest region as a whole (CRITFC, no date).

The relative importance among interview respondents of each factor and related subcategories are summarized by calculating the percentage of dam removal proponents, opponents, and total respondents who mentioned each topic during interviews (Table 6.1). Amongst removal opponents, the priority given to each factor seems to be distributed more equally rather than being concentrated around one or two considerations, as with the proponents of removal. All, or nearly all, proponents interviewed considered restoring “fish” (i.e., salmon and steelhead) and “habitat” as a deciding factor in their support of removing Condit Dam (100 percent and 67 percent, respectively). Proponents clearly believed that removal provided the best chances of restoring salmon run sizes.

Most respondents (67 percent) mentioned the dam’s production of electricity as something that was no longer needed, contributing relatively little to the main power grid. Comments to the effect of “The dam had outlived its usefulness,” often accompanied references to the importance of providing salmon with passage around the dam. Opponents who mentioned electrical production were of the opposite opinion, stating that the energy was still needed and that the dam would have been useful for many years to come (Table 6.1).

Respondents on both sides of the debate were concerned with the financial costs associated with decommissioning and removal (“Direct costs”, “Infrastructure and mitigation costs”). Comments from opponents centered primarily around their objection to the cost cap initially set on PacifiCorp’s financial obligation to the project. Concern over whether or not taxpayer dollars would be used to fund removal was also mentioned. Several of the proponents I interviewed worked for agencies involved in planning and/or paying for the project (in the case of the respondent from PacifiCorp); this concern, therefore, may explain why finances appear to be more prevalent amongst this group of respondents (67 percent versus 33 percent) (Table 6.1).

Percentage of interviewees citing specific concerns			
	Dam removal proponents	Dam removal opponents	Total
Environmental concerns			
Aesthetics	0	22	13
River dynamics and recreation	33	44	40
Natural resources	33	44	40
Fish	100	44	67
Habitat	67	33	47
Non-aquatic animals and plants	0	33	20
Water quality	33	33	33
Groundwater	33	67	53
Health and safety	33	22	27
Economic concerns			
Recreation economics	0	33	20
Property (values)	17	44	33
Infrastructure and mitigation costs	50	44	47
Electricity production	67	33	47
Direct costs	67	33	47
Logistics			
	17	33	26
Cultural Resources			
	17	0	0.07
Decision-maker/stakeholder interviewees			
	6	9	15

Table 6.1. Stakeholder interviewees and cited decision factors. Individuals often cited more than one factor related to support for/opposition to dam removal.

Issues related to changes in groundwater levels appeared to weigh more heavily on the minds of project opponents than those of proponents (67 percent vs. 33 percent). This is most likely due to the fact that the majority of respondents from the former category lived along the lake, and were still in the midst of the arduous process of re-drilling their water wells, which had emptied upon the draining of the reservoir. The physical appearance of the landscape (“aesthetics”) and the availability of recreational opportunities were matters of concern for opponents, who cherished the serene landscape of the lake and the family friendly atmosphere of the neighborhood (22 percent). The raw appearance of the landscape immediately following dam removal did not appear to upset proponents, likely due in part to the

fact that they did not live on-site (0 percent). Regarding recreational opportunities, proponents mentioned them as something they looked forward to once the river was safe to navigate once more (Table 6.1).

Environmental Concerns

The primary and the most publicized theme driving the debate between decision-makers and stakeholders on whether or not Condit Dam should have been removed is the environment, including several specific natural resources. The pro-removal side included the Washington Department of Ecology, the Yakama Indian Nation (Yakama Nation, or the Tribe), and the National Marine Fisheries Service (NMFS). The anti-removal side included the Klickitat County government (also speaking for Skamania County³⁵), the Cabin Owners of Northwestern Lake Association (CONLA), and the White Salmon Conservation League (WSCL). Both sides claimed strong environmental motivations for their stance on Condit dam removal. Proponents wanted a free-flowing river so that salmon and steelhead would be reconnected with their historic spawning grounds, which they hoped and expected would lead to the fish becoming abundant in the watershed once more. Opponents also wanted salmon and steelhead to gain passage above the dam; however, in their opinion, installing a fish ladder or using the trap-and-haul method (trucking spawning adults above the dam and migrating juveniles below the dam) would accomplish this while also allowing habitat for migrating waterfowl and resident trout to remain. Also mentioned was the fact that the dam served as a barrier to any potential invasive species; with the dam removed, these species would have free upstream access.

Within the environmental theme, I identified two categories: 1) habitat characteristics and biota, and 2) recreation impacts. Subdividing the first category further, I identified six sub-categories of interests mentioned with respect to the “habitat characteristics” theme. These six sub-themes include 1) fish, 2) habitat and species connections, 3) water quality, 4) groundwater, 5) plants, 6) aesthetics, and 7) health and safety. The over-arching “habitat characteristics” code was retained in part because certain comments were more general, rather than specific to any one resource.

³⁵As told to *White Salmon Enterprise* newspaper, on November 9, 2010, a Klickitat County Commissioner explained: “Klickitat County negotiated on Skamania County's behalf” (Burkhardt 2010).

Habitat Characteristics and Biota

Fish

During the interview process, dam removal opponents did not give the impression that restoring salmon and steelhead runs in the White Salmon River was unimportant, but rather that it was not the only consideration and that there were other equally important factors to be weighed against the fish runs. Maintaining the health and abundance of resident trout upstream of Condit Dam is one such concern. An agriculturalist in the watershed noted that when the dam was in place, it not only blocked the upstream passage of migrating salmon, it also prevented potentially invasive aquatic species from establishing themselves and out-competing the resident trophy trout living in the lake. The Klickitat County employee who was interviewed and a former cabin owner were also concerned about the trout. The former did not elaborate beyond stating that the County had been concerned that the resident trout population would be destroyed and that there wouldn't be any mitigation for the effects on trout. The latter mentioned the risk of the introduction of Whirling disease which had affected trout populations in other watersheds. Given the fact that the White Salmon River's trout population was a factor in its being designated as a Wild and Scenic River, the decline of this fishery was of particular concern for Smith.

Additionally, several dam removal opponents believed that fish ladders would have been sufficient for restoring salmon and steelhead upstream of the dam; one estimated that this might have been for much less than the \$30 million estimated by FERC in their 1996 FEIS. A fish ladder also held the potential to allow for the best of both worlds—salmon *and* migratory waterfowl, elk and other species dependent on the lake ecosystem—to be present in this particular watershed. According to Dave Johnson, cabin owner and president of CONLA,

PacifiCorp had put in very large fish ladders on much larger projects throughout the western United States. They just did not want to spend the money on this situation because it was only generating 14 megawatts. So it's a dollar issue and nothing else.

Wayne Lease, co-founder of the White Salmon Conservation League and cabin owner along the former lake, felt that “the White Salmon fish hatchery gave what was needed and compensated or exceeded for any loss of salmon productivity due to the dam. It was a ‘wonderful fish hatchery’ at the mouth of the stream.” Smith described the salmon fishing afforded to recreational fishermen downstream

of the dam, citing “thousands of fishermen” coming each year to take advantage of “the very best salmon river in the whole Columbia River chain”.

White Salmon River fisheries were a strong focus for dam removal proponents as well. From their perspective, the short-term losses from increased sediment transport and the displacement of the various species that depended upon the lake ecosystem—while lamentable—were necessary and their sacrifice worth the price if the dangerously low numbers of salmon and steelhead could be overcome and higher populations restored to the river. Stakeholders and decision makers—and not just dam removal proponents—are encouraged by the idea of salmon and steelhead returning to the upper reaches of the river. They hope to see them traveling further upstream now that rearing and spawning habitat for anadromous fishes has been opened up and quality improved.

According to Tom O’Keefe, regional stewardship director of American Whitewater, a signing party of the 1999 Settlement Agreement, the factors that weighed the most heavily in the American Whitewater decision to support the removal of Condit Dam were water quality and fish. Cold groundwater originating from the Mount Adams snow field feeds the White Salmon River; without the dam in place, snowmelt will provide cooler water for salmon “who can be thermally stressed in that lower Columbia reach.”

However, the most influential factor for the group by far, according to O’Keefe,

...was definitely the fish passage. And I would say it was primarily the downstream juvenile fish passage. So, it’s one thing to get the adults upstream, but you know, once they hatch and the juveniles come out,...how do you get those juveniles downstream? And that was a big factor on Condit.

The same applied for the National Marine Fisheries Service. Fisheries restoration was the one and only consideration in the NMFS decision to support dam removal: “So our goal all along was just to get fish production above the dam. It wasn’t to take out the dam—right away. After licensing and the NEPA process, dam removal was seriously considered as an alternative for fish passage.” For the Yakama Nation, fish were also the leading factor in their support for dam removal. Prior to the closure of Condit Dam in 1913, salmon were of great economic, ceremonial, and cultural importance. The dam was now one hundred years old, made a relatively small contribution to the power grid (compared to other PacifiCorp hydroelectric projects) and the Yakama had much to gain from salmon making it past the barrier. A respondent who worked on behalf of the Yakama people said:

I think the Tribe's position was the useful lifetime of that dam was over, and it was time to restore that watershed to its more important function as a production area for salmon and steelhead and the other species that once inhabited that watershed...

Now that the river is free-flowing once more, there is hope that fishing will once more contribute to Tribal household income.

