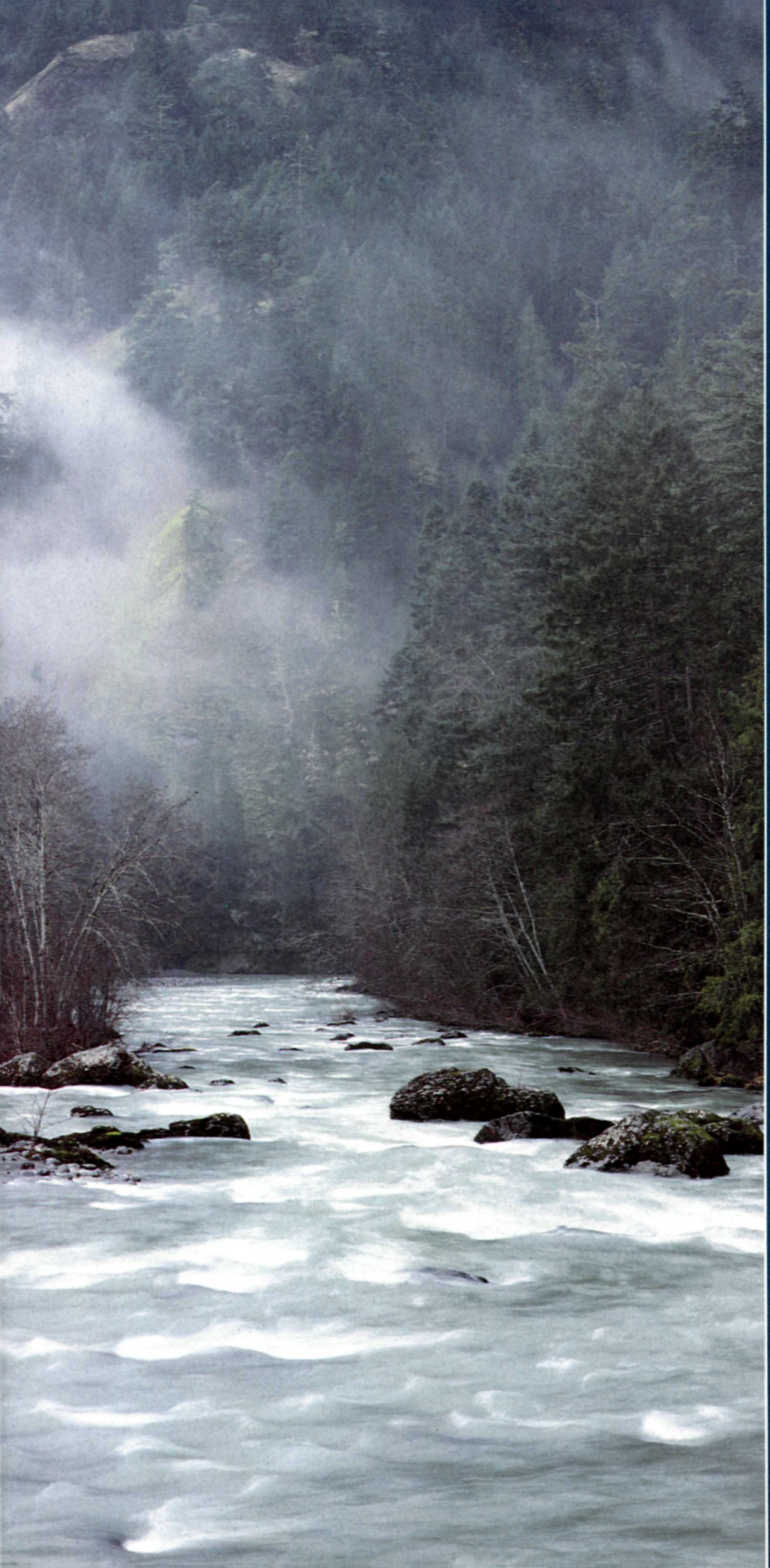


# *Elwha River*

## Ecosystem Restoration Implementation

**Final Environmental Impact Statement**
**November 1996**

*Olympic National Park*
*Washington*

*Cover Photo: The Elwha River (Pat O'Hara)*

Printed on Recycled Paper

# United States Department of the Interior
## NATIONAL PARK SERVICE

DENVER SERVICE CENTER
12795 W. Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287


IN REPLY REFER TO:

November 13, 1996

Dear Interested Party:

Enclosed you will find the final Elwha River Ecosystem Restoration Implementation environmental impact statement (final Implementation EIS). The draft Implementation EIS was released for public comment in April 1996, and the comment period ended June 27, 1996. Public meetings were held in Seattle and Port Angeles, Washington during May 1996.

This final Implementation EIS is in an abbreviated format and contains a series of errata sheets describing changes to the text of the draft Implementation EIS, an updated Consultation and Coordination chapter, the U.S. and Wildlife Service's Biological Opinion, copies of substantive comment letters received from all agencies and organizations, and responses to all substantive comments. A copy of the draft Implementation EIS is needed to use the errata sheets.

The National Park Service proposes to fully restore the Elwha River ecosystem and native anadromous fisheries by removing the Glines Canyon and Elwha dams, and manage the sediment stored behind them. The decision to do so was examined in a two-phased EIS. The first phase was a programmatic EIS that examined restoration options. The second examined specific methods to remove the dams and manage stored sediment. This FEIS represents the completion of the second phase.

A period of no action on the part of the Department of Interior/National Park Service will end 30 days after the U.S. Environmental Protection Agency has accepted the document and published a Notice of Availability in the Federal Register. Following this period, a Record of Decision to implement the proposed action will be signed. For further information, contact:

Dr. Brian Winter
Olympic National Park
600 East Park Avenue
Port Angeles, WA 98362
(360) 452-0302

*Final Environmental Impact Statement*

# *Elwha River Ecosystem Restoration Implementation*

**Purpose and Need**: The Elwha River ecosystem and native anadromous fisheries are severely degraded as a result of two hydroelectric dams (projects) and their reservoirs built in the early 1900s. Congress has mandated the full restoration of this ecosystem and its native anadromous fisheries through the Elwha River Ecosystem and Fisheries Restoration Act (Public Law 102-495). The Department of the Interior has found there is a need to return this river and the ecosystem to its natural, self-regulating state, and proposes to implement the Congressional mandate by removing both dams in a safe, environmentally sound and cost effective manner and implementing fisheries and ecosystem restoration planning. Only dam removal would fully restore the ecosystem or its native anadromous fisheries.

**Proposed Action**: The U.S. Department of the Interior proposes to fully restore the Elwha River ecosystem and native anadromous fisheries through the removal of Elwha Dam and Glines Canyon Dam and implementing fish restoration and revegetation. Dam removal would occur over a 2-year period. Elwha Dam would be removed by blasting, and Glines Canyon Dam by a combination of blasting and diamond wire saw cutting. Lake Aldwell would be drained by a diversion channel, and Lake Mills by notching down Glines Canyon Dam. Stored sediment would be eroded naturally by the Elwha River. The proposed action is located in Clallam County, on the Olympic Peninsula, in Washington State.

**Lead/Cooperating agencies**: The National Park Service is the lead agency. The U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, U.S. Bureau of Indian Affairs, U.S. Army Corps of Engineers, and the Lower Elwha Klallam Tribe are cooperating agencies/governments on this EIS.

**Type of statement**: This is a final environmental impact statement (EIS). Because public and agency comments did not substantially modify any of the alternatives or the environmental analysis in the draft EIS, the full text of the draft has not been reprinted. Rather, the attached material includes a summary of responses to comments, factual corrections and text changes in the form of errata sheets, and copies of letters received from agencies and organizations. Substantive comments from all written and oral comments on the draft EIS were summarized and responded to in the attached Responses to Comment section. The complete final EIS includes the draft EIS and the material attached to this abstract. This final EIS is tiered, or procedurally connected, to Interior's June 1995 final *Elwha River Ecosystem Restoration EIS*, which determined dam removal was required to fully restore the Elwha River ecosystem and anadromous fisheries.

**Abstract**: In addition to the proposed action, two other alternatives are examined. They are: removing fine-grained sediment prior to dam removal by using suction dredges, and sending the slurry to the Strait of Juan de Fuca in a pipeline, and No Action (i.e., dams are retained as is, without fish passage measures). The Proposed Action is also the Department of the Interior's "preferred alternative." Short-term adverse impacts from removing both dams would result from the release of sediment now trapped in the reservoirs. The finer grained particles would temporarily but significantly impact fish or other aquatic organisms. Impacts on water quality, river morphology, flooding, native anadromous and resident (i.e., trout and char) fisheries, living marine resources, wildlife, threatened and endangered species, vegetation, cultural resources, land use, recreation, aesthetic resources, and socioeconomics are also examined in this environmental impact statement. Both of the other alternatives would also have significant impacts on resources examined in this document.

**Public Involvement**: Oral comments were taken on the draft EIS in Washington State in three public workshops on May 21-22, 1996. Written comments were taken for a 60-day period which ended June 27, 1996. Substantive comments were responded to in a question/answer format, and by making appropriate text changes to the draft. Those text changes are attached as errata sheets, and should be used in conjunction with Interior's April 1996 draft *Elwha River Ecosystem Restoration Implementation EIS*. To obtain a draft or the location of the nearest agency or library which has a copy of the draft, contact Olympic National Park at (360) 452-4501 x264. Copies will be sent to those who request them until the current supply is exhausted. All who received a draft EIS in the initial April 1996 mailing will also receive the attached material.

# *Guide to Using This Document*

The attached document includes the following:

- A series of "errata sheets" or changes to the text of Interior's draft *Elwha River Ecosystem Restoration Implementation environmental impact statement (Implementation EIS)*
- Responses to Comments received on the *Implementation EIS*, indexed by subject and by author
- A new and revised Consultation and Coordination chapter
- A new appendix (appendix 7), the US Fish and Wildlife Service's Biological Opinion, and
- Copies of substantive comment letters received on the draft *Implementation EIS* from all agencies and organizations

The combination of these materials and Interior's draft Implementation EIS serves as an "abbreviated" final EIS. The reasoning behind an abbreviated EIS, and the contents of errata sheets and the Responses to Comments section is explained in further detail below.

The regulations which determine how the National Environmental Policy Act (NEPA) will be carried out include an option for responding to public comments on a draft environmental impact statement (EIS) when few changes result from those comments. The relevant section of these regulations (CFR 1503.4) states that if changes in response to public comments are minor and confined to factual corrections or explanations of why comments do not warrant further agency response, they may be written on errata sheets and attached to the draft EIS, instead of rewriting, printing and mailing the entire revised draft. The National Park Service (NPS) has opted to follow this "abbreviated" EIS procedure for the *Elwha River Ecosystem Restoration Implementation EIS (Implementation EIS).*

NPS received 374 letters on the draft *Implementation EIS*. The number of separate comments in these letters and those taken at three workshops May 21-22, 1996 totaled nearly 500. Many of these comments were very similar or identical to those received on Interior's programmatic EIS on how best to restore the Elwha River ecosystem and native anadromous fisheries. This document, *Elwha River Ecosystem Restoration EIS*, was finalized in June 1995 (copies are available from Olympic National Park).

Although NPS received a large number of comments, few resulted in even minor factual corrections to the draft *Implementation EIS*. When they did, or when the EIS team elaborated and explained material which may have been unclear in the draft, text changes in the form of errata sheets were made. These sheets must be used in conjunction with the draft EIS. Copies of the *Implementation EIS* are available by calling Olympic National Park at (360) 452-4501 x264 or by going to regional libraries that are listed in the Consultation and Coordination section of this document.

In addition to the text changes, specialists from the EIS team responded directly to each substantive comment received. The NEPA regulations described above also allow agencies to summarize public comments and respond to those summaries when appropriate. In an effort to reduce paperwork, streamline the planning process and reduce printing costs, all substantive comments have been summarized and combined where there is overlap in this final *Implementation EIS*. The responses to these combined and summarized comments are contained in the attached Responses to Comments section. This section includes indices to help each commentor locate the response to his or her particular comment.

Finally, NPS has included copies of substantive comment letters received from all agencies and organizations (e.g., special interest groups, businesses, and academic institutions).

# Contents

## *Tables*



## *Figures*

# *Corrections and Revisions*

# *Corrections and Revisions to the Draft Environmental Impact Statement*

The errata sheets are organized with the same headings as the draft EIS. If there are no changes to a section, the headings are not repeated. Corrections to the text are noted by page number, paragraph, and sentence. A partial paragraph at the top of a page is counted as paragraph 1. Sentences within a partial paragraph are numbered from the first complete sentence at the top of the page. Material that has been deleted is shown by a ~~strikeout~~ and added text is underlined. The phrase "change to read" means that text has been added or deleted. The word "replace"indicates new phrasing for a sentence or paragraph. "Add the following text" is used where text has been added to clarify a passage. Typographical, spelling, and punctuation errors are not changed unless it is necessary to make the passage more understandable.

# *Summary*

## *Introduction*

**Page 1, paragraph 1, sentences 1 & 2 - change to read:**
This document is a ~~draft~~ final environmental impact statement (~~DEIS~~ FEIS) prepared to analyze environmental impacts of alternative ways to remove two hydroelectric projects on the Elwha River and manage sediment stored behind them. This ~~DEIS~~ FEIS is the second of two, which in combination study...

## *Purpose and Need*

**Page 3, paragraph 2, last sentence - change to read:**
The single action of removing both dams would restore ~~to pre-dam, high quality condition the vast majority of habitat formerly available to Elwha anadromous fish~~. access to this 70+ miles of high quality habitat formerly available to Elwha anadromous fish.

## *Alternatives*

**Page 7, paragraph 1, sentence 1 - change to read:**
...experiencing supply problems, as the river is ~~meandering~~ migrating away from its current Ranney collector.

**Page 7, paragraph 1, sentences 3 & 4 - change to read:**
...a filter would be installed. Dry Creek Water Association ~~could either~~ would connect to the ~~city of Port Angeles~~ proposed new Ranney system ~~(collector and temporary filter plant)~~ as a replacement for the existing well field ~~or to a separate treatment facility built to chlorinate and filter its supply.~~ A package disinfection system would be provided to replace the existing wellhead chlorination system.

**Page 7, paragraph 2, sentence 1 - change to read:**
Additional mitigation measures not specifically required by the Elwha Restoration Act, but analyzed by this ~~DEIS~~ FEIS and recommended for adoption, would protect...