Habitat and Species Connections

Among dam removal proponents, concerns expressed about habitat included the connectivity of the river system, river flow dynamics and water temperature, and increasing usable habitat for salmon. Clayton Hawkes was involved in the relicensing process for Condit Dam as a biologist for the National Marine Fisheries Service from 1990 to 1993, and continued working on the relicensing and NEPA processes with the Columbia Basin Fish and Wildlife Authority (what he described as an "affiliation of all the tribes and agencies in the Columbia Basin") from 1993 to 1996, when he left the state. During his time at NMFS his work focused solely on the fisheries aspect of dam removal. One of the benefits of removing the dam that Hawkes mentioned was the restoration of salmon habitat by reconnecting the upstream and downstream reaches of the White Salmon River: "There wasn't any sediment coming downstream for a hundred years, so everything was flushed out except for big boulders and rocks. There wasn't a whole lot of spawning habitat left downstream of the dam." Restoring spawning gravels is a key component to salmon habitat restoration and something the NMFS wanted to see.

The American Whitewater respondent also mentioned the sediment flow aspect of river habitat restoration. Restoring the types of flushing flows that maintained gravel beds of proper grain size and distribution throughout the channel, and mitigating the effects of the dam on water temperature downstream were two of the organization's considerations.

The Washington Department of Ecology saw fish recovery and long-term habitat restoration as a desirable outcome of dam removal, as well. The agency recognized and cared about the importance of these issues to its "partners at the Yakama Nation and from other tribes" throughout the Greater Columbia River Basin and central Washington, according to an Ecology-related interviewee. Ecology decided to support the process through its role as a regulator in order to manage short-term impacts of the project to the benefit of the department's constituents. Steve Parker of the Yakama Nation's Fisheries

Resource management program recognized the opportunity to fulfill the mission of their program through the restoration of anadromous fish habitat, as well. During the decision making process of the Condit Project, he advised the Tribe on their fishing seasons, spawning escapements³⁶, and other operations pertinent to the management of their fisheries. He currently serves as the Yakama Nation's Technical Services Coordinator.

Among dam removal opponents, concerns were expressed about the river's wetlands, losing the ecosystem that had developed around the lake, and maintaining a stopover point for migrating fish at the mouth of the White Salmon River. Klickitat County had concerns about habitat they wanted to deal with during the permitting process, had it not been "preempted by FERC." A Klickitat County employee knowledgeable about the permitting process for Condit Dam removal said that these included a Critical Areas rating for wetlands that would be removed or destroyed, as well as a floodplain ordinance that "requires the evaluation of the effects of flooding downstream."

Two interviewees clearly were reluctant to see the century-old lake ecosystem disappear. One described it as "a very strong and unusual ecosystem that had developed around the lake." Another mentioned already seeing the effects of the lake's disappearance. Waterfowl were settling in upland areas that hadn't been used previously during the birds' fly-through. This was a prominent concern among dam removal opponents I spoke with. According to one respondent who grew up in the area,

waterfowl, and other species that used to use the lake are now moving into the upland areas. And on our farm, you see that all the time, whereas you used to not see those species in this area. Now they're moving here on their fly-through.

And a cabin owner observed that

all the migration from eastern Canada comes directly across and lands here throughout the spring, summer, etcetera. Types of birds from the Arctic you don't see anywhere else in the Northwest were here. They're all gone.

The cabin owner also regretted the loss of the deep, cool pool at the confluence of the White Salmon and Columbia Rivers after the release of sediment from behind the dam. Fish would use it as a resting point "...on their trek up to the Snake Rivers and up the Upper Columbia River." He observed that numbers were notably lower in 2012 and fewer recreational fishermen came to fish in Klickitat and

³⁶Spawning escapements are "adult fish that escape fishing gear to migrate upstream to spawning grounds" (NPS 2005, 348)

Skamania Counties as a result, negatively impacting the counties' economies. There were some doubts among the respondents that the thermal refuge would ever return³⁷.

One opponent mentioned the sediment stored behind the dam and acknowledged that it would have eventually required dredging in the future; however, he did not see it as needing to be dealt with immediately. While fully supporting restoration of salmon to the upstream reach of the river, he thought that there were other viable alternatives that would have accomplished this and that the century-old ecosystem that had built up around the lake was worth greater consideration and worth preserving.

It was universally agreed among respondents that "fish, fowl, and fauna must also be protected" (personal correspondence, cabin owner). Proponents of dam removal believed that the action was, objectively, the best alternative to accomplish this; however, opponents felt that, in the case of the Condit Project, money took precedence and that the well-being of wildlife was a secondary consideration.

Water Quality

According to respondents from dam removal proponent organizations Ecology and American Whitewater, next to the salmon issue satisfying state water quality standards was one of the primary considerations during the planning process. Unexpectedly, the process of meeting these standards ended up taking nine years (2001-2010), according to FERC's 2010 acceptance of the license surrender document. PacifiCorp applied for water quality certification with Ecology each year, working towards meeting state requirements, and each year until 2010 their application was denied (FERC 2010). According to a respondent with the Department of Ecology, one of the reasons it became involved at the Settlement table in 1999 was so that the agency could objectively regulate the dam removal process and "ensure that the state's water quality standards were met through the 401 Water Quality certification process."³⁸

³⁷It should be noted, however, that the effects of sedimentation on water temperature and migrating salmon should diminish over time. Cold water refuges are expected return once the reservoir is no longer present to serve as a "source of warming" and the river winnows away excess sediment (Ecology 2007, 2-4).

³⁸Section 401 of the Clean Water Act.

Groundwater

Groundwater was a concern for many stakeholders. Initially, Klickitat County was concerned that the concrete from Condit Dam would be disposed of within the well field for the city of White Salmon, as “leaching of certain types of materials from the concrete into the recharge area for the wells” was a possibility according to one anti-removal respondent. The post-removal drop in groundwater levels was another point of contention mentioned by respondents. When asked about what factored into his decision to oppose dam removal, former cabin owner Jerry Smith expressed his disgruntlement with of the Settlement Agreement (1999) for not requiring wells in the well field to be re-drilled ahead of time in anticipation of de-watering when the reservoir was drained³⁹, as the consultants’ report had recommended. When the aquifers did drain (and they drained quickly—within the first month, according to Mark King) people’s wells had to be re-drilled. When I was there in October of 2012, many people in the surrounding area whose water supply came from the aquifer were in the process of well-deepening. Mark King gave more details on the prediction for area wells. According to him, a decade prior to Condit Dam’s deconstruction, a hydro-geologist who was working for the City of White Salmon at the time predicted the potential for the lowering of the river-fed aquifer to negatively impact wells. However, when these concerns were raised with FERC and Ecology early on in the decision-making process, “...both entities basically punted on the issue. Ecology said, ‘We’re going to leave it to FERC to make that decision and their statements,’ ultimately; and FERC in their surrender order decided it was a state law issue and decided not to intervene on that matter.”

While FERC didn’t use its power to shield PacifiCorp from the issue, neither did it advise individual property owners in negotiations with the utility about how to deal with the de-watering of the wells, nor did they require PacifiCorp to re-drill the wells. The good news, according to one respondent, is that PacifiCorp has been “more responsive to the issue as time has gone by,” but the issue—residents losing their water source and being uncertain about whether they would be compensated or how the issue would be mitigated—was a major source of stress for the immediate community.

³⁹I did not find water wells specifically mentioned in the Agreement.

Perhaps contrary to the impression left on stakeholders, both Derek Sandison, lead author of the development of Ecology's Supplemental Final Environmental Impact Statement and Polly Zehm, Deputy Director of Ecology, mentioned anticipating and addressing the impacts on surrounding groundwater levels. "Once you remove the dam and the lake goes away, you reduce the level of surrounding groundwater and [go] back to historic conditions, or over time, it'll get back to historic conditions" (Sandison). "And so, you know, we try the best we could using the tools we have to try to address those, at least partially, in the 401 Certification requirements" (Zehm).

Plants

Very little was mentioned in interviews about plant life, in any way. The interviewee who had worked as Harvest Manager for the Yakama Nation Fisheries Program during FERC relicensing was the only respondent who mentioned vegetation in any respect as a factor in his party's decision to support or not support dam removal. The Tribe's interest in the native flora pertained to the availability of medicinal plants in the watershed. Others considered vegetation in other ways, but not as a factor in their preferences for or against the dam. The American Whitewater respondent talked about looking at the kinds of flows it would take to keep the river channel clear of unwanted vegetation. Every other respondent who mentioned plants referred to them not as a factor in deciding whether or not to support dam removal, but in the context of dealing with post-removal aftermath and mitigation (e.g., the negligible growth of seedlings on the re-vegetated hillsides and dust blowing off bare slopes).

Aesthetics

Aesthetics received two mentions, both of them by those who wanted fish passage to be provided through some avenue other than dam removal. Though the lake was man-made, it had been in place for a century and so had had time to develop a unique environment. Dave Johnson, president of CONLA, described it as "a very serene and peaceful place". Mark King lives in a small residential development within sight of the former lake, was (and is) President of his Homeowners Association, and is one of the founding members of the White Salmon Conservation League. He also has a background in environmental law. He communicated both with PacifiCorp and with FERC expressing his concerns and misgivings about removing Condit Dam. "I guess what drove me initially, to be honest, from an emotional

standpoint was just that I live near the lake. Not on it, but it's something I saw every day and thought was an absolutely beautiful thing. And I still believe that. It was a very pretty lake and it had a very pristine environment around it.”

Health and Safety

Health and safety were mentioned twice in interviews in the context of factors considered during the decision-making process. During their environmental review process, the Department of Ecology specifically addressed the levels of heavy metals and other contaminants in lake-bed sediments in their SFEIS (personal communication, Derek Sandison). One respondent mentioned it briefly: “One risk was...contaminants in the sediment that turned out not to be a big issue.” This may have been a matter of perspective. Although the levels of soil contaminants were found to be within allowable limits, some people experienced respiratory problems they associated with the dust. While the problem may have been localized around the project site and so was not a widespread problem, for those whose health was impacted it probably seemed like a significant issue. While most conflict over natural resource decision-making is likely to occur during the decision-making process itself, after-effects of decisions can mean that relatively strong differences of perception and opinion may remain.

Recreation Impacts

The impacts of dam removal and the subsequent change in river dynamics (free-flowing only versus free-flowing plus flatwater environment) on recreation and people's interactions with the environment were considered by persons on both sides of the debate. Rafters and kayakers were excited about the prospect of access to more river miles of whitewater; cabin owners and others who enjoyed swimming in the calm waters and fishing for trout in Northwestern Lake were loath to see a beloved landmark disappear. Five respondents mentioned the environmental aspect of river-based recreation, one of which was a dam removal proponent.

One opponent to dam removal commented that Northwestern Lake afforded the area a “unique recreational resource” that could safely be enjoyed by young and old alike. Given the abundance and diversity of whitewater recreational opportunities already in the area, both on the White Salmon River and the Columbia River, he said that “adding the additional amount of white water recreation I didn't feel like

was warranted compared to what was there already.” After dam removal, another resident also regretted the loss of flatwater recreational opportunities:

It was 200 yards across the lake. I could walk 195 yards of that up to my knees. So it was phenomenal for the grandkids. They could fall out of a canoe and stand up...And elderly people. You tell me how elderly people are going to enjoy a roaring white river. They're not. And the people that live around this lake are now the baby-boomers.

On the other side of the argument, rafters and kayakers were instrumental in generating support for removing the dam, mobilizing members of the rafting community. Tom O'Keefe, with AW, collaborates with other NGOs in the realm of hydropower reform. His work focuses on improving the environmental and recreational benefits of federal hydropower projects. Among other interests, such as seeing salmon habitat restored and reconnecting the river to itself and its floodplain, O'Keefe noted that restoring recreational opportunities also played an important role in the AW decision to support the removal of Condit Dam.

One risk that Steve Parker, manager for the Yakama Nation's fisheries program, foresees is the potential for conflict between whitewater rafters, kayakers, and Tribal fishers. The river is quite popular with recreationists, and has helped provide employment in an area where there are relatively few options for making a living. Though still in the beginning stages, the Yakama Nation has plans to enhance salmon habitat in the White Salmon River. This would include installing structures which look like natural log jams that would be “conducive to salmon rearing and that [would] provide cover for the juvenile salmon from predators.” Currently, the river has very few habitat structures; however, the addition of more would pose a problem for rafters and kayakers navigating the rapids. The solution to this potential conflict of interests was still unknown at the time of our interview.

Economic Factors

Economic concerns made up the second major theme in the decision to remove Condit Dam, in combination with the environmental concerns described above. Economic considerations included the financial resources required to provide fish passage, as well as costs to mitigate the impacts of whichever alternative was chosen. The factors included in the “Economy” theme are these: 1) direct costs; 2) electrical power production; 3) property; 4) infrastructure; 5) logistics; and 6) recreation economics.

Direct Costs

The initial 1996 FERC estimate of nearly \$60 million for dam removal made PacifiCorp reluctant to consider dam removal as an option for restoring upstream access for anadromous fish. This is not surprising given the company's initial proposal to invest \$9 million in upgrades for the structure. However, since the other alternatives proposed by FERC were also outside PacifiCorp's price range, they were willing to consider other options. The Yakama Nation and the Columbia River Intertribal Fish Commission (CRITFC) jointly funded, with PacifiCorp, an independent study done by the engineering firm R.W. Beck to reassess the costs associated with dam removal (personal communication, Steve Parker 2012). The \$10-million estimate of the firm was much more in line with PacifiCorp's original proposal.

PacifiCorp's decision to go ahead and remove Condit Dam, according to a PacifiCorp interviewee, was made with their customers in mind. They were aware of those who desired the dam to come out, and as long as it was possible to accomplish removal with relatively little expense passed on to customers, they would continue with the removal:

Our decision to remove the dam was made on behalf of our customers. The costs for the project would be transferred onto our customers. We could spend \$100 million to relicense the project and install the required fish passage; or we could remove the dam for \$37 million, to the benefit of customers (personal communication).

American Whitewater looked at the "hard costs" of addressing recreation, water quality, and fish passage issues and what it would take, financially, to adequately address these issues. For example, it assessed options available for moving adults and juveniles, especially, both upstream and downstream of the dam site, including fish ladders, trap-and-haul, and dam removal. Weighing the financial costs the utility company (PacifiCorp) would pay for such mitigation measures (e.g. installing the fish ladder, diverting more water away from electrical power generation for salmon-friendly flows) against the reduction in revenues that would result from these measures, "removal starts to look like a serious alternative" (personal communication, Tom O'Keefe). In their opinion, dam removal offered the best alternative in terms of balancing environmental and budgetary concerns.

Two other respondents were concerned that PacifiCorp take on the responsibility for paying for the entire bill when it came due for deconstruction and clean-up of the dam removal. According to one,

given all the variables that were involved, I felt like it was completely, actually, irresponsible for the Settlement Parties to agree to that cap on what PacifiCorp's finances- or what their financial responsibility would be because there was no way of knowing exactly what would happen when they did this process. And that sort of was the backbone of my opposition to this project all along.

Initially, the 1999 Settlement Agreement included a cap on the costs for which PacifiCorp would be liable.

Ultimately, FERC decided not to accept the cost cap, announcing their intention not to honor it in their 2010 surrender order.

"If a measure is required, we expect a licensee to perform it even if the cost exceeds agreed-upon cost caps. It would not be in the public interest for PacifiCorp to cease dam removal activities at any point short of completion on the grounds that a cap for construction and removal costs had been reached, and we would not allow PacifiCorp to do so..." (FERC 2010, 54)

Electrical Power Production

The significance placed on the electricity produced by Condit Dam depended on the stance a particular respondent had taken. Dam removal proponents generally considered the amount of power and revenue the facility produced to be relatively minor in comparison to that produced by other hydroelectric dams owned by PacifiCorp. The respondent from the Yakama Nation fisheries program described it as small and old, and as having out-lived its usefulness. To him and to the Tribe, the value of the electricity it produced was minor in comparison to the restoration of salmon and steelhead fisheries and regaining the Tribe's cultural heritage. The issue was also described as a "...pretty minor issue; it was a very small project in the scheme of things" by another supporter of dam removal. For Tom O'Keefe of the AW, too, the negative environmental impacts of the dam (e.g., high gas concentrations in the water and blocked fish passage) seemed larger than the positive benefit that might have been gained from a relatively small producer of electricity: "For a really small project like that, where those costs are high and the revenue coming in is very small from generation, that's where removal starts to look like a serious alternative."

Dam removal opponents, however, were of a different opinion. One interviewee noted that, though the amount of power generated by Condit Dam may have been relatively small, he still considered it an important part of the power supply and energy security for the nearby towns of White Salmon, Glenwood, Trout Lake, and BZ Corner. Another respondent said that, before the dam was removed, the

area in and around the White Salmon experienced a large snowstorm which cut off its supply of electricity from the main grid; Condit Dam meant that people were not without power during this time. After the dam was removed, however, an ice storm that swept through the area did result in a power outage, one that lasted for a week. “And that transmission system down there, the old sub-station, would’ve been an asset in that crisis situation that we no longer have.”

Property

Three out of the four respondents who mentioned property value as factoring into their stance on the Condit Dam removal were from the removal opposition side. This distribution is not unexpected. My sample of opposing parties was taken from those owning homes on or very near the former lake front. Understandably, this topic would likely be uppermost in their minds at the time of the interview. Decision-makers and involved stakeholders from among dam removal proponents did not live along the lake; nor did they, to my knowledge, have personal property affected by the dam removal. Thus, the issue perhaps did not feel as pressing or personal to them as it would to residents along the lake and river. Proponents did, however, address impacts to property value and structural integrity in comment letters submitted to FERC for their 1996 FEIS. Other topics mentioned that fell under the “Property” category were property rights and lease agreements.

One resident, now in his early thirties, grew up observing the debate surrounding the project. Factoring into his opposition of the project were losses in personal property value. As the decision-making process went on, he “continued to find out more and more what those costs were going to be and who was going to be supporting those costs and not having any compensation for those at all.”

Klickitat and Skamania Counties were concerned about the project’s impacts on property values since any alterations would affect revenues for the counties, and one respondent observed that the Condit Dam produced provided a significant proportion of the tax dollars the County received (though he did not specify which county, Klickitat or Skamania). Changes in tax revenue would also depend, in part, on future personal property values as well as whether or not PacifiCorp’s land would still be considered a “utility-operating property.” Klickitat and Skamania Counties predicted a total decrease in property values around the lake of over one million dollars, as well as significant loss in tax revenue from the removal of a dam valued at close to two million dollars (FERC 2002, 107).

Regarding Condit Dam itself, even though one respondent did not agree that PacifiCorp should be removing the dam, as a strong advocate for property rights he did support PacifiCorp's right to remove the structure if that was their desire, as long as they took responsibility for all the associated costs.