**Page 7, paragraph 7 (continued to page 8), sentence 2 - change to read:**
Under the No Action alternative, ~~no costs associated with construction would be incurred unless the dams require Federal Energy Regulatory Commission licensing, in which case those costs as identified in the~~

~~programmatic EIS (DOI et al. 1995) to install fish passage measures and other upgrades would apply.~~ conditions would remain as they are now — i.e., no fish passage measures would be installed on the dams. Therefore this EIS assumes that no costs associated with construction would be incurred. The Department of the Interior does not consider No Action to be a viable option. It is analyzed in the EIS for comparison purposes and because it is required by the National Environmental Policy Act (NEPA).

**Page 8, table 1 - replace with the following corrected table:**

***Table 1.*** *Summary of Costs for Each Action Alternative (in thousands of dollars)*

| ACTION | RIVER EROSION | DREDGE AND SLURRY |
|---|---|---|
| Project/land acquisition | 29,800[a] | 29,800[a] |
| Dam removal[b] | ~~33,567~~ 32,018 | ~~32,951~~ 32,098 |
| Road rehabilitation | 528 | 528 |
| Sediment management [bc] | | ~~22,496~~ 22,396 |
| Water quality mitigation | ~~29,770~~ 32,055 | ~~23,987~~ 26,899 |
| Revegetation/wildlife | 3,205 | 3,205 |
| Flooding mitigation | 3,998 | 3,998 |
| Hazardous and solid waste disposal | ~~587~~ 1,587 | ~~587~~ 1,587 |
| Fish restoration[cd] | ~~7,380~~ 7,080 | ~~7,380~~ 7,080 |
| Cultural resources mitigation | 665 | 665 |
| Monitoring/modeling | 2,144 | 1,844 |
| ~~Total~~TOTAL | ~~111,115~~ 113,080 | ~~127,441~~ 130,100 |

a Includes other lands and rights costs.

b Includes data collection, decommissioning, construction management, O & M, and transmission line removal.

~~b~~c Includes cost of slurry pipeline and dredging, all other sediment management costs for both included in monitoring/modeling.

~~c~~d Includes hatchery expansion, operation and maintenance.

**Page 8, paragraph 1, sentence 1 - change to read:**
Some protection from flooding and water quality treatment is in place now and so is included in the analysis of No Action.

# *Summary of Impacts*

## *Fluvial Processes and Sediment Transport*

**Page 8, paragraph 3, sentence 1 - change to read:**
Under the proposed action (the River Erosion alternative), between ~~4.8~~ 4.9 and 5.6 million cubic yards of fine-grained sediment (silts and clays) and between 1.2 and ~~2.6~~ 2.7 million cubic yard of coarse grained sediment...

**Page 9, paragraph 1, sentence 3 - change to read:**
Instead of the ~~4.8~~ 4.9 to 5.6 million cubic yards of fine-grained sediment...

**Page 9, paragraph 2, sentences 1 - 4 - change to read:**
Sand and gravel which formed the riverbed before the dams were built has eroded out to sea, ~~resulting in a lowered or degraded river channel~~ leaving an armor layer of cobbles and boulders along the bed of the river channel below the dams. ~~This section of river channel is also "armored" with larger rocks (cobbles and boulders) and so moves at high river flows~~. The loss of riverbed material has severely degraded anadromous fish habitat, allowed vegetation to become firmly established on gravel islands and floodplains, and has reduced natural river ~~meandering~~ migrating and most likely has lowered flood stage in some places. This in turn has curtailed the formation of slower moving side channels, periodic wetlands ~~or~~ and riparian areas.

**Page 9, paragraph 3, sentences 1 & 2 - change to read:**
...to the river downstream and restore the river's natural ~~river meandering~~ migration and flood stage. In some places along the river, ~~R~~reestablishing the natural sediment load to the river would cause ~~the river~~ the riverbed to aggrade and the water surface elevation to rise. ~~In some places.~~

**Page 9, paragraph 4, sentence 2 (continued on page 10) - change to read:**
Modeling indicates aggradation ~~would likely increase over time and~~ would increase the 100-year frequency water surface elevations by as much as 1 to ~~4~~ 5 feet in some ~~spots~~ places on the river, but would average 2 feet.

**Page 10, paragraph 2 - change to read:**
Other mitigating measures are not required by a specific law but are recommended to ~~protect~~maintain protection for downstream residents and structures.

**Page 10, paragraph 4, sentence 1 - change to read:**
The dam removal process would also greatly increase turbidity (from a maximum of about 800 nephelometric turbidity units (NTU's) now to as much as 25,000 NTUs) for short periods of time (a few days), suspended sediment and possibly dissolved manganese and iron stored in reservoir sediments for the ~~one to~~ two-year period during dam removal.

## *Groundwater*

**Page 11, paragraph 2, sentence 2 - change to read:**
Infiltration of fine sediments into riverbed substrate or through well screens ~~would~~ could increase turbidity and/or decrease yield from the aquifer for some well users.

**Page 11, paragraph 2, sentences 4 & 5 - change to read:**
Riverbed aggradation would increase river stage in some places, and wells might be overtopped and contaminated. Mitigation measures for Port Angeles~~,~~ and Dry Creek Water Association, ~~and the Lower Elwha Tribal Fish Hatchery~~ are mandatory and would effectively eliminate impacts of dam removal to these users. Even though not mandated by the Elwha Act, groundwater impacts to the Lower Elwha Tribal Fish Hatchery would also be mitigated, as a functional hatchery during removal is required to restore anadromous fisheries.

**Page 11, paragraph 3, sentences 2 & 3 - change to read:**
The Dry Creek Water Association (DCWA) ~~could~~ would ~~either~~ be connected to the proposed new Ranney well ~~supply,~~ and temporary filtration plant to ~~or require a separate filtration and chlorination facility. Either would~~ protect DCWA users from the adverse impacts of dam removal.

**Page 11, paragraph 4, sentence 2 - change to read:**
Mitigation measures to protect each are analyzed in this ~~DEIS~~ FEIS and recommended for adoption.

**Page 11, paragraph 5 - change to read:**
Several residents of the Lower Elwha Klallam Reservation and perhaps individual property owners who live along the lower river would experience higher groundwater levels, rendering their septic systems unusable following dam removal. ~~A~~ Mounded septic systems with lift stations would resolve this impact. Non-structural solutions to resolve flooding and/or water quality problems might also ~~exist~~ be possible.

## *Species of Special Concern*

**Page 15, paragraph 3 - change to read:**
Dam removal would adversely affect some species in the short term, ~~primarily through construction noise~~ by increasing turbidity in foraging waters, and possibly from increased noise associated with construction, as ~~M~~murrelets and spotted owls may avoid the area if noise gets too loud. ~~Surveys to date have shown no murrelet nests close to the damsites, but two consecutive years of data collection are required to fulfill US Fish and Wildlife Service procedures. If 1996~~ Ssurveys conducted in 1990, 1995 and 1996 confirmed that there are no nests of either species near the sites, ~~mitigation including noise reduction or changes in the sequences and timing of construction activities would be developed.~~ and so required conservation measures (mitigation) have been limited to impacts the murrelets would experience from higher turbidities in nearshore marine waters, where the birds forage. Spotted owl surveys to date have not found nests near either dam, with the closest being nearly one mile from Glines Canyon Dam. As a result, adverse effects on northern spotted owls are not expected, although standard noise reduction techniques during dam removal may be employed to ensure murrelets and owls access to the river corridor and forest surrounding the dam sites.

**Page 16, paragraph 3, sentence 2 - change to read:**
...about 25.2 tons over the ~~18-month to~~ 2 year dam removal time period.

**Page 16, paragraph 5, sentence 1 - change to read:**
There are no homes or nest sites of wildlife of special concern closer than 0.3 miles to either damsite.

**Page 16, paragraph 5, sentence 4 - change to read:**
Nests of species of ~~special concern (marbled murrelets and/or~~ Northern spotted owls~~)~~ (a species of special concern) have been located 1 mile from Glines Canyon Dam, and 1.2 miles from Elwha Dam.

**Page 16, paragraph 6, sentence 1 - change to read:**
Continuous noise levels from construction equipment could have short-term (~~18 months to~~ 2 years) minor adverse impacts...

## *Cultural Resources*

**Page 17, paragraph 7, sentence 1 - change to read:**
Removing the dams could adversely affect some historic sites, because the river is expected to both ~~meander~~ migrate and experience an increase in flood stage in some places over what it does now. With mitigation, these impacts would be reduced to minor.

**Page 18, paragraph 2, sentence 1 - change to read:**
The agencies cooperating in the production of this ~~DEIS~~ FEIS,...

## *Socioeconomics*

**Page 18, paragraph 6, sentence 1 - change to read:**
The proposed action is estimated to cost ~~$111.1~~ $113.1 million, and the Dredge and Slurry Alternative, ~~$124.4~~ $130.1 million,

## *Recreation*

**Page 20, paragraph 5, last sentence - change to read:**
Restrictions on sport fishing during dam removal and restoration of native anadromous salmon and trout may adversely affect ~~both marine and~~ in-river recreational fishers for up to a decade or more in some cases.

## *Aesthetics*

**Page 22, paragraph 1, last sentence - change to read:**
~~If shorelines and other upland areas....~~ The side slopes and terraces of the former reservoirs would be dominated by red alder, and in the climax successional stage, by Douglas fir and/or Western hemlock.

# *Purpose and Need*
## *Introduction*

**Page 25, Figure 3 - replace with the following corrected figure:**

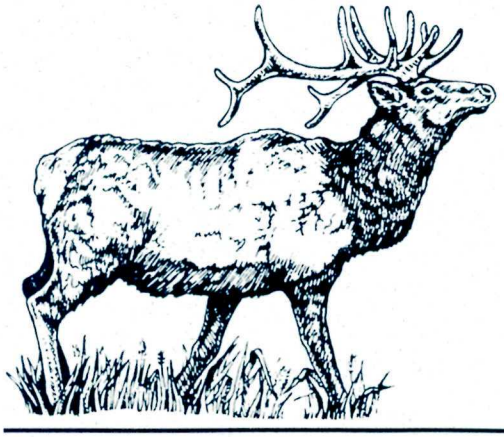
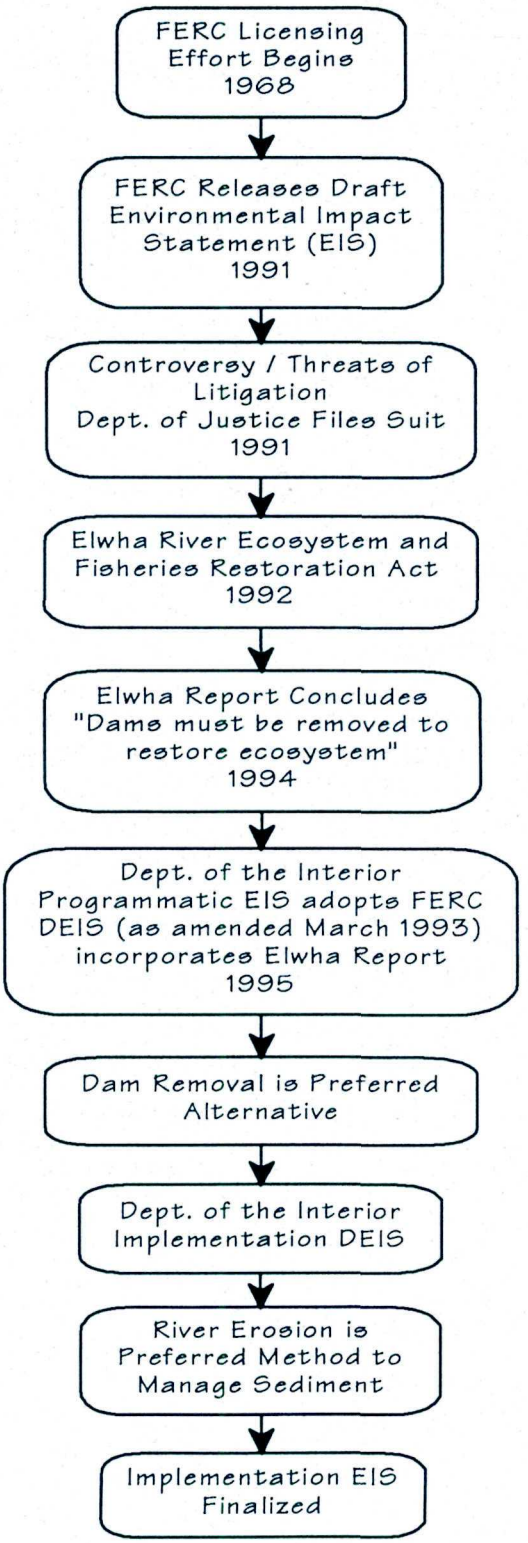


***Figure 3.*** *Sequence of Documents and Events Leading to this Environmental Impact Statement*



**Page 26, paragraph 2, after last sentence - add the following:**
The draft implementation EIS was reviewed by the public for 60 days. Comments and questions were submitted in writing during this period (April 26 - June 27, 1996), as well as at three public workshops held during May 21 - 22, 1996. The responses to these questions and comments, accompanying changes to the text (errata sheets), and copies of letters received from local, state and federal agencies, businesses, and special interest groups constitute the final version of the Implementation EIS.

# *Purpose and Need for Action*

**Page 29, paragraph 3, last sentence - change to read:**
Now, well vegetated islands, low aquatic productivity, and ~~a degraded~~ an armored, channelized river are the norm below the dams.

**Page 29, paragraph 4 - change to read:**
Beyond their impact to the river ecology and anadromous fisheries, the dams have altered the river's estuary and nearshore marine environment, contributing to the erosion and steepening of the beaches to the east, eliminating habitat for wildlife -- several ~~of them~~ species of which are now ~~species~~ of special concern...

# *Relationship to Other Planning Documents*

**Page 31, paragraph 3, sentence 1 - change to read:**
This document is the final version of that second, *Implementation EIS.*

# *Issues and Concerns*

**Page 31, paragraph 4, last sentence - change to read:**
This list was supplemented with public input from two scoping sessions held in the fall of 1994, and with written comments collected from agencies and the general public during the 60-day review periods for the programmatic EIS and draft of the *Implementation EIS.*

**Page 32 - 37, table 3 - replace with the following corrected table:**

***Table 3.*** *Substantive Issues and Concerns Analyzed in this EIS*

| Resource of Concern | Substantive Issues | Impact Topics Requiring Detailed Analysis |
|---|---|---|
| **Sediment** | About 17.7 million cubic yards of clay, silt, sand, gravel, and cobbles have accumulated behind the dams, and much ~~(less than half)~~ of it would be released as a result of dam removal | Impacts to reservoir area through time<br><br>Impacts to river morphology in downstream channel, delta area and beaches |
| | There would be the potential for increases in flooding from riverbed aggradation <u>in some places</u> after dams are removed | Impact on and measures to protect downstream land uses and structures including homes, cultural resources, wells, and existing levees |
| **Surface Water** | Releasing stored sediment would result in increases in turbidity, manganese and/or iron into surface water during dam removal, and increased spikes in turbidity after the dams are removed | Impact ~~of~~ <u>on</u> river water quality<br><br>Impact on and measures to protect Port Angeles industrial users (Daishowa and Rayonier mills) and state <u>fish</u> rearing facility<br><br>Impact on and measures to protect Tribal fish hatchery |
| **Groundwater** | During dam removal fine sediment may infiltrate aquifers, increase turbidity and decrease yield<br><br>Increased dissolved manganese and/or iron may change water quality<br><br>Increased flood stage may change well water quality and quantity | Impacts to and measures to protect from increased turbidity: Port Angeles water supply and Dry Creek Water Association wells; Lower Elwha Klallam Tribal Fish Hatchery; other users<br><br>Impacts to and measures to protect from <u>potential</u> increases in manganese and iron: Port Angeles, Dry Creek Water Association, ~~and~~ Elwha Place Homeowners' Association<u>, and other well users</u> |
| | Change in groundwater levels may change downstream septic systems<br><br>Increases in bedload may change well yields, either through wider meanders away from collection systems, or by burying existing riverbed collection systems | Impacts to and measures to protect from changes of water table levels to Lower Elwha valley users<br><br>Impacts to and measures to protect from increased flood potential: Elwha Place Homeowners' Association and wells in the floodplain |

| Resource of Concern | Substantive Issues | Impact Topics Requiring Detailed Analysis |
|---|---|---|
| **Native Anadromous and Resident Fisheries** | The restoration potential, and time to restore each stock after dam removal varies, and depends on stock availability, fishing pressure and habitat<br><br>Fish habitat would change in the long term following dam removal<br><br>Reintroduction of salmon would increase competition with resident trout<br><br>Release of fine sediment during dam removal would kill fish exposed to it, coat and kill eggs and potentially cause in-migrating adults to avoid entering the river | Assessment of stock availability, habitat and fishing pressure on chinook (summer/fall and spring), coho, steelhead (summer and winter), pink, chum, sockeye, steelhead, sea-run cutthroat trout, and native char<br><br>Long-term impacts from dam removal to habitat downstream of dams; restoration of inundated areas to riverine habitat; impacts to resident species<br><br>Short-term impacts to and protection from turbidity for above stocks |
| **Vegetation** | Areas occupied by the reservoirs or dams would revegetate following removal<br><br>Some small changes in existing vegetation would occur during or following removal | General acreages of vegetation types which would return following dam removal; specific impacts to riparian and upland communities and wetlands; revegetation plans<br><br>Wetlands associated with reservoir shorelines; upland vegetation removed to facilitate dam removal, waste disposal |
| **Wildlife** | Revegetated areas would provide wildlife habitat; restored salmon would be a source of prey and nutrients for wildlife<br><br>Loss of reservoir habitat would adversely affect trumpeter swans and ducks which use it | Impacts on terrestrial ecosystem; wildlife overall; elk and other large mammals; trumpeter swans, lesser scaup and diving ducks; fish eating mammals, raptors, and other birds; amphibians |

| Resource of Concern | Substantive Issues | Impact Topics Requiring Detailed Analysis |
|---|---|---|
| **Species of Special Concern** | Site-specific effects from dam removal (noise, dust, human activity)<br><br>Change in existing habitat and long-term restoration of riverine, riparian, wetland and upland habitat | Impact on four federally listed threatened species, and one endangered species (listed respectively):<br><br>-bald eagle<br>-northern spotted owl<br>-marbled murrelet<br>-Stellar sea lion<br>-peregrine falcon (endangered)<br><br>Impact on ~~six~~ species that are candidates for federal listing~~, and five species that are candidates~~ for state listing or "of concern" to the USFWS (listed respectively):<br><br>-Bull trout<br><br>-Pileated woodpecker<br>-Common loon<br>-Van Dyke's salamander<br>-Vaux's swift<br>-Golden eagle<br><br>-Pacific fisher<br>-Harlequin duck<br>-Northern goshawk<br>-Cascades frog<br>-Northern red-legged frog<br><br>Impact on six sensitive plant species |
| **Living Marine Resources** | High turbidities at the river mouth during removal would kill or harm some marine life in the short-term<br><br>Replacement of rocky nearshore marine substrate with a mixture of substrates would change the species make-up over time<br><br>Restored sediment transport would restore the size and complexity of the Elwha delta and estuary over the long term | Impact on nearshore marine community (including direct and indirect effects on macroalgae (kelp) and indirect effects on rockfish, greenling, red rock crab, chitons, clam species and cragon shrimp)<br><br>Long-term impacts to species dependent on sandy or mixed substrate (Dungeness crab, littleneck, butter, horse and geoduck clams, sand lance, surf smelt, eelgrass, and species of green algae)<br><br>Impacts to delta and estuary |
| **Air Quality** | Construction dust would increase over background during dam removal | Impacts to air quality in and around the damsites during their removal from increases in $PM_{10}$ and TSP<br><br>Impacts to local residents from dust and construction activity |

| Resource of Concern | Substantive Issues | Impact Topics Requiring Detailed Analysis |
|---|---|---|
| **Ambient Noise Level** | Ambient noise levels would increase during construction, and may be heard by residents or wildlife | Impacts on local residents and park visitors from increased continuous noise levels (dBA) as dams are removed<br><br>Impacts to above from acute instances of loud noise (such as blasting)<br><br>Impacts of and protection from noise on species of special concern (marbled murrelets and Northern spotted owls) |
| **Cultural Resources** | Removal of the hydroelectric projects means the loss of two historic resources<br><br>Cultural resources in or near the floodplain may experience increased flooding or erosion from aggradation and increased surface water elevation during and following dam removal<br><br>Construction activities, road grading, trenching to bury the slurry pipeline and offsite disposal of dam rubble could damage known or unknown cultural resources<br><br>Draining the reservoirs and removing the dams may uncover cultural resources now inaccessible to members of the Lower Elwha Klallam Tribe | Construction-related impacts and mitigation of these impacts to the hydroelectric projects; to cultural resources now inundated or buried by the projects, including the tribe's cleansing site, prophecy hole, and creation site; to cultural resources potentially affected by waste disposal or road grading<br><br>Impacts from increased flooding or erosion and mitigation of these impacts to resources in the floodplain (Elwha Ranger Station Historic District, Elwha River bridge, CCC community kitchens in Altaire and Elwha campgrounds; archeological sites, cultural landscapes, or culturally sensitive areas) |
| **Socioeconomics** | Changes in existing local and regional ~~socioeconomic characteristics, such as employment sectors, may~~ employment and income would result from dam and reservoir removal<br><br>Daishowa Mill would need a replacement source of power and the mill's power costs ~~may~~ would change as a result<br><br>Restoring fisheries in the Elwha River would increase commercial income from salmon fishing for tribal and non-tribal fishers<br><br>Supplying workers for a 10-year period of preparation, construction and restoration may change the demand for local housing and public services | Impacts to county economic tax base; increases in jobs, payroll and business activity during the construction period; long-term impacts to Clallam County businesses from recreation and tourism dollars<br><br>Impacts to real cost of providing replacement power to Daishowa Mill; impacts to municipal power users<br><br>Impacts to public infrasturcture/housing<br><br>Impacts on annual net business benefits from dam removal and fishery restoration<br><br>Impacts on tribal social and economic conditions<br><br>Impacts to social values<br><br>Impacts on nonmarket benefits from dam removal and fishery restoration |

| Resource of Concern | Substantive Issues | Impact Topics Requiring Detailed Analysis |
|---|---|---|
| **Public Health and Safety** | The dams may present a safety risk to downstream residents due to earthquakes<br><br>If removed improperly, the dams may present a safety risk to workers, visitors, residents and others using the river corridor. A failure of the fill under Elwha Dam due to hydrostatic pressure of the reservoir is of particular concern<br><br>Some hazardous wastes exist at the damsites, and may pose risk to health and safety of workers and the general public | Risk and impacts posed to downstream residents by dam failure during shallow, deep and megathrust earthquakes<br><br>Risk of failure during probable maximum flood or maximum credible earthquake given safety and strengthening measures already taken<br><br>Impacts on and measures to protect workers, visitors, and others using the river corridor from sudden increases in water levels as dams are removed<br><br>Impacts on and measures to protect workers and the general public from exposure to hazardous wastes found in dam-related structures as they are removed |
| **Transportation** | Removing dam rubble, and transporting personnel, equipment and supplies in and out of the damsites would increase traffic volume and congestion at intersections | Impacts on local road conditions from heavy equipment during dam removal<br><br>Impacts on level of service at key intersections and road corridors from increased traffic volumes during dam removal |
| **Indian Trust Resources** | The dams adversely affect the federal government's responsibility to protect tribal resources | Impacts of dam removal and fisheries restoration and restoration of shellfish as a tribal resource by estuary expansion and return of sandy nearshore substrate<br><br>Impacts of restoring wildlife habitat for game<br><br>Elimination of dams as a potential safety hazard |
| **Recreation** | In the long term, water-related uses of the Elwha River valley would change from reservoir and river, to those associated with the river<br><br>Fishing would be restricted in short term, but would increase in the long term as salmon and steelhead return<br><br>Recreationists using the Elwha Sub-district of the park would need to find alternative locations during dam construction, because the sites would be closed to visitors. | Impacts on recreation facilities, including the reservoirs<br><br>Impacts on recreational fishing, including flat water, residential trout and sport fishing for salmon and steelhead<br><br>Impacts on other recreational activities, including white-water boating; recreational fishing; camping; hiking; recreational facilities and wildlife observation |

| Resource of Concern | Substantive Issues | Impact Topics Requiring Detailed Analysis |
|---|---|---|
| **Land Use** | The hydroelectric facilities conflict with numerous agency plans, and do not conform with neighboring land use<br><br>Olympic National Park would acquire and manage lands now occupied by Lake Mills and Glines Canyon Dam facilities<br><br>Future land managers of the Lake Aldwell lands may use or develop the lands. This use or development would affect vegetation, wildlife, air quality, cultural resources, recreation, traffic flow, aesthetics, water quality and/or fisheries<br><br>Rubble and other waste from dam removal would restrict future use of land | Impacts to Olympic National Park from management of acquired Glines Canyon lands<br><br>Impacts from future management of Lake Aldwell lands on land ownership, use and resources if Olympic National Park, US Fish and Wildlife Service, Washington State or the Lower Elwha Klallam Tribe acquires<br><br>Impacts from waste disposal |
| **Aesthetic Resources** | The appearance of uncovered reservoir land in the short-term is of concern<br><br>Long-term management of the restored landscape is important to visitors, recreationists, land managers, etc. | Impacts on project area landscape from removal of dams and related structures and restoration of the river corridor<br><br>Impacts on management of aesthetic resources after dams and reservoirs are removed |

# *Planning Goals and Objectives*

**Page 40, paragraph 2, after sentence 2 - add the following:**
...remain primary goals. By this, Interior does not expect to replicate exact natural conditions or resources that existed over 70 years ago, but would restore the natural, physical, and biological processes that defined the ecosystem before the dams were built.

# *Alternatives*
## *No Action Alternative*
### *Fisheries Recovery*

**Page 43, paragraph 4, sentence 1 - change to read:**
Given the assumptions of this alternative, no or only minor, unrelated fish recovery efforts would be conducted, although hatchery operations for chinook, coho and steelhead would continue.

### *Costs*

**Page 48, paragraph 4, sentences 1 - 3 - change to read:**
Costs to operate both dams ~~average between $6 and $10 per megawatt hour or $1 to $1.5 million per year (FERC 1993 p. 2-37).~~ if no further action were taken would be $2.1 million (Meyer, et. al. 1995) annually. ~~For this cost, the mill receives~~ The two dams produce approximately 38% of ~~its~~ the mill's annual energy requirements. Required repairs at the two dams would cost an estimated ~~$8.7~~ $9.0 million in the near future ~~(FERC 1993 p. 2-19).~~