Personal property rights, pertaining to the conditions of the renewal of his property lease, formed part of Wayne Lease's objection to PacifiCorp's actions in the Condit Project. He and his wife were the only cabin owners along the lake who did not renew their lease (cabin owners own their homes but lease the land it sits on from PacifiCorp) when it came up for renewal in 2010. The Leases are still living in that home.⁴⁰ The previous lease cabin owners had with PacifiCorp was signed in 1993, and was supposed to last for the life of Condit Dam's new license (indicating the utility's assurance of renewal at that time and their first desire to continue long-term operation of the hydroelectric project), which would have amounted to 30-35 years. The 2010 version of the lease, presented to cabin owners less than 20 years into the previous one, did not appeal to the Leases as it would have had them "give away [their] rights to a reservoir and recognize the removal of Condit Dam and its aftereffects" and release PacifiCorp from all liability from removing the dam.

During the interviews, only one proponent mentioned property value as a consideration, and this very briefly. This was Polly Zehm, of the Department of Ecology. She noted that the concerns of property owners and lessees regarding this topic were brought to the attention of Ecology during public meetings. In their environmental impact statements (EIS's) FERC acknowledged the likely decrease in the short term of property values around the former Northwestern Lake. Property values in the long-term, it declared, would "depend upon how prospective homeowners and landowners would value river-front property relative to lake-front property" (FERC 2002, 106).

Infrastructure

Since the breaching of Condit Dam, erosion of the stream bed has gradually exposed the natural gas pipeline that crosses above Northwestern Lake Bridge, necessitating repairs (personal correspondence, Klickitat County employee; Dininny 2012). One respondent, a long-time resident in the area, said that he realized before deconstruction began that this would likely become an issue, and even

⁴⁰Whether this was by land purchase or another arrangement is unclear.

spoke to a biologist⁴¹ about his concerns. He had seen the construction of the gas line in 1974 and had noticed that it was installed in the thick sediment that covered the old gas line installed in 1955. He indicated that, underneath the accumulated sediment, he knew there was a 20-foot drop⁴² in the channel bed at the mouth of Buck Creek (a tributary that enters White Salmon River above the dam site), and that it would likely be exposed again once river flows were restored to pre-dam levels. He warned the biologist about the likelihood that the sediment would be eroded away and the pipeline exposed with removal of Condit Dam, making the pipeline vulnerable to damage by debris floating downstream and posing a hazard to anyone living nearby.

Concerns over the impact of dam removal on nearby infrastructure, such as Northwestern Lake Bridge, the county road system, and the water line that supplied the City of White Salmon with water from Buck Creek, were significant enough that Klickitat County made mitigation for any impacts a part of a settlement agreement in 2010 between Klickitat and Skamania Counties and PacifiCorp.⁴³ The stability of the piers supporting the bridge was fixed prior to dam removal so that they would remain stable. Klickitat County also made sure that the bridge remained open in case of emergency so medical vehicles and law enforcement could make it across, even during deconstruction. PacifiCorp took on the responsibility for any damages to county roads caused by the deconstruction process, and took care to protect the municipal water line, which Klickitat County insisted be done before the breaching of the dam, according to County Commissioner David Sauter⁴⁴. However, Sauter noted that he would have preferred that PacifiCorp had been more proactive with some mitigation measures (e.g., re-drilling water wells and moving houses back from hillsides in danger of sliding into the river) and more communicative with affected people about what its plans were related to these concerns.

Logistics

One of the least mentioned topics during interviews was the logistics of the dam removal itself.

One respondent mentioned that Klickitat County would have required PacifiCorp to acquire a number of

⁴¹The respondent did not mention a name or agency with which the biologist was affiliated.

⁴²It was unclear when that drop had last been exposed.

⁴³In this agreement, the two counties acknowledged that their concerns over dam removal had been addressed sufficiently by PacifiCorp, and officially removed their objection to the project.

⁴⁴David Sauter is a Klickitat County Commissioner (2006-present) who was involved in meetings between the county and PacifiCorp to deal with county concerns and objections to the dam removal.

permits, but the process was preempted by FERC. One was a conditional use permit that would have established requirements for the disposal of debris from the dam. According to two interviewees, the county did insist upon disposal of the concrete from the dam in a secure landfill to prevent leaching of chemicals into the water supply. The other permit the County wanted (but was not able to require) was a demolition permit mandating that PacifiCorp submit a deposit to cover expenses in case the utility decided not to complete the project. Other concerns included the traffic, noise, and dust generated by construction, according to an interview source.

One interview respondent expressed a level of uncertainty regarding the management of the downstream flow of sediment once the dam was breached. The so-called “blow-and-go” method, wherein a hole is blasted through the base of a dam and the sediment allowed to erode naturally downstream uncontrolled, was supposed to be the inexpensive option of sediment management. “I’m not sure it’s happened inexpensively because... obviously all of [the sediment] didn’t get flushed out and a lot had to be managed with a lot of grading equipment and a lot of it’s still in place.”

Recreation—Economic Factors

The economic aspects of recreation, during the interviews at least, received brief attention. One respondent mentioned the multitude of salmon and steelhead fishermen who came each year to fish at the confluence of the White Salmon River and the Columbia River. Another respondent also regretted the loss of the steelhead fishing grounds found at the mouth of the White Salmon River where it met the Columbia River, specifically based on the financial loss it represented: “That brought in a lot of income into the area, where the steelhead run and all that. And that’s all gone now.”

One potential change mentioned in an interview was that there could now be “a very large regulatory magnifying glass over this entire reach,” which the respondent dreaded could also mean large fines for not meeting the more stringent environmental regulations and the closure of local businesses unable to meet the requirements or pay the fines (the nature of such feared fines is unclear). Though at present the impacts from increased regulatory attention have not been too intense or too negative, its full effect on the business community in the area will be known only through the passage of time, according to one respondent. Thus far, however, the short-term impacts to local businesses the respondent witnessed during the deconstruction process have been positive.

FERC, a key decision-maker in the Condit Project, assessed the effects of dam removal on river-based recreation in more detail their 1996 FEIS and 2002 SFEIS. Taking an inventory of the proportion of recreationists originating from out of town, a reported eighty percent of the recreationists FERC polled were visitors (usually from the Portland, Oregon, and Vancouver, Washington, area). This means that the White Salmon River area recreation industry is heavily dependent upon on out-of-town guests and that the potential for dam removal to depress this sector of the local economy is significant. The worst case scenario FERC envisioned for recreation-based economic activities, assuming all current visitors to the area took their business elsewhere, was an estimated net loss of \$141,000 (1991 dollars) for “the socioeconomic impact area during construction in eliminating fishing, boating, and other activities at Northwestern Lake” (FERC 1996, 4-96). The short-term impact was expected to last 12 months (FERC 2002, 105).

The long-term impact on fishing was uncertain. It would depend on how well the fish—resident trout and salmon fisheries—and anglers adjusted to the change (FERC 2002, 105). A partial loss of spending from recreational anglers who fished near the Underwood *in lieu* site⁴⁵ was anticipated since it would be filled with sediment from behind the dam. Eventually, river flow would again carve out a portion of the pool that existed at the ‘*in lieu*’ site, but it would be smaller than prior to dam removal.

While deconstruction was in progress, whitewater recreation would continue upstream of the dam site and at the take-out site in the Northwestern Park area. However, fishing, flatwater recreation, and picnicking would not be possible during this time, resulting in a loss of income related to these activities for area businesses. While flatwater recreation would no longer be an option after the reservoir was drained and the dam fully removed, in the long term whitewater activities would have an expanded territory (FERC 1996, 4-96). In fact, due to the increased number and duration of whitewater boating trips that would likely occur, the total associated recreational benefits and expenditures (e.g. food, lodging) would exceed the benefits and expenditures generated by the current flatwater activities within the project area (4-97).

⁴⁵ At the mouth of the White Salmon River is a pool, or backwater, created by the Bonneville Dam. The pool is managed by the United States for the use of the Yakama Indian Nation, the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Reservation, and the Nez Perce Tribe “as an access site to the Columbia River in lieu of other sites that were inundated when Bonneville Dam was completed in 1938” (Settlement Agreement 1999; quote from NMFS 2006, 49).

There is a portion of the local community that is concerned about the effect the loss of tourism dollars associated with the lake fishery would have on the local economy; however, people seem eager to raft the newly opened stretch of river, which will hopefully mean there will be a net benefit in the long-run from tourism dollars “for the local governments, who are struggling like every other local government in the country” (Polly Zehm 2012).

Respondent Opinions and Perceptions

The Desirability of Removing Condit Dam

The controversial removal of Condit Dam acted as a polarizing force in the towns and communities surrounding the project site. Both supporting and opposing positions in the debate were enthusiastically taken up among those with an interest in the project. The impression should not be that dam removal opponents did not care about environmental issues, but rather that they believed there were other, equally important environmental factors at stake in addition to salmon restoration. One of these was the presence of an established lake-based ecosystem. “If this was 100 years ago, and dam construction was the issue, I would be just as strong for not putting in the dam as I am now, for not taking it out. With an ecosystem that’s 100 years old, why would I want to take it out?” (personal communication, cabin owner).

On the proponents’ side, one remarked that removing a dam is not always an option. Other uses for the dam may take precedence, such as irrigation, flood control, or a source of clean energy in the face of global warming. However, “where it is feasible and makes sense, as was the case on the White Salmon”—being a relatively minor producer of electricity, being aged, and having the potential to fully restore habitat to a native salmon run—dam removal is a legitimate choice.