# *Proposed Action—River Erosion Alternative*

**Pages 50-52, table 5 - replace with the following corrected table:**

***Table 5.*** *Summary of Mitigation Measures for River Erosion and Dredge and Slurry Alternatives*

| TOPIC | PART OF ACTION ALTERNATIVES | RECOMMENDED MITIGATION |
|---|---|---|
| **Fluvial Processes and Sediment Transport** | | |
| Long-term sediment monitoring (cross-sections, air photos, stream gauging) | X | |
| **Flooding** | | |
| Raise and strengthen federal levee to maintain existing 200-year flood protection | X | |
| Adjust rate of Glines Canyon Dam removal to control release rate of coarse sediment | X | ~~X~~ |
| Raise individual houses to provide existing level of protection | | X |
| Raise and reinforce non-federal west side levee to provide existing level of protection | | X |
| **Water Quality** | | |
| Dredge and slurry some of silt and clay sized materials from reservoir areas* | X | |
| Construct infiltration gallery / diversion modifications, open channel, pre-treatment for industrial users | X | |
| Construct new Ranney collector, flood proofed for new 100-year flood level, temporary iron treatment / filtration for municipal water use | X | |
| Replace hatchery infiltration gallery, drill and floodproof supplemental wells for Lower Elwha Klallam Reservation | X | |
| Construct mounded septic system with lift stations for Lower Elwha Klallam Reservation and other affected residents | | X |
| Connect ~~to Ranney system or build new treatment system and wells for~~ Dry Creek Water Association to Ranney system and provide a temporary disinfection system | X | |
| Modify wellheads, flood-proof pump house, install temporary in-line water treatment system for Elwha Place Homeowners' Association | | X |
| Raise and modify wellheads up to 100-year floodplain, install temporary in-line filters, construct temporary storage tanks, provide bottled water, deepen existing wells, drill new wells, provide contingency fund for private well users not yet identified | | X |
| Close WDFW fish rearing channel during dam removal | X | |
| Provide long-term wellhead protection at WDFW fish rearing channel | | X |

| TOPIC | PART OF ACTION ALTERNATIVES | RECOMMENDED MITIGATION |
|---|---|---|
| **Fisheries** | | |
| Gradual/intermittent release of water and sediment from reservoir | | X |
| Dredge and slurry some of silt and clay sized materials from reservoir areas* | X | |
| Prior to dam removal, outplant eggs or fry in upper river | X | |
| Shut down dam removal activities to ensure minimum riverflows | X | |
| Stop construction during high flows to protect fish (November and May to June) | X | |
| Develop broodstocks, outplant juveniles, and evaluate adult return during and after dam removal | X | |
| Expand Lower Elwha Klallam Tribal Fish Hatchery; dredge outlet, create new bypass | X | |
| Restrict fishing during restoration | X | |
| **Vegetation** | | |
| Collect native plant materials from the Elwha Valley, seed both reservoirs with native grasses and forbs, plant trees of different ages and eradicate non-native vegetation. | X | |
| Literature search, controlled planting, on-site cultivation, and biotechnical slope stabilization | | X |
| **Wildlife** | | |
| Trumpeter Swan mitigation | | X |
| **Species of Special Concern** | | |
| ~~Noise reduction measures or changes in sequencing and timing of construction activities~~ | ~~X~~ | |
| Stop construction during critical marine feeding periods for marbled murrelet (November and May to June) | X | |
| **Air Quality and Noise** | | |
| Periodic spraying of roads with water | X | |
| **Cultural Resources** | | |
| HABS/HAER documentation of dams | X | |
| Leave parts of Glines Canyon Dam in-place (thrust block, powerhouse, spillway, penstock, and gatehouse) | X | |
| Documentation of affected resource(s), monitor, survey, stabilize riverbank, data recovery, and avoidance | X | |

| Topic | Part of Action Alternatives | Recommended Mitigation |
|---|---|---|
| **Public Health and Safety** | | |
| Cofferdams, progressive reservoir lowering and other measures to prevent foundation washout under Elwha Dam | X | |
| Stop construction during high flows to protect dam workers (November and May to June) | X | |
| Remove transformers, asbestos, and chemicals from damsites (hazardous materials) | X | |
| **Traffic** | | |
| Flaggers at congested intersections if needed | X | |
| **Recreation** | | |
| Close watershed access | X | |
| Provide shuttle service for park visitors to Elwha subdistrict during dam removal | | X |
| ~~Restrict fishing during restoration~~ | ~~X~~ | |
| Provide interpretive facilities | | X |
| Educate users on nearby similar opportunities | | X |
| **Land Use** | | |
| Leave bottom lands and lands along river corridor undeveloped | X | |

* Dredge and Slurry alternative only

## *Dam Removal*

**Page 54, paragraph 4, last sentence - change to read:**
Improvements required to use ~~Olympic Hot Springs~~ Lower Dam Road to carry...

**Page 57, paragraph 5, sentence 1 - change to read:**
To complement fisheries restoration, important marbled murrelet foraging periods in nearshore marine waters, and protect workers, no demolition...

## *Water Quality Protection*

**Page 63, paragraph 5 - change to read:**
To provide for existing water supplies various repairs, upgrades, and short-term treatments are proposed for the existing water systems (table 7). Construction activities required to begin dam removal (i.e., construction of the left cofferdam and diversion channel at Lake Aldwell) would cause some minor impacts to water quality before dam removal actually begins. ~~The facilities would be in place and operating before dam removal begins.~~ These impacts would be mitigated because water quality measures would be in place and operating prior to site mobilization and dam removal.

**Page 64, table 7 - replace with the following corrected table:**

## *Table 7.* *Water Quality Mitigation Measures*

| | PART OF ALTERNATIVE |
|---|---|
| **Industrial Supply** | Infiltration gallery/diversion modifications<br>Open channel pre-treatment |
| **City Water** | New Ranney well — west bank<br>Temporary iron treatment/filtration |
| **Tribe** | Upgrade hatchery infiltration gallery<br>Supplemental wells |
| **Dry Creek WA** | Connect to Ranney system **and** temporary filtration ~~new treatment (Cl, filtration)~~ system; package disinfection system ~~or modification to existing wells and system~~ |
| | **RECOMMENDED MITIGATION** |
| **Tribe** | Mound sewage treatment |
| **Elwha Place Homeowners' Association** | Flood proof existing wells<br>Temporary in-line treatment system |
| **Well owners / residents upstream of 101** | Temporary in-line filtration, bottled water |
| **Well owners upgradient of Lake Aldwell** | Drill new wells (if needed) |
| **Well owners and residents in river valley** | Raise and modify well heads / mound sewage treatment as needed |
| **All well owners (private)** | Contingency fund ($150,000) |
| **State rearing channel** | Offsite rearing<br>Wellhead protection |

## *Costs*

**Page 68, table 9 - replace with the following corrected table:**

## ***Table 9.*** *Cost Estimates — River Erosion Alternative (Proposed Action)*

| ACTIVITY | Total | REFERENCE YEAR (BUDGET YEAR) (costs in thousands of dollars) n-2 (1) | n-1 (2) | n (3) | n+1 (4) | n+2 (5) | Balance to Complete |
|---|---|---|---|---|---|---|---|
| **Project Acquisition** | | | | | | | |
| Direct Acquisition Cost | 29,500 | 29,500 | | | | | |
| Other Lands & Rights Costs | 300 | 250 | 50 | | | | |
| **Lands and Rights Subtotal** | **29,800** | **29,750** | **50** | | | | |
| **Engineering Design** | | | | | | | |
| Preconstruction Data Collection | 458 | 458 | | | | | |
| Decommissioning of Projects | 30 | 30 | | | | | |
| Water Quality Protection | ~~1,531~~ 1,645 | ~~1,523~~ 1,637 | | | | | 8 |
| Flood Protection | 368 | 295 | | | | | 73 |
| Dam Removal | 800 | 300 | 500 | | | | |
| Haz.. Waste Cleanup | 53 | 45 | | 8 | | | |
| Transmission Line Removal | 10 | | | | 10 | | |
| Road Rehabilitation | 48 | | | | 48 | | |
| Hatchery Expansions | 405 | 320 | ~~320~~ 85 | ~~85~~ | | | |
| **Engineering Design Subtotal** | ~~3,703~~ 3,817 | ~~2,651~~ 3,085 | ~~820~~ 585 | ~~93~~ 8 | 58 | | 81 |
| **Direct Construction Costs**[a] | | | | | | | |
| Decommissioning of Projects | 300 | | 300 | | | | |
| Water Quality Protection | ~~24,788~~ 27,010 | 10,240 | ~~14,398~~ 16,620 | | | | 150 |
| ~~Salvage of Water Treatment~~ | ~~(225)~~ | | | | | | ~~(225)~~ |
| Flood Protection | 3,630 | | 1,140 | 1,765 | | | 725 |
| Dam Removal | 20,200 | | | 9,200 | 10,000 | 1,000 | |
| Haz. Waste Cleanup | 534 | | 200 | | 334 | | |
| Transmission Line Removal | 650 | | | | | 650 | |
| Road Rehabilitation | 480 | | | | | 480 | |
| Hatchery Expansions | 4,040 | 2,300 | ~~3,180~~ 1,740 | ~~860~~ | | | |
| **Direct Construction Costs** | ~~54,397~~ 56,844 | ~~10,240~~ 12,540 | ~~19,218~~ 20,000 | ~~11,825~~ 10,965 | 10,334 | 2,130 | ~~650~~875 |
| **Construction Management** | 8,490 | ~~1,920~~ 585 | ~~2,560~~ 2,518 | ~~1,580~~ 2,460 | ~~1,537~~ 1,840 | ~~760~~ 947 | ~~133~~140 |
| **Waste Disposal Fees** | 1,000 | | | 500 | 500 | | |
| **Sediment Management/WQ** | 1,894 | | 100 | 610 | 460 | 320 | 404 |
| **Sediment Modeling** | 100 | 70 | 30 | | | | |
| **Cultural Resources** | 665 | | 151 | 162 | 167 | 74 | 111 |
| **Fish Restoration** | ~~2,685~~ 2,365 | ~~91~~ 136 | ~~166~~ 165 | ~~199~~ 187 | ~~226~~ 187 | ~~237~~ 199 | ~~1,766~~ 1,491 |
| **Revegetation/Wildlife** | 3,205 | | 885 | 565 | 560 | 560 | 635 |
| **Marine Resources Monitoring** | 150 | 10 | 20 | 20 | | | 100 |
| **Construction Related O & M** | | | | | | | |
| Glines Canyon and Elwha Dams | 1,100 | 500 | 500 | 100 | | | |
| Water Treatment Facilities | ~~3,676~~ 3,400 | | | ~~412~~ 349 | ~~1,088~~1,017 | ~~1,088~~1,017 | ~~1,088~~1,017 |
| Dredge Hatchery Outlet | 250 | | | | 50 | 100 | 100 |
| **O&M Costs Subtotal** | ~~5,026~~ 4,750 | 500 | 500 | ~~512~~ 449 | ~~1,138~~ 1,067 | ~~1,188~~ 1,117 | ~~1,188~~ 1,117 |
| **TOTAL** | ~~111,115~~ 113,080 | ~~45,232~~ 46,676 | ~~24,500~~ 25,004 | ~~16,066~~ 15,926 | ~~14,980~~ 15,173 | ~~5,269~~ 5,347 | ~~5,068~~ 4,954 |

a Includes those items subject to design and construction management allowances.

Note: The preceding cost estimates are refined from those contained in the restoration project programmatic FEIS. These costs will be further refined when final project designs are developed. Generally, these further refinements can be expected to reduce costs as design constraints become more certain and contingencies are reduced accordingly. In addition, application of value engineering procedures have the potential to further reduce costs at the final design stage. A less probable likelihood is that costs could increase due to some as yet unforeseen cost element.

Costs at April 1995 Price Level Revised: ~~17 Oct 95~~ 18 Sep 96

# *Dredge and Slurry Alternative*

## *Summary of Actions*

**Page 67, paragraph 2, after second bullet - add the following:**

- erosion of coarse-grained sediment by natural river processes

**Page 69, paragraph 5, sentence 3 - change to read:**

A majority of the lake bed sediments (75%) ~~within the pre-dam 100-year floodplain~~ would be removed.

## *Pipeline*

**Page 71, paragraph 1, after last sentence - add the following:**

...would be required for this alignment. Although costs for this alignment are higher, construction involves fewer uncertainties at this level of development. The river erosion alternative was chosen as the preferred alternative because resolving issues for development of the dredge and slurry alternative would require further investigation.

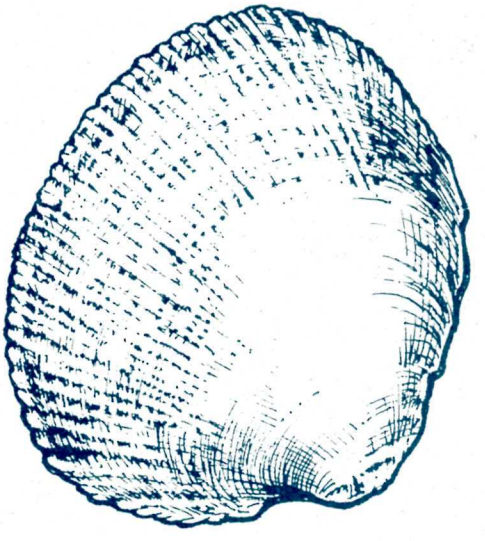
## *Water Quality Protection*

**Page 71, paragraph 4, sentence 4 - change to read:**

About 1.2 to ~~2.6~~ 2.7 million cubic yards of fine sediment in the deltas would still wash downstream as the deltas eroded.

## *Costs*

**Page 74, table 10 - replace with the following corrected table:**



## ***Table 10.*** *Cost Estimates — Dredge and Slurry Alternative*

| ACTIVITY | Total | REFERENCE YEAR (BUDGET YEAR) (costs in thousands of dollars) n-2 (1) | n-1 (2) | n (3) | n+1 (4) | n+2 (5) | Balance to Complete |
|---|---|---|---|---|---|---|---|
| **Project Acquisition** | | | | | | | |
| Direct Acquisition Cost | 29,500 | 29,500 | | | | | |
| Other Lands & Rights Costs | 300 | 250 | 50 | | | | |
| **Lands and Rights Subtotal** | **29,800** | **29,750** | **50** | | | | |
| **Engineering Design** | | | | | | | |
| Preconstruction Data | 481 | 481 | | | | | |
| Decommissioning of Projects | 30 | 30 | | | | | |
| Water Quality Protection | ~~1,379~~ 1,515 | ~~1,371~~ 1,507 | | | | | 8 |
| Flood Protection | 368 | 295 | | | | | 73 |
| Slurry Pipeline[b] | 1,120 | 1,120 | | | | | |
| Reservoir Dredging | 100 | 100 | | | | | |
| Dam Removal | 800 | 300 | 500 | | | | |
| Haz. Waste Cleanup | 53 | 45 | | 8 | | | |
| Transmission Line Removal | 10 | | | | 10 | | |
| Road Rehabilitation | 48 | | | | 48 | | |
| Hatchery Expansions | 405 | 320 | ~~320~~ 85 | ~~85~~ | | | |
| **Engineering Design Subtotal** | ~~4,794~~ 4,930 | ~~3,742~~ 4,198 | ~~820~~ 585 | ~~93~~ 8 | 58 | | 81 |
| **Direct Construction Costs**[a] | | | | | | | |
| Decommissioning of Projects | 300 | | 300 | | | | |
| Water Quality Protection | ~~21,943~~ 24,220 | 7,100 | ~~16,815~~ 16,970 | ~~4,978~~ | | | 150 |
| ~~Salvage of Water Treatment~~ | ~~(225)~~ | | | | | | ~~(225)~~ |
| Flood Protection | 3,630 | | 1,140 | 1,765 | | | 725 |
| Slurry Pipeline[b] | 11,728 | | 11,728 | | | | |
| Reservoir Dredging | 9,136 | | | 4,568 | 4,568 | | |
| Dam Removal | 20,200 | | | 9,200 | 10,000 | 1,000 | |
| Haz. Waste Cleanup | 534 | | 200 | | 334 | | |
| Transmission Line Removal | 40 | | | | | 40 | |
| Road Rehabilitation | 480 | | | | | 480 | |
| Hatchery Expansions | 4,040 | 2,300 | ~~3,180~~1,740 | ~~860~~ | | | |
| **Direct Construction Costs Subtotal** | ~~71,806~~ 74,308 | 9,400 | ~~33,363~~ 32,078 | ~~21,371~~ 15,533 | 14,902 | 1,520 | ~~650~~ 875 |
| **Construction Management** | 8,990 | ~~1,920~~ 585 | ~~3,000~~ 2,708 | ~~1,700~~ 2,570 | ~~1,477~~ 2,040 | ~~760~~ 947 | ~~133~~ 140 |
| **Waste Disposal Fees** | 1,000 | | | 500 | 500 | | |
| **Sediment Management/WQ** | 1,594 | | 100 | 550 | 400 | 260 | 284 |
| **Sediment Modeling** | 100 | 70 | 30 | | | | |
| **Cultural Resources** | 665 | | 151 | 162 | 167 | 74 | 111 |
| **Fish Restoration** | ~~2,685~~ 2,365 | ~~91~~ 136 | ~~166~~ 165 | ~~199~~ 187 | ~~226~~ 187 | ~~237~~ 199 | ~~1,766~~ 1,491 |
| **Revegetation/Wildlife** | 3,205 | | 885 | 565 | 560 | 560 | 635 |
| **Marine Resources Monitoring** | 150 | 10 | 20 | 20 | | | 100 |
| **Construction Related O & M** | | | | | | | |
| Glines Canyon and Elwha | 1,100 | 500 | 500 | 100 | | | |
| Water Treatment Facilities | ~~890~~ 1,164 | | | ~~270~~ 362 | ~~450~~ 592 | ~~130~~ 187 | ~~40~~ 63 |
| Electricity for Lake Dredging | 412 | | | 206 | 206 | | |
| Dredge Hatchery Outlet | 250 | | | | 50 | 100 | 100 |
| **O&M Costs Subtotal** | ~~2,652~~ 2,926 | 500 | 500 | ~~576~~ 656 | ~~706~~ 836 | ~~230~~ 275 | ~~140~~ 159 |
| **TOTAL** | ~~127,441~~130,100 | ~~36,083~~ 44,649 | ~~39,085~~ 37,272 | ~~25,736~~ 20,751 | ~~18,996~~ 19,650 | ~~3,641~~ 3,835 | ~~3,900~~ 3,876 |

*(Table 10 continued from previous page)*

a Includes those items subject to design and construction management allowances.

b Uses overland route for pipeline to facilitate maintenance of slurry pipeline regardless of river flow; provides for discharge of sediment 1 mile offshore. Using Alignment A would reduce total cost by $4.2 million.

Note: The preceding cost estimates are refined from those contained in the restoration project programmatic FEIS. These costs will be further refined when final project designs are developed. Generally, these further refinements can be expected to reduce costs as design constraints become more certain and contingencies are reduced accordingly. In addition, application of value engineering procedures have the potential to further reduce costs at the final design stage. A less probable likelihood is that costs could increase due to some as yet unforeseen cost element.

Costs at April 1995 Price Level Revised: 24-Oct-95 2-Oct-96

**Pages 76 & 77, table 11 - replace with the following corrected table:**

## ***Table 11.*** *Summary of Alternatives*

| | No Action | River Erosion (Proposed Action) | Dredge and Slurry |
|---|---|---|---|
| **Dams** | Operation of Elwha and Glines Canyon Dam would continue. | Removal of features of both Elwha and Glines Canyon dams necessary to fully restore the ecosystem and fisheries of the Elwha River would occur over a 24-month period. | Same as proposed action |
| **Sediment Management and Monitoring** | Sediment would continue to accumulate behind the dams. | Natural river processes would be allowed to erode the reservoir areas; Dam removal would be phased to reduce sediment levels during some periods to help protect fish; River sediment processes would be monitored to help control dam demolition rates. | Downstream suspended sediment concentrations would be reduced by dredging lakebed sediments and transporting through a slurry pipeline to the Strait of Juan De Fuca. Dam removal phasing and monitoring would be the same as for the proposed action. |
| **Flood Control** | No new flood control measures. | The Lower Elwha Federal Flood Control Levee would be raised and strengthened to maintain existing levels of flood protection. Other flood control mitigation is recommended although not required by law. | Same as proposed action |
| **Fisheries** | Fisheries partially maintained by hatcheries | Hatchery support, outplanting, harvest management, and optimal timing of dam removal would be used to help protect anadromous fish populations during the dam removal process and accelerate full restoration. | Same as proposed action |
| **Revegetation** | No revegetation | Reservoirs would be revegetated to restore pre-dam conditions and processes. | Same as proposed action |
| **Water Quality Protection** | Filtration through aquifer and chlorination for municipal ~~and/or industrial supplies~~ supply | Infiltration gallery and pre-treatment for industrial supplies; new Ranney well for municipal supply (including Dry Creek Water Association). Other treatments (filtration, new wells, mounded septic system, raised wellheads, contingency funds etc.) recommended for EPHA, Lower Elwha Klallam Tribe and individual well users. | Water quality facilities would generally be the same as the proposed action except that Fe/Mn treatment and filtration would not be required and the industrial pre-treatment would not be used as intensively. |

| | No Action | River Erosion (Proposed Action) | Dredge and Slurry |
|---|---|---|---|
| **Disposition of Lands** | All project lands would remain in existing ownership (James River Corporation). | Lands acquired at the Glines Canyon Damsite would become part of Olympic National Park. Aldwell lands would be managed by the park, Washington state or held in trust for Lower Elwha Klallam Tribe. | Same as proposed action |
| **Interpretation** | No changes in interpretation. | Interpretation would include leaving parts of the Glines Canyon project in place, wayside exhibits explaining key historic events in the construction of the dams, physical and biological features, and documentation of dam removal and ecosystem restoration. | Same as proposed action |
| **Cultural Resources** | No cultural resource mitigation occurs. | Cultural resource mitigating measures (avoidance, survey, documentation, monitoring) would occur in compliance with the Section 106 requirements of the National Historic Preservation Act. | Same as proposed action except with additional measures to mitigate impacts of dredging and construction of the slurry pipeline. |
| **Costs** | ~~$1.0 to 1.5~~ $2.1 million per year to operate; ~~$8.7~~ $9.0 million for future repairs; $100,000 per year indirect costs to maintain Ediz Hook; $480,000 total hatchery costs per year. | ~~$111.1~~ $113.1 million total cost over an 18-year period plus increased power costs for Daishowa. | ~~$127.4~~ $130.1 million total cost over an 18-year period plus increased power cost for Daishowa. |
| **Permitting** | It is unknown how FERC licensing would be resolved. Litigation would probably resume. | Numerous federal, state, and local permits and review processes would be required. Several permits required for compliance with Clean Water Act sections. | Same as proposed action except with additional reviews for construction and operation of the slurry pipeline. |

# Alternatives Considered but Rejected

## Dam Removal

**Page 78, after paragraph 4 - add the following:**

Phased Removal of Both Dams

During the comment phase on the draft Implementation EIS, Interior received several comments and a proposal to phase the removal of the two dams over a 13-year period. The phased approach of removing Elwha Dam, allowing the river to "clean up" for a period of time, and then removing Glines Canyon Dam later, was evaluated early in the planning process by the EIS interagency team. It was rejected as a reasonable alternative because of its unacceptable impacts on existing anadromous fish stocks, increased costs, and its delay in restoring the Elwha River ecosystem.

- Phased removal would lengthen the period of time fish would be adversely and significantly affected by increased sediment loads. Sediment releases resulting from the removal of Elwha Dam would have a significant impact on aquatic life in the lower river for a period of 12 to 18 months. By removing Glines Canyon Dam 6 to 7 years later, fish would be subjected to another 12 to 18 months of high sediment loads. This phasing of dam removal would seriously threaten the long-term health of fish stocks remaining in the lower river, particularly chinook and chum salmon.

- Delaying the removal of Glines Canyon Dam for such a long period of time would in itself adversely affect Elwha anadromous fish stocks. Habitat quality would remain poor below the dam, as sediment transport would remain blocked and water temperatures abnormally high in low flow months. Higher quality upstream habitat would remain inaccessible. Again, because many Elwha stocks are rapidly declining, this kind of delay in restoring the Elwha ecosystem would have significant adverse effects on anadromous fisheries.

- Separate dam removal contracts would cost more to prepare, administer and implement, and the inflation inherent in delaying dam removal would increase overall project costs.

- Phasing of dam removal would delay the release of sediments and nutrients from Lake Mills and the upper reaches of the Elwha River. This would extend the period of time it would take to reestablish the natural hydrological, biological, and physical processes that are critical in restoring the Elwha River ecosystem and its anadromous fisheries.