The Decision-making Process

The decision-making process for some proponents turned out to be a “learning experience” (Tom O’Keefe, American Whitewater). With the Settlement Agreement signed, dam removal may have seemed imminent; but this was not so. The breaching of Condit Dam finally took place thirteen years after the document was signed, in 2012. Local push-back and a lack of public consensus on dam removal likely contributed to the delay. Certainly, gathering the required permits took longer than many anticipated or

desired, as one participant commented. One permit in particular, the state's Section 401 Water Quality Certification (SEPA), took PacifiCorp multiple tries over a period of years to finally obtain. But for Ecology, the main state regulator in this case, the view was that it was worth it in the end:

where you had a private utility who had decided that decommissioning was the appropriate way to address the fish issues that were inescapable for this project, [we believed] that it was our job to be as engaged as possible so that we could help ... alleviate the shorter-term impacts from such a big, dramatic project, the decommissioning (Polly Zehm).

For those who opposed dam removal, the length of the decision-making process was not the point of contention. The issue for them was *how* it played out and the manner in which they were included in decisions. To opponents, the decision to remove Condit Dam seemed like it was a closed-door process, and only the "government agencies and private groups that had filed with FERC about relicensing of the project in 1993 were allowed input or a role as Intervenors in the decision-making process." One interviewee seemed to be in agreement with this sentiment, expressing that, with the amount of money and power behind dam removal advocates, it seemed impossible for individuals and even the cabin owners association to convince PacifiCorp, or anyone, that the lake should remain. While acknowledging the lack of influence dam removal opponents had on the initial Settlement Agreement in 1999, another opponent came to a slightly different conclusion: "[U]ltimately, I think FERC did a reasonable job of eventually letting the public speak to the issue and giving people a forum and an opportunity to comment" through public hearings and the submission of comments via mail and email.

Perceived Benefits and Costs

Various costs associated with the removal of Condit Dam were felt by respondents. Some were fiscal, including a decrease in county property tax revenues from the dam and risks posed to the outdoor recreation industry. Others were environmental, including the potential exposure of the river's trout fishery to invasive species and the displacement of migrating waterfowl that had historically used the lake. One respondent described witnessing flocks of Canada geese returning to find former nesting spots replaced with bare ground. Other sources of irritation and anxiety following dam removal included a dramatic decrease in groundwater levels; respiratory problems resulting from airborne sediments

contaminated by heavy metals; and dangers posed by the exposure of a section of the natural gas pipeline which crosses above Northwestern Lake Bridge.

Derek Sandison, who managed the research and writing of Ecology's SEPA Supplemental FEIS (2007), acknowledged the adverse environmental impacts of deconstruction that have occurred. However, he was satisfied that these outcomes had been anticipated during the environmental review process. These events were nothing unexpected, according to Sandison, and I gathered that he felt that the situation was well in hand.

From the Yakama Nation's perspective, the spiritual benefit of "restoring a river to the way it was intended to be, as they say, 'the way the Creator put it on earth'" is a definite benefit of the project (personal communication, Steve Parker). The Tribe looks forward to the ability to once again harvest fish from the river, and this would boost the Tribal economy. While the lowering of the opinion towards the Yakama Nation of some in the White Salmon (city) area may be included among the costs of the project, Parker assured me that "unfavorable public perception is nothing new for the Tribe and so it is not regarded as much of a cost."

In her responses, Polly Zehm (Deputy Director, Ecology) didn't focus so much on what was lost in the process of dam removal, but on what was gained and what would change as a result of removal. She was able to view the situation from both perspectives, having interacted frequently with and received feedback from decision-makers and citizens from both sides of the debate. A high point for her was the fact that people were already seeing fish above where the dam used to be, a major goal for this project. She recognized that people would miss the reservoir-based ecosystem that had been there for so long, but pointed out an expectation that over time it would again be "a lovely place that supports a diverse biota up there. And you know, depending on who you are and what you care about ... some folks will appreciate that more than others."

Summary

Condit Dam served the human community while it was in place by providing water for irrigated agriculture; lake-side and boat-based recreational fishing; a safe, flatwater swimming experience for children; a source of tax revenues for Klickitat and Skamania counties; and, of course, electricity production with a relatively low carbon footprint. The shallow, but long, man-made lake created by the

dam served the natural community by providing important habitat for migrating birds and waterfowl and hosted a healthy resident trout fishery. These benefits were traded for reconnecting the up- and downstream reaches of the White Salmon River in order to restore native anadromous salmon and steelhead fish populations, which are important environmentally, economically and culturally for the Pacific Northwest region of the U.S., and whose numbers were critically low in the watershed. Was the trade-off worth it? The answer depends on who is asked. It may also depend on when the question is asked; time may change views.

Chapter 7 will interpret respondent opinions and perceptions regarding dam removal, connections to various concerns, and the decision-making process and results through the lens of the concepts explained in my analytical framework in Chapter 2 in order to answer the research questions. The focus continues to be on Condit Dam removal, but its comparison to Elwha dams also is important.

Chapter 7

Discussion

Introduction

Baish, David, and Graf (2002) call for more work to be done measuring public opinion and social values regarding the maintenance and removal of dams. Graf mentions the need for more social science research to be done on the roles of “the creation and expression of opinions, and the collision between private property rights and public trust resources” (Graf 2003, 10). This thesis contributes to the body of research literature in this area. The goal of this research project was to discover how the priorities, opinions, and perceptions of decision makers and engaged stakeholders shaped decision making for the dam removal project. The Pacific Northwest region of the United States, in general, and the state of Washington in particular, is ideal for this purpose. Hydroelectric dams supply 70 percent of the Pacific Northwest’s electrical needs. In Washington, there are vast stretches of forested land, much of it managed by federal and state governments, important stream networks, and a growing population (Naiman, Bilby, and Bisson 2000; Graf 2001). How does one balance providing for the latter while protecting terrestrial and aquatic ecosystems? There will be tradeoffs, and the Condit Dam removal project near White Salmon, Washington, is a perfect example of this dilemma. By performing a case study of the Condit Project and comparing it with the Elwha River Restoration Project, a near-contemporaneous dam removal project to the north near Port Angeles, Washington, I illustrate tradeoffs, decision-making considerations and tensions, and outcomes.

Comparing Case Studies: Condit vs. Elwha

Here I describe the similarities and differences in decision-making between the Condit Project and the Elwha Project in order to identify implications for future removals of large dams in the U.S. (see Chapter 8 for implications). In addition, the differences between Projects may help to illustrate some of the potential variability between dam removal decision situations. Similarities are described first, and then differences are outlined.

One characteristic the two projects share is that the first calls for dam removal were put forth in the mid-1980s by area American Indian tribes whose cultures and economies had historically depended upon the salmon and steelhead that returned each year to the White Salmon and Elwha Rivers. Restoring salmon was a matter maintaining their sense of place and way of life (Cheng, Kruger, and Daniels 2003). In the Condit Project, with little ecological data to support such a move, state and federal resource agencies were at first reluctant to support dam destruction. Dam removal as fish passage alternative was taken more seriously, however, after the Yakama Indian Nation and Columbia Inter-tribal Fish Commission (CRITFC) were able to convince PacifiCorp to jointly finance an independent analysis of the costs of dam removal (personal communication, Steve Parker). The cost-benefit analysis produced by this report returned figures more amenable to PacifiCorp's desired price point and thus, its role in decision making made the prospect of dam removal a legitimate probability (Heinz Center 2002, 78). With the Elwha Project, the Lower Elwha Klallam Tribe broke away from the official policy of the Point No Point Treaty Council (in which some members preferred to focus on hatcheries and protecting existing fish harvests) and were the first to intervene in the FERC process in 1986 to move for dam removal (Gowan, Stephenson, Shabman 2006, 512). After viewing James River's technical analyses on the biological, engineering, and financial aspects of various fish passage alternatives and performing analyses of their own, the state and federal agencies (JFWA) added their support to the LEKT's calls for removing the dams.

Decision-making for both projects took decades to complete, and dam removals for both commenced in the same year. However, the timeline for each was unique. The relicensing process for each hydroelectric project began in the late 1970s and extended into the 1980s, as fish passage alternatives were explored and the Tribes and resource agencies advocated for dam removal. The 1990s was the decade where decision-making for the projects diverged. Congress intervened in the Olympic Peninsula case 1992 with the passage of the Elwha Act, effectively taking the responsibility for the dams from then-owner James River Corporation. The remainder of the next two decades was spent slowly acquiring funds from the Appropriations process in Congress and implementing mitigation projects like the Port Angeles Water Treatment Plant (PAWTP). For the Condit Project, the 1990s were spent convincing PacifiCorp that dam removal was the best fish passage alternative and then meeting with the

Intervenors to settle on the best way to implement such a project. From 2000 to 2011 a long process of permit applications ensued, particularly for those pertaining to water quality, in order to go forward with dam removal. Deconstruction for both the Elwha Project and the Condit Project began within about a month and a half of each other in 2011.

Not only did Project timelines diverge, but the avenues through which decisions were made differed. Initially, the Federal Energy Regulatory Commission oversaw the Elwha Project. However, due to a lack of direction from FERC concerning fish passage alternatives and a dread of an expensive, extended legal battle over the fate of the dams, owner James River and other decision-makers welcomed the intervention of Congress with the passage of the Elwha Act (P.L. 105-492) in 1992. The Department of the Interior oversaw the project from that point on. In contrast with the Elwha Project, the Condit Project remained in the hands of PacifiCorp, the utility company that owned it, throughout the decision-making and removal process, with more oversight from FERC and the Washington State Department of Ecology. Distaste for the high price tag attached to FERC's fish ladder alternative led PacifiCorp to eventually meet with Intervenors to discuss the possibility of dam removal, resulting in the Settlement Agreement of 1999.

Answering the research questions

Three basic research questions were developed to guide this research to increase understanding of dam removals:

- What factors affected decision-makers' and other stakeholders' support for (or rejection of) dam removal?
- How did decision-maker perception and opinion play a role in removal decisions? and
- What problems and 'successes' can be identified in the process?

The research procedures and analysis of removal of Condit Dam and Elwha river dams help to answer these questions.

Factors considered during decision-making

The premise of political ecology—that political, economic, and ecological processes are interdependent—helps explain the factors which led to the Condit Dam being dismantled (Peterson 2000; Paulson, Gezon, and Watts 2003). Three main themes factored into respondents' support either for dam retention or for dam removal: 1) the fish (salmon and steelhead); 2) the economy; and 3) policy. One side wanted to preserve a way of life; the other side wanted to restore a way of life that had all but disappeared. For the former, a fish ladder would have allowed continued personal enjoyment of the beauty and amenities of the lake (e.g., recreational fishing and boating), continued influx of tourist dollars into the local economy from visiting trout fishermen, as well as preservation of habitat for migrating waterfowl while allowing salmon to pass the dam going upstream. With the dam still in place, property values wouldn't be diminished and important infrastructure like the Northwestern Lake Bridge and the City of White Salmon's water line would not be put at risk. Others in the community of White Salmon saw dam removal as an opportunity to restore endangered salmon and steelhead fisheries, which had annually returned to the White Salmon River in abundance before dam emplacement in 1913. In addition to returning the ecosystem to a more natural state, there would be human benefits, including provision of food and income to the Yakama Indian Nation and attracting recreational fishermen to the region (bringing income to Klickitat and Skamania Counties). Dam removal as a fish passage alternative seemed like the most affordable option to PacifiCorp (owner of Condit Dam) and the Settlement Agreement parties for fulfilling legal and legislative requirements pertaining to salmon conservation.

Perceptions and Opinions about removing Condit Dam

By the time PacifiCorp applied to the Federal Energy Regulatory Commission for license renewal on December 27, 1991, the Condit Dam had been in place for nearly 80 years. Northwestern Lake had become a familiar and picturesque fixture in the local landscape (Figure 7.1 and Figure 7.2). Some members of the community wanted the dam to remain, yet others were ready to see it go. Maintaining the century-old traditions and lifestyle Condit Dam and its reservoir, Northwestern Lake, supported was traded in favor of making an effort to bring back a centuries-old cultural, environmental, and economic resource. For certain cabin owners, the project meant a violation of property rights, the destruction of an

important ecosystem, and the loss of a private, peaceful, family-oriented atmosphere. The Yakama Indian Nation placed a high value on treaty fishing rights and rightly wanted them to be honored by the American government. They viewed dam removal as an opportunity to revive their culture and their economy. Other organizations like the Department of Ecology and American Whitewater Association also wanted to restore an important symbol and economic resource to pre-dam abundance; proponents cherished the unique place anadromous fish hold in the White Salmon River's ecosystem and throughout the Pacific Northwest, and believed that removing Condit Dam was the most appropriate way to accomplish this.



Figure 7.1. Northwestern Lake, December 19, 2008 (photo courtesy of Wayne Lease).



Figure 7.2. Northwestern Lake, June 2002 (photo courtesy of Wayne Lease).

Problems and Outcomes: Stakeholder Views

In the case of the Condit Dam removal project, removing the dam changed the meaning of the river for many stakeholders, who promptly organized themselves into groups in order to promote and protect their perceptions and evaluations of the proposed dam removal, illustrating Cheng, Kruger, and Daniels' (2003, 97) proposition that "groups intentionally manipulate the meanings of places hoping to influence the outcome of natural resource controversies." Respondents' feelings about the fate of Condit Dam are clearly related to whether they were in favor of dam removal as the preferred alternative for fish passage. Those who wanted the dam removed generally seem pleased with the outcome of the project. Proponents' general perception of the decision-making process is that it was fair and involved all interests, even if the process was lengthy. Thus their support for dam removal continued throughout the

process. Polly Zehm, Deputy Director of one of the lead regulating agencies in this case (Ecology), also seemed satisfied with agency efforts to reach out to the community and engage those with opposing viewpoints. Those who believed the wise decision would have been to keep the dam in place are less enthused with the outcome, particularly at this point in time (so near dam removal). Removal opponents generally saw decision-making as a one-sided and closed process, with a foregone conclusion. This added to their resistance and may have contributed to the length of the decision-making process.

To the extent that it explains ecological change in terms of power relations and the multiple spatial scales at which they occur, political ecology gives data analysis the added dimension of explaining, at least in part, why certain values and place meanings prevailed over others with respondents' roles and level of authority/power relative to each other (Peterson 2000; Paulson, Gezon, and Watts 2003). Local cabin owners were under the authority of state and federal agencies and PacifiCorp, who owned the dam and the land upon which they built their homes. The agencies, in turn, were obligated to enforce key environmental legislation and litigation (i.e., Clean Water Act; Endangered Species Act; the Boldt Decision) and PacifiCorp was obligated to fulfill the requirements included therein in order to protect endangered salmon and steelhead populations and fulfill tribal treaty fishing rights. In the case of the Condit Project, it would seem that the most powerful decision-makers were of the opinion that the river-based ecosystem took precedence over the lake-based ecosystem—or that the cost of maintaining the lake-based system did not warrant its continuance. The argument could be made that the balance of criteria (including economics, as well as scientific and cultural understandings) favored ecosystem 'restoration' over the more modified dam-based ecosystems. In a situation of competing interests, framing of the decision and decision process may well depend on whether one stands on the 'losing' side or the 'winning' side of the issue.

Opinions about dam removal didn't seem to change through the process: stakeholder priorities at the outset were maintained throughout the life of the project. Proponents remained convinced that the project was a good idea for salmon and the community. Opponents remained convinced that the economic and environmental cost for restoring one species—however important—was too high and unnecessary, and that a different fish passage alternative should have been chosen. As time passed,

each party discovered what they were willing to give up in order to accomplish what they thought best balanced the needs of the river and of the communities and local area.

In Chapter 8, I describe the lessons learned from the Condit Project process and the implications of finding related to both projects investigated here. The concluding chapter also includes my personal observations about the research process, final conclusions regarding the Condit Dam removal, and suggestions for future research directions.

Chapter 8

Conclusions

Planning Future Dam Removal Projects

Implications for future decision making processes for dam removal projects include the possibility of dam removal becoming an issue for debate where treaties with indigenous nations over fishing rights in U.S. rivers exist and where dams jeopardize the fulfillment of those rights. Tribes may call for removal and dam owners—desiring to avoid being held financially and legally liable for the loss of fish, or indeed for loss of life or property should older dams fail—may concede to removing the structure(s) in question. Judging from the initial reluctance in the Condit and Elwha Projects, state and federal agencies in Washington state (probably in other states as well) require sound evidence demonstrating the ecological benefits and technical and financial feasibility of such a project before lending their support/permission to dam removal.

Another consideration for decision-making regarding potential future removal projects is the question of “Who pays?” A project’s source of funding significantly influences the scale of dam removal projects, as well as which removal and mitigation measures are considered feasible (Heinz Center 2002). The Elwha River dam removal project was government-run and taxpayer-funded. The Department of the Interior had a larger financial resource base than PacifiCorp and thus had the capacity to focus more on proactive planning for and installing mitigation measures, such as the construction of two new water treatment plants. PacifiCorp’s concern would naturally tend toward trying to accomplish the task without simultaneously eating too far into their profit margin. As a result, in the case of the Condit Project mitigation measures were not as proactive or as extensive as those in the Elwha case. Interior’s primary focus during the Elwha Project was restoring an ecosystem and making sure every applicable regulation was followed to the fullest extent possible; PacifiCorp’s primary focus was running a successful business and considering the wishes and well-being of their customers—their revenue base.

Differences in the channels through which decisions are reached also impact the pace of events for dam removal projects. In the Elwha Project, Congress’ legislative authority superseded that of the Federal Energy Regulatory Commission (FERC) and dam owner James River; therefore a decision was

reached much more quickly than in the Condit Project. In the Condit case, multiple decision makers—including the PacifiCorp, FERC, and the Washington Department of Ecology (Ecology)—shared authority at the settlement table, requiring more time for consensus to be reached. However, one advantage in having multiple avenues available for dam removal decisions is that it offers flexibility useful in such a complicated process. The Elwha Project, for instance, began with an intervention by the LEKT and government agencies in the FERC relicensing process. Later, removal became a legislative matter when Congress saw the need to intervene and change the course of decision making.

Both Projects show that decision-making for and the implementation of large dam removal projects can easily become drawn-out over the course of years due to a variety of possible contributing factors: sources of funding, contention among stakeholders and decision makers, obtaining the required permits, implementing mitigation measures. Funding may be the element least in control of decision makers, and may act as a determining factor in the feasibility of dam removal and the extent to which mitigation and restoration efforts are carried out. As a project's timeline lengthens, the survival of the species the project is attempting to conserve is increasingly at-risk. Therefore, it would behoove all parties involved in future removal projects intended for ecosystem restoration to conduct decision-making in ways which foster consensus and meet legal requirements in a time efficient manner.