**Pages 84 - 100, table 12 - replace with the following table:**

## ***Table 12.*** *Impact Summary Chart*

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| **SEDIMENT MANAGEMENT** | | | |
| Reservoir areas | Reservoirs continue to trap sediments, (now 13.8 million cubic yards in Lake Mills and 3.9 million cubic yards in Lake Aldwell). | ~~1.2-2.6~~ 1.2-2.7 million cubic yards of coarse, and ~~4.8-5.6~~ 4.7-5.6 million cubic yards of fine sediment would erode from reservoirs. | ~~1.2-2.6~~ 1.2-2.7 million cubic yards of coarse, and 1.2-1.4 million cubic yards of fine sediment would erode from reservoirs; remainder slurried to strait. |
| Downstream channel | Reduced amounts of coarse-grained sediments (sand-size and larger) downstream of reservoirs, less meandering of river, armoring of river channel. | Fine-grained sediment and sand would move rapidly downstream, gravel would appear along the lower river in measurable quantity in 2 to 6 years; coarse sediments deposit and aggrade riverbed; more meandering and streambank erosion would be a beneficial impact. | Same as proposed action except less fine sediment eroding downstream (25% of total). |
| Delta, beaches and Ediz Hook | Continued beach erosion, recession of delta and erosion of western edge of Ediz Hook and Angeles Point. | Re-establish sediment supply, rebuilding of beaches and delta within 3 years; begin to reverse erosion of Ediz Hook within 5-10 years. | Same as proposed action. |
| **FLOODING** | | | |
| Increases in water surface elevation, aggradation | Degradation of riverbed has lowered flood stage in some places- a beneficial impact to property owners and adverse impact to the river's ecosystem; houses (except behind federal levee) and private wells along river flood at less than 100 year frequency flood event, a potential minor to major adverse impact. | Riverbed aggradation would cause increases in river stage of up to 4 feet; mandatory mitigation on federal levee and for municipal and industrial water wells would provide current level of flood protection; without recommended mitigation other areas may experience minor to major impacts due to more frequent flooding (not significantly different than existing conditions); ~~short-term flooding impacts less than long-term impacts~~. | Same as proposed action - dredging of fine sediments would have no additional impacts on flooding. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| **SURFACE WATER** | | | |
| **Short-term (during dam removal) critical indicators** | | | |
| Total suspended solids in river (peak concentrations) | Dams have reduced peak TSS to less than 1,500 parts per million. Moderate beneficial impact to water quality. | 28,000 to 51,000 parts per million - major adverse impact for 1 to 3 day periods. | 1,400 to 13,000 parts per million - major adverse impact for 1 to 3 day periods. |
| Total iron | Dams may have slightly reduced to peaks of 20 to 2,300 micrograms per liter. Negligible or minor impact to water quality. | 30,000 to 50,000 micrograms per liter maximum for 1-3 day periods - major adverse impact. | 5,000 to 15,000 micrograms per liter maximum for 1-3 day periods - moderate to major adverse impact. |
| Total manganese | Dams may have slightly reduced to peaks of from 4 to 210 micrograms per liter. Negligible or minor impact to water quality. | 500 to 10,000 micrograms per liter maximum for 1-3 day periods - possible major adverse impact to water quality. | 50 to 1,500 micrograms per liter maximum for 1-3 day periods - moderate to major adverse impact. |
| Turbidity | Dams have reduced peak turbidity to 800 NTUs; moderate beneficial impact to water quality. | 2,000 to 25,000 NTUs maximum for 1-3 day periods - major adverse impact. | 1,000 to 10,000 NTUs maximum for 1-3 day periods - major adverse impact. |
| pH during dam removal | 6.7 to 10.0 now; negligible impact. | 5 to 9 - minor change. | 6 to 9.5 - minor change. |
| Temperature (Celsius) during dam removal | Reservoirs have resulted in increased peak temperatures to 19° C. Major adverse impact to water quality/aquatic life. | 15°C to 19°C - minor to major beneficial impact. | 15°C to 19°C - minor to major beneficial impact. |
| Dissolved oxygen during dam removal | 95 to 110%; negligible or minor impact. | 90 to 100% - minor change. | 95 to 105% - minor change. |
| **Long-term (from 1 year after dam removal) critical water quality indicators** | | | |
| Total suspended solids in river | Dams have reduced TSS concentration to less than 1,500 ppm; moderate beneficial impact to water quality. | Average 69 parts per million within 2 years after dam removal - moderate adverse impact. | Same as proposed action. |
| Turbidity | Dams have reduced peak turbidity to 800 NTUs; moderate beneficial impact to water quality. | 1 to 1000 NTUs within 2 years following dam removal - moderate adverse impact. | 1 to 1000 NTUs within 1 year following dam removal - moderate adverse impact. |
| Dissolved iron | Dams may have reduced peak concentrations to 2,300 micrograms per liter; minor beneficial impact to water quality. | 10 to 5,000 micrograms per liter within 2 years - minor adverse impact to water quality. | 10 to 5,000 micrograms per liter within 1 year - minor adverse impact. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Dissolved manganese | Dams may have reduced peak concentrations to 210 micrograms per liter; minor beneficial impact to water quality. | 10 to 700 micrograms per liter within 2 years following dam removal - minor adverse impact to water quality. | 10 to 700 micrograms per liter within 1 year following dam removal - minor adverse impact to water quality. |
| pH | 6.7 to 10.0; negligible to minor impact. | 6.5 to 8.5 - minor beneficial impact. | Same as proposed action. |
| Temperature (Celsius) | Reservoirs have increased peak temperatures to 19° C; major adverse impact to water quality and aquatic life. | 15° C to 17° C - major beneficial impact. | Same as proposed action. |
| Dissolved oxygen | 95 to 110%; negligible or minor impact. | 95 to 110% - no change over existing conditions. | Same as proposed action. |
| **SURFACE WATER USERS** | | | |
| Daishowa and Rayonier mills | Existing treatment prevents adverse impacts. | Addition of permanent infiltration gallery and temporary pre-treatment will prevent adverse impacts in short and long-term. No impact. | Same as proposed action. |
| Washington Department of Fish and Wildlife fish rearing channel | No treatment now. Some pulses of turbidity during high flow events. | Facility would close during removal; moderate 1-2 year adverse impact. Infiltration gallery would minimize adverse impacts in long-term . | Same as proposed action. |
| Lower Elwha Klallam Tribal Fish Hatchery | Infiltration gallery/groundwater wells filter surface water now. | Enlarging infiltration gallery, drilling new wells to enlarge capacity would prevent adverse impacts in short and long-term. No Impact. | Same as proposed action. |
| **GROUNDWATER** | | | |
| Turbidity | High suspended sediment levels increase turbidity in some wells (Dry Creek Water Association, and some wells hydraulically connected to river) now. | Suspended sediment would infiltrate aquifers and well screens of some wells and cause major impacts from turbidity in well water. | Suspended sediment would infiltrate well screens of some wells and cause ~~moderate~~ minor impacts from turbidity in well water. |
| Suspended sediments | Minor impacts to well yield now. | May settle in spaces between granules in aquifer and decrease yields. Moderate adverse impact. | May settle in spaces between granules in aquifer and decrease yields. Minor ~~to moderate~~ adverse impact. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Dissolved iron | Average below 0.3 milligram per liter drinking water standard in Port. Angeles Ranney collector; max concentration 1.0 milligram per liter. | Dissolved iron could infiltrate well screens and cause mineral staining of fixtures and clothing, metallic tasting drinking water. Probability of impact low, minor to moderate impact if it occurs. | Dissolved iron could infiltrate well screens and cause mineral staining of fixtures and clothing, metallic tasting drinking water. Minor impact if it occurs. |
| Dissolved manganese | No water samples tested above state standards. | Dissolved manganese could infiltrate well screens and cause mineral staining of fixtures and clothing. Probability of impact low, minor to moderate impact if it occurs. | Dissolved manganese could infiltrate well screens and cause mineral staining of fixtures and clothing. Minor impact if it occurs. |
| Coarse sediment/ aggradation | Riverbed is nearly devoid of coarse sediment where wells are located; wells are built close to river's edge. | Aggradation and increases in surface water elevation would lead to overtopping and contamination of wells close to river's edge or in floodplain. Major long-term adverse impact. | Same as proposed action. |
| Water table levels -- Lake Aldwell area | Lake Aldwell supports an artificially high groundwater level in east end of Indian Creek valley. | Two wells would experience decrease or loss of yield. Major long-term adverse impact. | Same as proposed action. |
| Water table levels -- lower reach area | Groundwater elevation in lower valley is artificially low because of degradation of riverbed. | Aggradation would increase groundwater levels and make septic systems unusable- moderate impact to those users in the long term. | Same as proposed action. |
| GROUNDWATER USERS | | | |
| City of Port Angeles municipal supply | Water ~~is filtered and~~ is chlorinated, some high turbidity and iron levels. | A second Ranney collector, treatment and flood protection for the existing Ranney collector would prevent adverse impacts to water quality and yield. No Impact. | Same as proposed action except no filtration needed. |
| Dry Creek Water Association | Some high turbidity levels now. | Connecting to ~~Port Angeles~~ new Ranney Collector and temporary filtration plan would prevent adverse impacts to water quality. No Impact. | Same as proposed action except no filtration needed. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Elwha Place Homeowners' Association | No impacts now. | Increases in turbidity and iron or manganese could have minor to moderate impacts on well water quality; increased surface water elevation could flood and overtop wells; major impact if it occurs. Recommended mitigation would reduce impacts to negligible. | Increases in turbidity and iron or manganese could have minor impacts on well water quality; increased surface water elevation could flood and overtop wells; major impact if it occurs. Recommended mitigation would reduce impacts to negligible. |
| Lower Elwha Klallam Reservation residents | Groundwater elevation ~~low;~~ high; septic systems installed and usable. | Increased groundwater elevation would render 10 septic systems unusable. Moderate impact in long-term. | Same as proposed action. |
| Individual wells in lower valley and upstream of Highway 101 bridge | Wells built close to river's edge; some increases in turbidity now. | Increases in turbidity and iron or manganese could have minor to moderate impacts on well water quality; increased surface water elevation could flood and overtop wells; major impact if it occurs. Recommended mitigation would reduce impacts to negligible. | Increases in turbidity and iron or manganese could have minor impacts on well water quality; increased surface water elevation could flood and overtop wells; major impact if it occurs. Recommended mitigation would reduce impacts to negligible. |
| Individual wells upstream of Lake Aldwell | Groundwater high because of Lake Aldwell. | Groundwater level and yield would drop or stop altogether. Major, long-term adverse impact. Recommended mitigation would reduce impact to negligible. | Same as proposed action. |
| Unidentified users | Unknown impacts. | May experience short-term increases in turbidity, iron and manganese, water level differences, unusable septic systems, or changes in yield. Impact intensity unknown. Mitigation would reduce impact to negligible. | Same as proposed action. |

| Impact Topic | No Action | River Erosion (Proposed Action) | Dredge and Slurry |
|---|---|---|---|
| **Native Resident and Anadromous Fisheries** | | | |
| Long-term restoration | No chance of restoring native anadromous fish in the Elwha River; genetic integrity of the existing native stocks deteriorates due to continued use of hatchery stocks; existing stocks in the lower river unsupported by artificial propagation would likely decline to extinction. | All Elwha River anadromous fish stock except sockeye salmon fully restored within 20 years. Hatchery support, outplanting, harvest management, and optimal timing of dam removal could halve restoration time. | The long-term beneficial impacts would be the same as the proposed action except full restoration of native fish stock would occur in slightly less time. |
| Species-specific restoration potential | No restoration. | The Elwha River could eventually produce an estimated 31,000 returning chinook salmon, 35,000 coho salmon, 274,000 pink salmon, 36,000 chum salmon, 10,000 steelhead, and 6,500 sockeye salmon per year. | Same as proposed action. |
| Short-term impacts | Existing conditions, i.e. poor quality habitat, hatchery propagation and crowded spawning conditions would not change. | The release of fine sediment during and following dam removal would cause mortalities, physiological stress, or displacement of fish in the river for up to four years, and cause returning adults to avoid migrating up the river. Hatchery support, outplanting, harvest management, and optimal timing of dam removal would help protect fish during this period. | The short-term adverse impacts of fine sediment on trout and salmon and their habitat would be reduced by removing as much as 75% of the fine sediments with a dredge and slurry pipeline in combination with other measures. Direct fish losses and the risk of straying adults would be reduced. |
| Chinook salmon | Same as above. | Direct fish loss caused by extreme sediment. Hatchery support and outplanting would replace fish lost to high sediment levels and begin to reestablish stock in the middle and upper Elwha River. | Same as proposed action except the direct fish loss caused by high sediment levels would be less. |
| Coho salmon | Same as above. | Same as for Chinook Salmon. | Same as proposed action except direct fish losses would be less. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Pink salmon | Same as above. | Direct loss, if pinks present, caused by extreme sediment levels. Hatchery support and outplanting of Dungeness stock would begin to reestablish pink salmon in the Elwha River. | Same as proposed action except, if pinks present, the direct fish loss caused by high sediment levels would be less. |
| Chum salmon | Same as above. | Direct fish loss caused by extreme sediment levels. Hatchery support and outplanting would reduce adult fish loss and replace young fish lost caused by high sediment levels. Begin to reestablish stock in the middle and upper Elwha River. | Same as proposed action except the direct fish loss caused by high sediment levels would be less. |
| Sockeye salmon | Same as above. | No direct fish loss caused by extreme sediment levels. There would be no hatchery or outplanting effects. The existing Lake Sutherland kokanee population may eventually reestablish a native sockeye run. | Same as the proposed action. |
| Steelhead | Same as above. | Same as for Chum Salmon. | Same as proposed action except direct fish losses would be less. |
| Sea-run cutthroat & char | Same as above. | Direct fish loss caused by extreme sediment levels. There would be no hatchery or outplanting effects. Natural recolonization by remnant stocks would eventually reestablish anadromous populations. | Same as proposed action except the direct fish loss caused by high sediment levels would be less. |
| VEGETATION | | | |
| Restored communities | 562 acres of vegetation, much of it important, low elevation riparian communities, would remain lost. | 562 acres of vegetated lands would recover: 514 of forested lands and 48 of other vegetation. | Same as proposed action except for minor impacts of constructing the slurry pipeline. |
| Riparian communities | 5.3 linear miles inundated. | 5.3 miles returned. | Same as proposed action. |
| Wetlands | ~~43~~ 48 acres of vegetated wetlands, resulting from or enlarged by the higher water table would remain and 122 acres of unvegetated, riverine wetlands would remain lost; these losses have likely reduced biodiversity in the area. | Portion of 43 acres may be lost; 48 acres of vegetated and 122 acres of unvegetated wetlands would be restored. | Same as proposed action. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| **WILDLIFE** | | | |
| Terrestrial habitat including elk and other mammals, trumpeter swans and other birds | 715 acres of natural wildlife habitat would remain lost. Without anadromous fish runs, critical to the wildlife community, natural biodiversity of the area would remain compromised. | Restoration of habitat and fish runs would be a major beneficial impact to most species including elk. Species dependent on the reservoirs, including trumpeter swans, would lose habitat, but regional impacts would be minor. | Same as proposed action except for minor wildlife disturbances along the lower river while constructing the slurry pipeline. |
| **SPECIES OF SPECIAL CONCERN** | | | |
| Federally listed species: bald eagle, northern spotted owl, marbled murrelet, Stellar sea lion, and peregrine falcon | Natural populations of salmon would remain unavailable to foraging bald eagles. Up to 514 acres of potential habitat for spotted owls and murrelets would remain unavailable. Sea lions and falcons would sustain continued minor impacts. | ~~Bald eagles, spotted owls, and~~ M~~m~~urrelets would be adversely impacted in the short term (2 to 5 years) by noise, turbidity, but return of salmon as prey and upland forest as habitat would have a major beneficial impact on murrelets, bald eagles and spotted owls in the long term. Sea lions and falcons would experience minor beneficial and no impacts, respectively. | All impacts would be the same as the proposed action except: spotted owls and murrelets may be impacted from the noise of dredging activities. ~~Impacts to foraging bald eagles would be slightly less, because turbidity and impact on fish as prey would be less.~~ |
| Candidates for federal listing including ~~Pacific fisher, harlequin duck, northern red-legged frog, and~~ bull trout, and rated "of concern" to the USFWS, including Pacific fisher, harlequin duck, and northern red-legged frog. | Over 5 linear miles of riparian and riverine habitat would remain unavailable for Pacific fishers and harlequin ducks. | Harlequin ducks and bull trout would sustain short-term, minor impacts. All species would sustain major beneficial impacts in the long term. | Impacts to harlequin ducks and bull trout would be slightly less due to less turbidity in the river. |
| Species or stocks considered for federal listing: coho, chum and chinook salmon, steelhead, and sea-run cutthroat trout | Habitat for these species would remain unavailable, possibly contributing to the listing of these stocks under the Endangered Species Act. | All species would be adversely impacted in the short term, but over the long-term, restoration would offset some cumulative impacts occurring elsewhere in the region. | Same as proposed action. |
| Candidates for state listing including pileated woodpecker, Van Dyke's salamander, and Vaux's swift | Forest and riparian habitat for these species would remain inundated. | All species would sustain major beneficial impacts in the long term. | Same as proposed action. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| **LIVING MARINE RESOURCES** | | | |
| Nearshore marine communities | Existing marine communities would remain, the delta and estuary would be undersized, and clam populations would be lower than under pre-dam conditions. | Moderate adverse impacts would occur to local marine communities from silt and clay transported by the river. A major change would occur, from transport of sand and gravel, in the substrate and biological community at the river mouth and to the east. However, future conditions would approximate pre-dam conditions. | Same as proposed action. |
| **AIR QUALITY** | | | |
| Air quality | Air quality is presently high quality and would stay this way. The projects do not affect air quality. | Elwha Dam demolition would result in 105.3 tons of particulates and Glines Canyon Dam demolition, 25.2 tons over the ~~18-month to~~ 2-year dam removal period. Impact to local area would be minor, except from use of one-half mile of unpaved haul road, which would have moderate adverse impacts to residents without mitigation. Sprinkling with water (required) would reduce impact to minor. | Same as the proposed action except trenching for pipeline may add minor amounts of $PM_{10}$ and TSP (particulates). |
| **NOISE** | | | |
| Continuous noise | Noise from project negligible impact on residents or wildlife. | Residents of approximately 20 homes closest to (within 0.6 mile) the Elwha Dam would experience short-term minor increases in noise levels to as high as a typical office environment (about 58 decibels) under poor atmospheric conditions. Residents further away would be unaware of day-to-day construction noise. | Noise levels for this alternative would be quantitatively indistinguishable from the proposed action. The trenching operations required for pipeline laying and the pumping stations required to pump the slurried fines would result in minor noise that could have minor, short-term impacts on residents in the immediate vicinity. |