What can we learn from the Condit Project process?

Comparison of the Condit Project and the Elwha Project yields support for methods that can promote a democratic ethos in decision-making and include a variety of stakeholders in discussions regarding potential environmental restoration projects. Based both on what might be expected from literature promoting public engagement in decision-making, and specifically on the experiences expressed by stakeholders related to these case studies, it is important to deliberately include community representatives of those opposed to a project from the beginning of the decision-making process. Returning briefly to my review of the literature, the lessons learned from studies in participatory environmental management have something to offer here. Carnes et al. (1998) developed a list of criteria with which to judge the effectiveness of public participation in management decisions. This includes full and active stakeholder representation throughout the process, understanding and trust between the

agency in charge and other stakeholders, and accomplishing the agency's site-specific mission. In the Condit Project, these criteria were generally met, but could have been improved upon.

The impression of the Washington Department of Ecology and PacifiCorp—both of which had received feedback from their constituents or consumers—was that a large portion of the population was pleased with the outcome and supported the decision-making process, though their results may have been subject to sampling bias. Citizen proponents seemed generally to have understood the concerns of the agencies and accepted their decisions as legitimate; the opposite was true for opponents, who generally felt ignored. Greater attention to all sides throughout the process might (or might not) yield more satisfaction in the end.

Klickitat and Skamania Counties were invited to the Settlement table early on, but apparently the meetings weren't widely publicized, perhaps because it was initially believed that nothing would come of discussions to remove such a fixture of the community. This meant that the news that Condit Dam was being removed came as a shock to many members of the local area, including cabin owners living along Northwestern Lake. It would be advisable to exceed public information requirements so as not to create barriers to decision making (Johnson and Graber 2002). In the case of the Condit Project, there were multiple opportunities for all sides of the argument to be heard. While multiple public meetings were held and well-attended, and comment letters submitted in response to FERC's DEIS and Ecology's Final SEPA Supplemental EIS (Ecology 2007) received responses, several interview respondents still did not feel they had received sufficient serious attention, and felt that the decision-making process was biased toward dam removal from the start. This last outcome might have been avoided by proponent organizations and—particularly—agencies being more intentional in including organizations representing all viewpoints in planning meetings, conducting focus groups, or if local citizens had formed a community advisory council similar to what occurred in the Elwha Project (Carnes et al. 1998; Rowe and Frewer 2000).

Based on Egan (2007), Elwha Project opponents seem to be less unhappy than Condit Project opponents with the results of the decision process. This may be due, in part, to the fact that the opponents of the former project were less directly affected than those in the latter. Many respondents who opposed the Condit Project lived directly along the river and, prior to removal, on the shores of the

lake. Without the dam in place, they lost serene lake views and easy access to the flatwater recreational opportunities it had afforded. The lake and the dam had been a visible, tangible part of their daily lives. While residents of Clallam County risked losing jobs at the paper mill—no small sacrifice—living within walking distance to Northwestern Lake and Condit Dam must have added immediacy to the tradeoffs involved in the Condit Project not present in the Elwha Project. Additionally, unlike in the Elwha Project the values of their homes were impacted as their property became “river front” instead of “lake front”; whether the impact is positive or negative remains to be seen. Another reason for the higher satisfaction with decision making in the Elwha Project is likely also due to the addition of the Citizen’s Advisory Group (CAG) to the various ways in which the public could participate in decision making. Something that can be learned from the CAG--or at least may be beneficially emphasized—about increasing public acceptance of policy and resource management decisions is the importance of educating the public and providing official channels for parties, especially dissenters, to interact closely with the dam owner and government agencies directing the project. The CAG, which included a number of entities, held meetings over a period of six weeks for a two-way discussion and clarification of the issues stakeholders were concerned about (Egan 2007, 181-182). The grassroots-based CAG provided an official avenue for dissenting community members to discuss, debate, and ask questions about the issue of dam removal as well as make recommendations of their own for the project. This served to calm some of the feelings of those who opposed dam removal (Egan 2007, 188). Public perception of the fairness of the decision-making process also influences the likelihood of gaining their cooperation, or at least their non-opposition. As Egan (2007, 208) discovered,

Stakeholder groups that are not engaged by the lead agencies or power brokers, do not perceive that they are being heard, or believe that their ideas or opinions are not respected may invest in disrupting the process either by interfering in the ability of other parties to reach a decision or by introducing stratagems for delaying or preventing implementation of a decision once reached.

In many—probably most—resource management decisions, it is impossible to convince all stakeholders of the ‘rightness’ of a proposed action. However, when decision-makers are as transparent as possible with communication of the reasoning behind and developments in the decision process frequently, thoroughly, and clearly, resentment and mistrust may be kept to a minimum.

Personal Observations and Recommendations

The nature of this case study allowed me to capture an in-depth understanding of the motivations and factors considered by decision-makers and engaged stakeholders involved in the decision-making process of the Condit Project. I conducted 15 semi-structured interviews with officials and staff from government agencies, Klickitat County, and a local non-profit organization, and with area residents – a key informant pool that yielded information about important decision-maker and stakeholder concerns regarding dam removal. To build a thorough history of the Condit Project, as well as the Elwha Project, I conducted a thorough review of the available government reports and academic literature related to the projects.

While planning the primary data-gathering and analysis stages of my research, I originally intended to focus solely on those in authority who made the decision to remove Condit Dam and collaboratively planned the project: PacifiCorp, the Yakama Indian Nation, American Rivers, state agencies, and others. However, as the interviewing process progressed, I realized that in order to capture both sides of the story—opponents of the decision as well as proponents—I would need to expand my search outside of the official “decision-maker” boundary. I interviewed stakeholders who were active and engaged in the Condit Dam removal process and who opposed dam removal. The lives of these individuals would be tangibly impacted by the project, and they took it upon themselves to stay informed and to communicate with decision-makers.

Most interviews were conducted over the phone; however, during the last week of October 2012, I visited the location where the Condit Project took place. While there I was able to conduct interviews in person instead of over the phone. I was able to walk along the White Salmon River, seeing the old dam site up close, and the impact of Condit Dam removal on the landscape. I found this helped increase the “flow” of the conversation between interviewer and respondent. Visiting changed the Condit Dam removal from an abstract concept to a concrete reality. Respondents became people I had met personally, instead of a simply being another source of data. Being able to walk to the edge of the White Salmon River myself and see where the dam once stood allowed me to understand what dam removal meant more fully than if I had been limited to photographs and typeface; it became more immediate. After returning home, I was able to visualize what the environmental impact statements and articles were

describing as I wrote about the historical and present-day context of the project. I better grasped the opinions and perceptions behind the decisions that were made and recorded in the official record.

The research process taught me the value of self-reflexive thinking. At the start of researching and writing this thesis, I was certain that the decommissioning and removal of Condit Dam was the best alternative for restoring salmon and steelhead runs in the White Salmon River. The dam was endangering the existence of an important symbol and resource in a part of the country whose natural resources and beauty I value. Removing the dam seemed like the most obvious course of action. Experiencing the hospitality of residents who lived near the now-defunct dam and hearing their reasons for opposing the project, however, made me question my own opinions and perceptions. Uncertainty crept in, and I had to reexamine *why* I believed dam removal was the best alternative for restoring the White Salmon River. I realized that there are no good guys or bad guys here. It's simply a matter of differing perspectives on the best solution to a complex problem. Experiencing the hospitality of respondents who supported dam retention during my stay in Washington allowed me to look at the Project through their lenses for a brief time. This was a valuable experience and has me better-informed than I would have been had I relied solely on official documents for my information.

Additional Research Needs

Findings would have been strengthened by pursuing more interview respondents from the proponent side of the Condit Dam removal. This was attempted, but I was unable to contact some of the identified proponents. Also, including a mailed (or email-based) questionnaire, particularly with random sampling, to get a better sense of the true distribution of opinions among stakeholders in Klickitat and Skamania Counties would have allowed quantitative characterizations and a greater potential for generalizations about opinions throughout the study area. This would give government agencies, dam owners and managers, community councils, and citizen action groups that find themselves in the middle of a dam removal debate a clearer idea of the dynamics of such a complex decision-making process. Such efforts are possible in the future, and may be designed to acquire data regarding changes in experiences and opinions in the post-removal period.

Much more is known about the ecological impacts of dams and their removal than about the social processes and effects related to decisions to retain or remove them. Few of the identified articles

on dam removal addressed public opinion and its impact on the dam removal process. Keeney (1994), Born et al. (1998), The Heinz Center report on the status and prospects of dam removal research (Graf 2003), and certainly Egan (2007) were the only ones to address social values and opinions in the dam removal context. Others studied legislative, economic, and ecological factors in dam removal decision-making (Tucker 2001; Blumm and Erickson 2012). Gowan, Stephenson, and Shabman (2006) explored the role of economic valuation of natural resources in the decision to remove the Elwha and Glines Canyon dams. Johnson and Graber (2002) explained the use of human psychology to promote public acceptance of dam removal. Tonn, English, and Travis 2000 developed a framework for improving environmental decision-making in general.