| Impact Topic | No Action | River Erosion (Proposed Action) | Dredge and Slurry |
|---|---|---|---|
| Acute noise | No blasting or other sudden loud noise exists in the vicinity. | Residents beyond 1.2 miles of blasting sites would not be expected to hear blasting noise. The 20 residents within 0.6 miles of the Elwha Dam would periodically experience noise similar to moderate thunder. Minor short-term impact to these residents. | Same as proposed action. |
| **Cultural Resources** | | | |
| Construction related impacts | No effects to properties listed on the National Register of Historic Places (NRHP); continued major adverse impacts to cultural resources inundated by the reservoirs; no effects to cultural resources in or near the floodplain. | Major adverse effect to hydroelectric projects. Mitigation through HABS/HAER ~~inventory,~~ documentation, and leaving some structures in place at Glines reduces impacts to minor. Permanent, major beneficial impacts to cultural resources important to the tribe by making previously inundated resources accessible. Minor to negligible impacts, with mitigation, to cultural resources and cultural landscapes in the immediate vicinity of damsites. | Same as proposed action except that trenching of pipeline could affect some cultural resources; with mitigation, impacts would be minor. |
| Offsite disposal of dam rubble | No effects to cultural resources. | Minor impacts, with mitigation. | Same as proposed action. |
| Increased flooding and erosion | No effects to cultural resources. | Minor impacts, with mitigation, to sites potentially affected by increased flooding and erosion. | Same as proposed action. |
| Construction of access roads and staging areas | No effects to cultural resources. | Moderate, short-term impacts to Elwha Ranger Station Historic District, Altaire and Elwha campgrounds kitchen shelters, known and potential landscapes, culturally sensitive areas, known and unknown archeological sites if roads built near or these areas are used for access/staging of equipment. With mitigation, impact minor. | Same as proposed action. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| **SOCIOECONOMICS** | | | |
| County economic base | Ten employees would continue to be required for the operation of the hydroelectric projects.<br><br>Travel and tourism creates about 2,000 jobs and $21.3 million now. Tax receipts from tourism/travel estimated at $1.4 million. | Major long-term beneficial impacts would occur to the county's economic base. Over the 10-year pre-construction, construction and restoration period, an additional 1150-1240 jobs, $60-65 million in business activity, and $32-34 million in personal income would be generated in Clallam County. After restoration completed, 446 annual jobs, $4.6 million in annual payroll in the recreation/ tourism sector, and an annual increase in local sales taxes of $296,000 would be generated.<br><br>~~County property tax on projects eliminated ($230,000 per year). Local share of state sales tax would increase by $296,900 per year after project completion.~~ | Higher capital costs of pipeline would incrementally increase net cost of project, but not significantly. Major long-term beneficial impacts to the county's economic base would still occur under this alternative. |
| Infrastructure, services and utilities | Clallam County 1993 operating budget ($14.8 million); $4.3 million in property taxes collected, of this, $230,000 was from hydroelectric projects. A total of $2.1 million generated from sales tax payments to county general fund in 1993.<br><br>Annual maintenance costs of $100,000 for Ediz Hook would | County would not collect $230,000 in annual property taxes from the projects.<br><br>Annual maintenance costs for Ediz Hook reduced by $28,000 per year.<br><br>Housing and public infrastructure would be adequate to meet | Same as proposed action. |
| Estimated project cost | Not applicable | ~~$111.1~~$113.1 million | ~~$127.4~~$130.0 million |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Impacts to Daishowa America Mill and electric power consumer | Estimated 1996 cost of power production from the dams, without any improvement expenses is 12.29 mills; real priority firm for purchased power is 26.7 mills; real rate expected to decline to 23 mills by 2001.<br><br>Estimated annual real energy cost for replacement power in 2010 is $2.1 million.<br><br>Dams would require ~~$8.7~~ $9.0 million in repair costs; annual operational costs of the dams would continue at $2.1 million. | Daishowa's power acquisition costs would start at 26.7 mills, and would decline to 23 mills by 2001.<br><br>Estimated annual real energy cost for replacement power in 2010 is $4.0 million.<br><br>Negligible impacts to overall electric rates.<br><br>Dam repair costs of ~~$8.7~~ $9.0 million not necessary. Power cost to the mill increases to $4 million annually. ~~$440~~,000 in payments to local energy utility not collected. | Same as proposed action. |
| Fisheries and fish processing | Continued major adverse impact--total annual net business benefits from Elwha fishery currently estimated at $840,000. | Major beneficial impact--total annual net business benefits from Elwha fishery would reach $3.5 million. | Same as proposed action. |
| Recreation and tourism | Travel/tourism expenditures (1993) in Clallam Co. $116.9 million. Related payroll income $18.8 million. | An increase of 734,000 annual visitor nights in Clallam County is expected with river restoration, generating business expenditures of $28.5 million. Related payroll income increased by $4.6 million annually. | Same as proposed action. annually. |
| Social values | Dams considered an important source of local pride to some residents.<br><br>County and region would continue to experience economic trends from resource based to tourism based economy. No sharp changes in social structure anticipated. | Minor impact to social structure. | Same as proposed action. |
| Lower Elwha Klallam Tribe | Major long-term adverse impact to level of tribe's poverty, employment, income, health, and social structure. | Major beneficial impact to level of tribe's poverty, employment, income, health, and social structure. | Same as proposed action. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Nonmarket values | No change or impacts expected. | Major beneficial impacts; restoration expected to generate $3.5 billion annually for 10 years. | Same as proposed action. |
| Net economic value of project | Daishowa America pays $2.1 million/yr. for 172 gigawatt hours. Major impact to commercial, recreational fishery sectors continues. Overall, recreation and tourism continue slow growth trend. | Major beneficial impact; benefits from increase recreation and tourism would reach $133 million over 100 years of project life. The $3.5 million per year of net economic benefits after fish stocks were restored would reach $35 million over project life. | Same as proposed action. |
| **PUBLIC HEALTH AND SAFETY** | | | |
| Earthquakes | Glines Canyon Dam considered safe for currently identified maximum credible earthquake, and probable maximum flood; safety of Elwha Dam is unknown. If MCE is modified, may need to reanalyze and modify structures. | Dam removal would remove danger from flooding caused by maximum credible earthquake; would eliminate need to correct structural deficiencies in the future. | Same as proposed action. |
| Dam safety | Both dams considered safe during currently identified probable maximum flood and maximum credible earthquakes (MCE). | Safety precautions built into dam ~~remoal~~removal designs, no safety risks anticipated during deconstruction; dam removal would eliminate potential of dam failure. | Same as proposed action. |
| Hazardous materials | Asbestos, lead based paint, petroleum hydrocarbons and PCBs would continue to pose a threat of further contamination. Some soil contaminated with hydrocarbons ~~would require clean-up~~ would need to be remediated or capped. | Remediation or removal of materials (petroleum contaminated soils, underground storage tanks, asbestos, and various chemical stores) prior to dam removal would reduce the threat of further contamination. | Same as proposed action. |

| Impact Topic | No Action | River Erosion (Proposed Action) | Dredge and Slurry |
|---|---|---|---|
| **Transportation** | | | |
| Levels of service for peak weekday hours during year 2000 at 13 intersections between damsites and disposal area | Levels of service are very good (LOS A) for most intersections. They are acceptable (LOS B) at the intersection of Old Olympic Highway and Sequim-Dungeness Road and (LOS C) at the intersection of US 101 and Highway 112, and poor (i.e. long delays and poor traffic flow-LOS F or LOS *) for the intersection of Marine Drive and Highway 117. | No changes to levels of service would be expected from the addition of project-related traffic. | Same as proposed action. |
| Levels of service for peak weekend hours during year 2000 at 13 intersections between damsites and disposal area | Same as weekday, except traffic flow is very good (LOS A) at the intersection of US 101 and Highway 112, and acceptable (LOS C) at Marine Drive and Highway 117. | No changes to levels of service would be expected from the addition of project-related traffic. | Same as proposed action. |
| Levels of service for peak weekday hours during year 2005 at 13 intersections between damsites and disposal area | Same as for year 2000 weekday, except the intersection of US 101 and Highway 112 is now poor (LOS F), and LOS at US 101 and Old Olympic Highway has declined from A to B. | No changes to levels of service would be expected from the addition of project-related traffic. | Same as proposed action. |
| Levels of service for peak weekend hours during year 2005 at 13 intersections between damsites and disposal area | All intersections except those listed below are operating well (LOS A). Marine Drive and Highway 117 is at LOS C, US 101 and Highway 112 is at B; US 101 and Old Olympic Highway is at D (still considered acceptable); and Old Olympic Highway and Sequim-Dungeness Road is at LOS B. | No changes to levels of service would be expected from the addition of project-related traffic except LOS at US 101 and Highway 112 would decline from B to C. | Same as proposed action. |
| **Indian Trust Resources** | | | |
| Federal trust responsibility to protect treaty fishing rights (up to one-half harvestable fish) | Dams have blocked access to, inundated and degraded fish habitat with major adverse impact to harvestable fish; access to usual and accustomed fishing places is blocked. | Permanent restoration of anadromous fisheries and access to usual and accustomed fishing places. Major, beneficial, long-term impact. | Same as proposed action except that fish restoration and access to usual and accustomed fishing places may occur sooner. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Federal trust responsibility to protect shellfish harvesting rights (to take up to one-half of non staked or cultivated bed shellfish) | Degraded shellfish habitat in estuary and nearshore marine areas, near elimination of sandy substrate has caused decline in hardshell clam populations; impact unquantified, but considered major, adverse. | Restoring sediment transport would re-establish sandy substrate, larger and more complex estuary for shellfish. Major, beneficial, long-term impact. | Same as proposed action. |
| Federal trust responsibility to protect right to hunt on open and unclaimed lands | Inundated wildlife habitat, and loss of salmon as prey has had a major, unquantified adverse impact on wildlife | Restoration of 562 acres of land now inundated to natural vegetation, and of salmon throughout river would have major, long-term, beneficial impact to wildlife. | Same as proposed action |
| Protection of primary purposes of Lower Elwha Klallam Reservation | Risk of flooding from Elwha Dam failure unknown but unacceptable to tribe. Impact should failure occur would be major and adverse. Near elimination of sediment beyond dams has contributed to erosion of tribal beaches. Impact unquantified, but considered major and adverse. | Dam removal would eliminate risk of flooding; restoring sediment transport would rebuild beach. Both major, permanent beneficial impacts. | Same as proposed action. |
| **RECREATION** | | | |
| Recreation facilities, including reservoirs | No change, lake oriented -- incongruous with pristine nature of Elwha River watershed. | Permanent loss of flatwater boating and fishing opportunities - other lakes available in area, so impacts considered moderate.; significant permanent increase in sport and marine fishing for anadromous salmon and trout; significant permanent increase in river oriented recreation, with an increase of 5.3 miles of river. | Same as proposed action except that dredge and slurry operation could disrupt river recreational activities. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| Recreational fishing | Continued major adverse impact; only resident fish above RM 4.9; resident trout populations greater than pre-dam levels. | Restoration of anadromous trout and salmon would have a major long-term beneficial impact; moderate adverse short-term impact due to restricted access during construction and restricted fishing during restoration of runs; decrease in resident trout. | Same as proposed action except over the short-term, slurry pipeline in river could have a moderate adverse impact on river fishing. |
| White-water boating, hiking, camping, and wildlife observation | No change-current recreational facilities would remain available. | Short-term major impacts due to limitations on access during dam removal, such as from noise and dust, may detract from visitor experience. With mitigation, impacts would be minimized. | Same as proposed action except that over the short-term, slurry pipeline in river could have a minor impact on river recreation uses and recreationists seeking a wilderness experience. |
| **LAND USE** | | | |
| Acquiring Glines Canyon lands | Hydropower project inconsistent with neighboring land uses in park. | Land uses would change, but would conform with NPS policies -- a permanent beneficial impact. | Same as proposed action except for additional short-term, local effects from construction and use of the slurry pipeline. |
| Management of Lake Aldwell lands | Hydropower project contrasts with neighboring natural and rural land uses. | While lands would be managed for restoration of the Elwha River ecosystem, impacts on new upland uses would depend on the manager -- either Olympic National Park, the state of Washington, or the Lower Elwha Klallam Tribe. | Same as proposed action except for additional short-term, local effects from construction and use of the slurry pipeline. |
| Consistency with local and regional land use plans | Land use at the dams is inconsistent with policies of the NPS and Olympic National Park, and with objectives of several local and regional plans. | Long-term restoration of shoreline areas and anadromous fisheries would be consistent with objectives of Olympic National Park, and several regional and local land use plans. | Same as proposed action. |
| Waste disposal | No waste would be generated. | Impacts would be minor since potential locations are already large surface pit mines, industrial sites, or sanitary landfills. | Same as proposed action. |

| IMPACT TOPIC | NO ACTION | RIVER EROSION (Proposed Action) | DREDGE AND SLURRY |
|---|---|---|---|
| **AESTHETICS** | | | |
| Short-term impacts | No change in visual features. Major impacts associated with damming the river in a naturally appearing landscape would remain. | Major short-term impact during construction and for 2-3 years after dam removal until vegetation begins to recover. | Same as proposed action except that pipeline would have a moderate impact on visual quality depending on route selected. |
| Long-term restoration | No change in visual features. Major impacts associated with damming the river in a naturally appearing landscape would remain. | Major beneficial impacts to aesthetics overall as area is restored to natural conditions and blend with surrounding landscape. | Same as proposed action. |

# Affected Environment

## Fluvial Processes and Sediment Transport

### River Morphology

**Page 107, paragraph 3, last sentence - change to read:**

As a result, sediment yields to the delta have dropped from a pre-dam total sediment supply of 280,000 cubic yards per year to 5,900 cubic yards per year, approximately 2% of the pre-dam volume (~~Schwartz 1994,~~ FERC 1993).