The sub-discipline of geography which holds great potential for improving the decision making process for dam removal is the study of people-place connections, or sense of place, and the general 'human-environment' tradition of geography—including more recent focus on social-ecological systems (National Research Council 1997; Turner 2002; Cantrill and Senecah 2001; Cheng, Kruger, and Daniels 2003). By allowing decision makers and stakeholders to go beyond an "us/them" mentality and "see beyond the rhetoric of an opponent's advocacy campaign to its cultural impulses and meanings," a sense of place perspective would help prevent removal debates from escalating into hostile conflicts that polarize communities (Cantrill and Senecah 2001, 193). It also fosters a nuanced understanding of the meanings and values attached to a location and would provide insight into stakeholders' reactions (or potential reactions) to dam removal proposals. This would prevent the feelings of being ignored and powerless to influence policy found among opponents of the Condit Dam removal. Future research on dam removal decision making should include an even greater sense of place perspective than that which is included in this thesis, although my own thinking certainly evolved with exposure to the sense of place held by opponents of Condit Dam removal and resulting lake destruction.

As more dams in the U.S. are considered for removal, the hope of environmentalists and river advocates is that the results of the Condit Dam removal project will help stakeholders advocate more effectively for dam removal. My hope is that the results will help stakeholders create a balanced and fair process of decision-making that protects the environment, as well as the needs of the people.

Final Conclusions

Although I comprehend the emotional and financial tradeoffs involved in removing the Condit Dam and the Elwha and Glines Canyon dams, based on what I understand about the impacts of dams on migratory fish and their habitat—blocking access to miles of spawning beds, impacting water temperatures and oxygen content—as well as the importance of healthy, local populations in maintaining the genetic diversity and resilience of the wild Pacific salmon and steelhead runs, I believe that reestablishing a free-flowing river via dam removal was the alternative most suited for restoring the White Salmon River ecosystem and its populations of anadromous fish. Even with fish ladders or trap-and-haul facilities, navigating past the dam would not have been as successful as it is without the dam in place. Additionally, had the dam remained, the Yakama Nation would not have regained their cultural heritage, and which is significant. I understand, however, that not all dams can or will be removed, and many dams do provide important benefits that, in balance, are needed. Each potential dam removal should be considered on an individual basis, and more thoughtfully than my initial inclination.

In the case of the Condit Dam removal, it seems that FERC and the Parties to the Settlement Agreement conducted themselves well, in terms of following regulatory requirements for managing the environmental impacts of dam removal and following the procedures established by NEPA—the National Environmental Policy Act—for inviting the input of and discussion with the public. While the process didn't happen flawlessly and increasing understanding between proponents and opponents might have been improved, I do think that the alternative most likely to restore salmon in the White Salmon River was the option taken, and I look forward with hope to seeing the results of this endeavor to restore a river to its free-flowing state, and for local residents to adjust to the new but more natural state of the ecosystem.

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Appendix A: Parties to the 1999 Settlement Agreement

(source: PacifiCorp 1999, 1)

PacifiCorp (former dam owner)

Intervenors:

American Rivers, et al:

American Rivers
American Whitewater Affiliation
Columbia Gorge Audubon Society
Columbia Gorge Coalition
Columbia River United
Federation of Fly Fishers
Friends of the Columbia Gorge
Friends of the Earth
Friends of the White Salmon
The Mountaineers
Rivers Council of Washington
The Sierra Club
Trout Unlimited
Washington Trout
Washington Wilderness Coalition

Agencies:

Federal Energy Regulatory Commission
("FERC")
Columbia River Intertribal Fish Commission
("CRITFC")
Yakama Indian Nation ("Yakama Nation")
U.S. Forest Service ("USFS")
U.S. Department of Interior ("Interior")
National Marine Fisheries Service ("NMFS")
Washington Department of Ecology
("Ecology")
Washington Department of Fish and Wildlife
("WDFW")

Appendix B—White Salmon Watershed Management Committee

(source: <http://w3.gorge.net/ucd/wsrwmc.htm>)

Steve Stampfli—Small Woodlot Owner, Co-Chair (Primary)

Mike Sandlin—Mt. Adams Orchards, Co-Chair (Primary)

Bengt Coffin—USFS, Mt Adams Ranger Dist. (Primary)

Stephanie Caballero—USFS, Mt. Adams Ranger Dist. (Alternate)

Susan Lourne—Friends of the White Salmon River (Primary)

Sherry Penney—Friends of White Salmon River (Alternate)

Jason Spadaro—SDS Lumber Co. (Primary)

Jon Cole—SDS Lumber Co. (Alternate)

Donna Bighouse— Washington Dept of Fish and Wildlife (Primary)

David Anderson—WDFW (Alternate)

Sue Baker—USFS Columbia River Gorge NSA (Primary)

Speros Doulos—Spring Creek National Fish Hatchery (Primary)

Mark Ahrens—Spring Creek National Fish Hatchery (Alternate)

Nikki Hollatz—Skamania County (Primary)

Dave McClure—Klickitat County (Primary)

Jeff Martin—Klickitat County Health Dept. (Primary)

Kelly Clothier—Husum/BZ Community Council (Primary)

Larry Leach—Washington. Dept of Natural Resources (Primary)

Blake Murphy— Washington Dept of Natural Resources (Alternate)

Kevin Ernst—Farmer (Primary)

Todd Olson—PacifiCorp (Primary)

Lance Beckman—Snowden Community Council (Primary)

Sherry Penney—Snowden Community Council (Alternate)

Kelly Kreps—Cattle Rancher (Primary)

Rich Potter—Hancock Forest Mgt (Primary)

Wayne Vinyard—Hancock Forest Management (Alternate)

Ben Kofoed—Recreation Industry (Primary)

Mark Zoller—Recreation Industry (Alternate)

Greg Morris—Yakama Nation (Primary)

Jeanette Burkhardt—Yakama Nation (Alternate)

Monte Pearson—Trout Lake Community Council and Dairy Farmer (Primary)

Sam Davis—Underwood Community Council (Primary)

Appendix C—White Salmon Watershed Management Committee, 2009

(source: Underwood Conservation District 2009—those contributing to the document)

WSWMC Members and Reviewers:

Mark Ahrens—Spring Creek National Fish Hatchery, USFWS (alternate)	Monte Pearson—dairy farmer & TLCC (primary)
Bill Anderson—Husum/BZ Community Council (primary)	Sherry Penney—Snowden Community Council (primary)
Pat Arnold—Friends of the White Salmon (Alternate)	Rich Potter—Hancock Forest Mgt. (primary)
Sue Baker—USFS Columbia River Gorge NSA (primary)	Linda Prendergast—Pacifcorp (alternate)
Lance Beckman—retired USFWS fishery biologist, local citizen	Mike Sandlin—co-chair, Orchards (primary)
Stephanie Caballero—USFS-Mt. Adams Ranger District (alternate)	Jason Spadero—SDS Lumber Co. (primary)
Bengt Coffin—USFS, Mt. Adams Ranger District (primary)	Steve Stampfli--co-Chair, small woodlot owner (primary)
Jon Cole—SDS Lumber Co. (alternate)	Wayne Vinyard—Hancock Forest Management (alternate)
Kevin Ernst—farmer (primary)	Bill Weiler—WDFW (primary)
Nikki Hollatz—Skamania Co. (primary)	Jim Wells—NWSA (primary)
Kelly Kreps—cattle rancher (primary)	Mark Zoller—Recreation (primar
Ed LaMotte—Friends of the White Salmon River (primary)	
Larry Marchant—Spring Creek National Fish Hatchery (primary)	
Bill Mason—Friends of the White Salmon (Alternate)	
Dave McClure—Klickitat County (primary)	
Greg Morris—Yakama Nation (primary)	
Blake Murphy—DNR (primary)	
Margaret Neuman—Mid-Columbia Fisheries Enhancement Group	

Appendix D: Informed Consent Letter

Informed Consent
**Decision-Making and Dam Removal for Ecosystem Restoration:
The Condit Dam Project**

I am exploring thinking and decision-making about dam removal for ecosystem restoration, using the removal of the Condit Dam as a case study. I will interview 15-20 individuals who have been involved in some way in policy and legislation, judicial rulings, environmental management, or stream restoration. I am completing this as partial fulfillment of the requirements for a master's from Kansas State University. Interviews will take 30 to 45 minutes.

Your participation is completely voluntary and you may refuse to answer any questions that you do not wish to answer. A recording device will be used to ensure accuracy if (and only if) you agree to its use.

Your responses during this interview will remain confidential to the extent that you desire. **If you wish to have absolutely no connection of your name to research report(s) that result from this study, sign on the left side below. If you grant permission for identification of your specific comments or viewpoints with your name/specific position, sign on the right side below.** If you wish to maintain confidentiality regarding only certain pieces of information or opinions that you share with me, please indicate this during the interview and I will make sure that this information is never publicly attributed specifically to you. You may specify the degree to which you are identified, and any specific quotes or viewpoints that may be attributed to you will be cross checked with you for accuracy and level of attribution before use.

We apologize for the formality of this form, but it has been developed to protect research participants and is expected by our review board. **Federal law mandates that all signed and dated informed consent forms be retained by the principle investigator (PI) for at least three years following completion of the study.** Study dates are mid-2012 to mid-2013.

TERMS OF PARTICIPATION: I understand this project is research, and that my participation is completely voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to participate in this study **without being specifically identified**, and that my signature acknowledges that I have received a signed and dated copy of this consent form.

Name: _____

Signature: _____

Date: _____

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to participate in this study **with the potential for identification**, and that my signature acknowledges that I have received a signed and dated copy of this consent form.

Name: _____

Signature: _____

Date: _____

[Laura Wallace – Signature and date]

Additional information on the reverse.

If you have any questions or concerns, would like to provide additional information, or would like to receive a summary of findings, please contact:

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