## Flooding

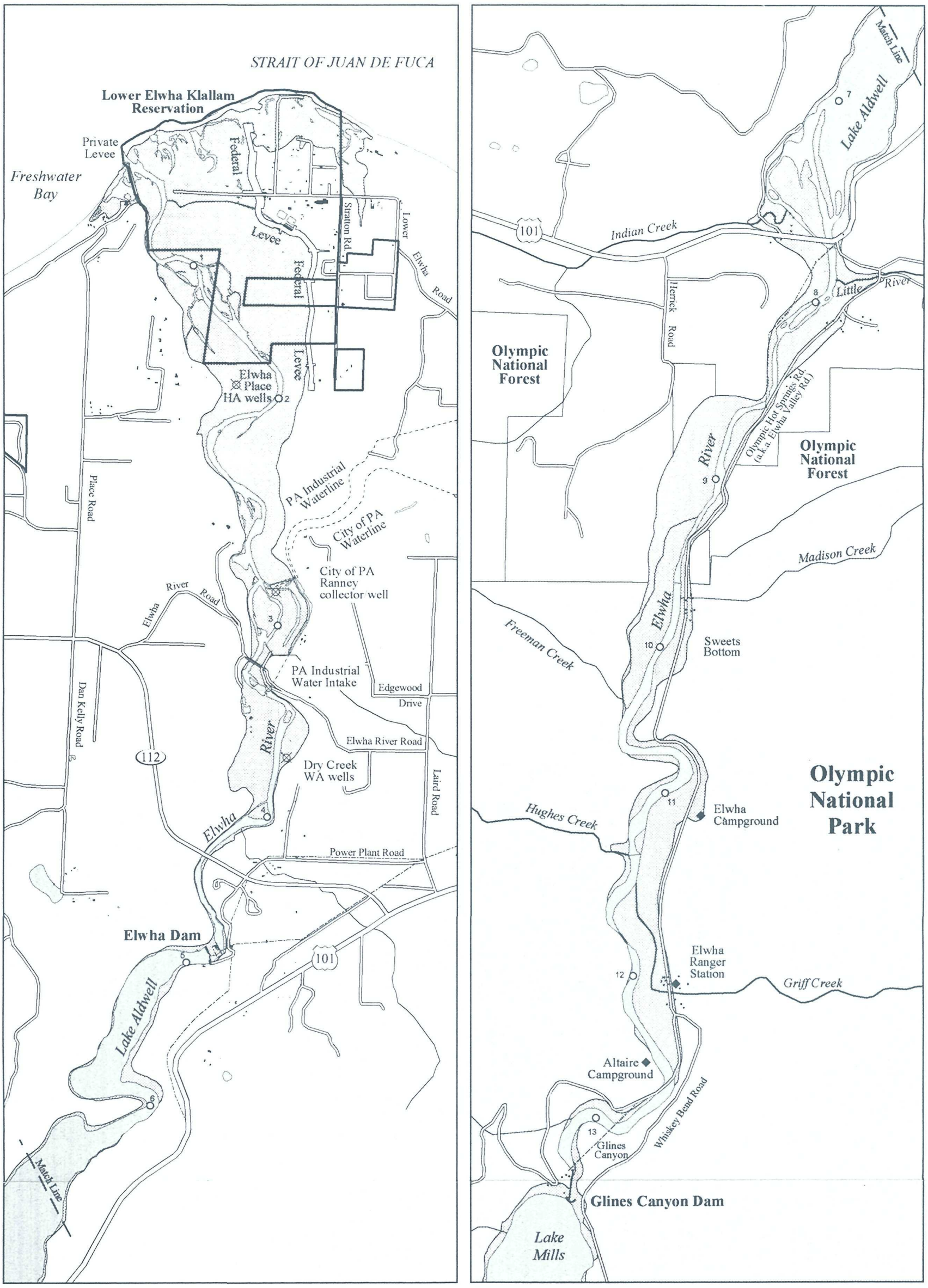
### Flooding Frequency

**Page 109, paragraph 4, sentence 1 - change to read:**

Since the dams were built, ~~less~~ relatively little bedload has been introduced into the ~~lower part of the~~ river downstream of the dams, allowing the riverbed to degrade (become lower at some locations), which has reduced the flood hazard from pre-dam conditions to some properties along the lower river.

**Page 111, Figure 9 - Floodplain Map - replace with the following corrected map:**

*Figure 9.* *Floodplain Map*
*Olympic National Park*
*United States Department of the Interior - National Park Service*
*DSC - December 1995 - 149 - 20070.1*



# Groundwater

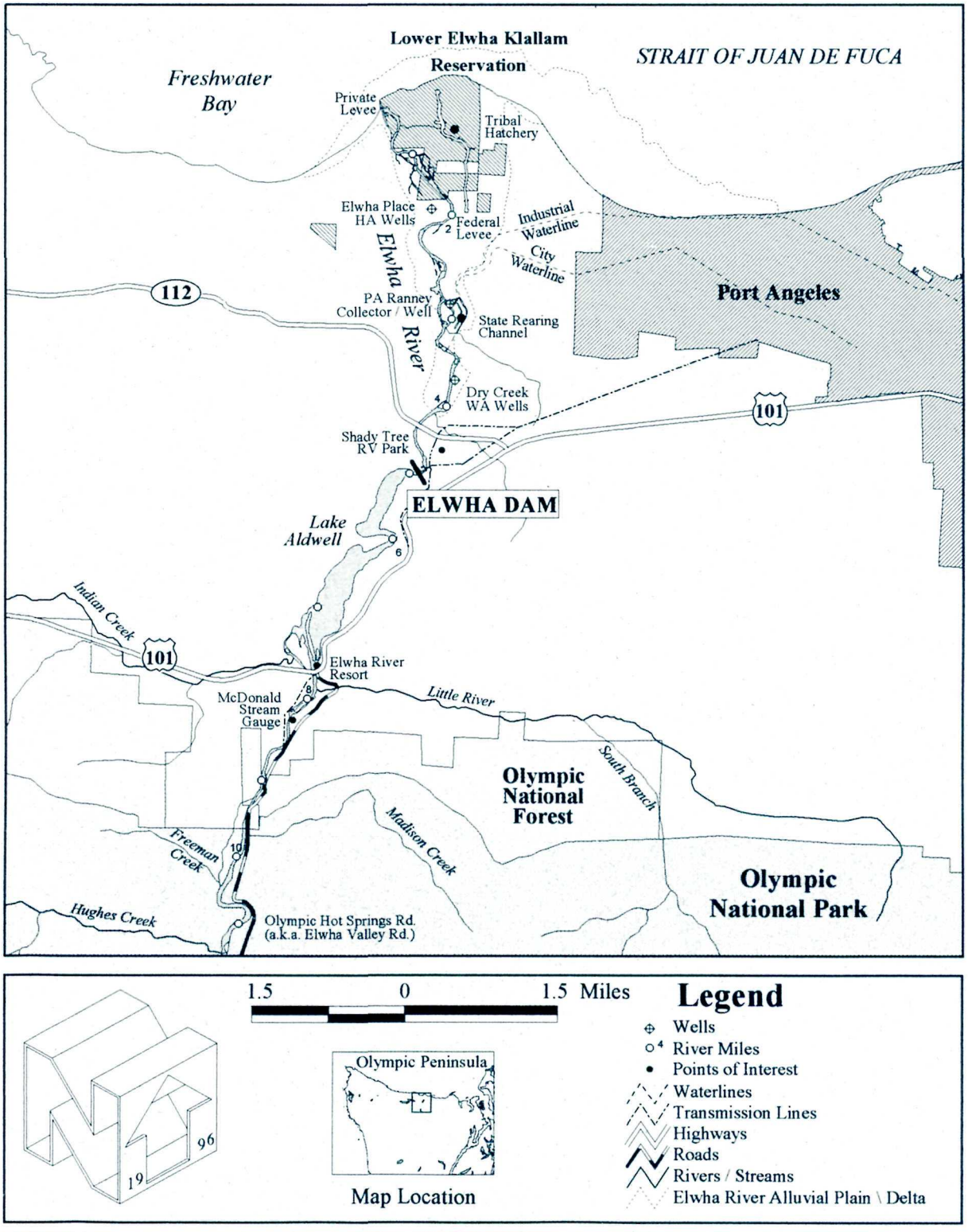
## Regional Hydrological Setting

**Page 114, paragraph 4, sentence 1 - change to read:**

An alluvial sand and gravel groundwater aquifer, which supplies municipal ~~and industrial~~ water for local residents and businesses, underlies the Elwha River valley (see BOR 1995a).

**Page 115, Figure 10 - replace with the following corrected map:**

***Figure 10.*** *Northern Study Area*
*Olympic National Park*
*United States Department of the Interior — National Park Service*
*DSC — December 1995 - 149 - 20069A*



## *Groundwater Quantity and Use*

**Page 118, paragraph 3, last sentence change to read:**

There is little indication that river water quality affects the Ranney collector water supply~~.~~ except during high flow events following a prolonged dry spell when soil around the base of the collector caisson dries and cracks. This provides an infiltration path that bypasses the filtration normally provided by the riverbed sediments.

## *Groundwater Quality*

**Page 119, paragraph 2, after last sentence - add the following text:**

...mineral staining of fixtures and clothing. Iron and manganese are regulated by secondary standards and are advisory only.

**Page 119, paragraph 3, sentence 1 - change to read:**

Turbidity of the Ranney well is lower than in the river because alluvial sands and gravels filter out a large portion of the particulate matter, the 1994 measured mean turbidity of 0.08 NTU (nephelometric turbidity units - a measure of how ~~intensely~~ much light is scattered by particles in the water) does not exceed drinking water standards of 1.0 NTU.

# *Wildlife*

## *Birds*

**Page 133, paragraph 4, after sentence 2 - add the following:**

...and lesser scaup are common winter residents on both reservoirs. Canada geese use the lakes during the fall and early winter, and at least two pairs nest at Lake Aldwell each spring. Mallards and gadwells have also been observed nesting at Lake Aldwell.

**Page 133, paragraph 5, sentence 5 - change to read:**

The Pacific Coast population currently totals approximately ~~14,000~~ 16,300 birds, with 2,000 wintering in western Washington (FWS 1995e).

**Page 133, paragraph 5, sentences 8 & 9 - change to read:**

As a result, ~~trumpeter swans have been increasing over the last 15 years (WDFW 1994b). In 1990-1992, sightings of trumpeters in winter index areas of the Pacific Coast region were already above year 201 North American Waterfowl Management Plan goals of 10,000 birds~~. the Pacific coast population of trumpeter swans has increased from about 2,850 in 1968 to 16,300 birds in 1995.

# *Species of Special Concern*

**Page 134, paragraph 2, sentence 3 - change to read:**

Species in the area that are currently candidates for federal listing include the ~~are the Pacific fisher, harlequin duck, northern goshawk, northern red-legged frog, and~~ bull trout. The Pacific fisher, harlequin duck, northern goshawk and northern red-legged frog have been downgraded from federal candidate species to considered "of concern to the US Fish and Wildlife Service."

**Page 135, paragraph 6 - change to read:**

~~Sixty-seven surveys for murrelets were completed during the 1995 breeding season at 15 detection stations throughout the project area (Hathorn et al., 1995). A total of 145 murrelet detections (birds heard or seen) were recorded. Most (63%) were obtained at boat stations on Lake Mills (71 detections) and Lake Aldwell (21). Two detections on average were recorded per survey, with a range of 0 to 17. Observation patterns indicated low numbers of birds in daily north-south travel movements along the river.~~ Surveys were conducted in 1995 and 1996 to determine if nesting by marbled murrelets occurs within the vicinity of the two dams (Hathorn, et al., 1995 and 1996). A total of 145 and 207 detections were recorded within the lower Elwha drainage in 1995 and 1996 respectively, which indicates low numbers of birds travel daily north to south through the study area. No evidence of nesting was found ~~in the project area~~ within the vicinity of either Elwha Dam or Glines Canyon Dam; the nearest nesting activity ~~appeared to be~~ occurs in upper parts of adjoining tributary streams such as Boulder Creek, or farther upriver, which is similar to ~~earlier~~ findings in earlier studies (FERC 1993, Hathorn, et al., 1996).

**Page 136, paragraph 5, sentences 4 & 5 - change to read:**

...marginally suitable. These areas were surveyed ~~are currently being surveyed~~ for nesting ~~and will be resurveyed in 1996~~ to comply with the requirements of the Endangered Species Act. ~~If nesting birds are found in the project area.~~ A~~a~~ppropriate conservation measures will be included ~~identified~~ to mitigate anticipated effects of dam removal and other restoration activities (see Impacts section for Species of Special Concern and Appendix 7 for more information ~~for more detail~~).

## *Federal Candidate Species*

Page 137, paragraph 5 and page 138, paragraph 1, 2, and 3 - Pacific Fisher, Harlequin Duck, Northern Goshawk, and Northern Red Tailed Frog are now Species of Concern instead of Federal Candidate Species. Move all of the text but the Bull Trout paragraph to a new section entitled:

***Federal Species of Concern to U.S. Fish and Wildlife Service***

*Pacific Fisher*

...

*Harlequin Duck*

...

*Northern Goshawk*

...

*Northern Red Tailed Frog*

...

# *Living Marine Resources*

**Page 142, paragraph 3, after last sentence - add the following:**

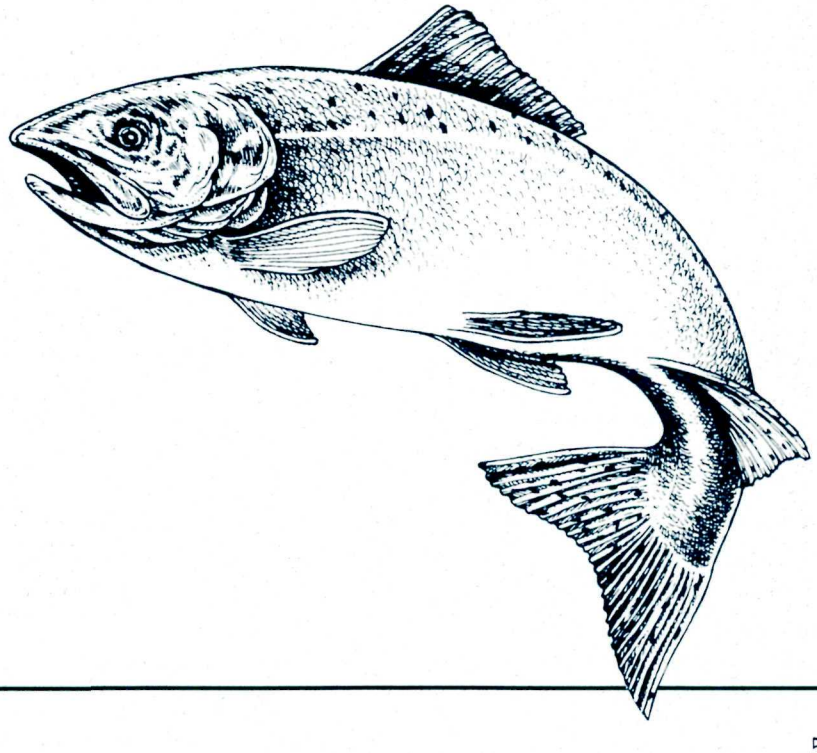
...need estuaries in which to feed and grow. The estuary is now smaller and less productive than before the dams were built as a result of them blocking the transport of coarse grained sediments and nutrients.

# *Cultural Resources*

## *Affected Resources*

**Page 150, paragraph 3, last sentence - change to read:**

Located near the one-lane bridge are the ~~Rayonier~~ industrial intake / screen house and ...



# *Socioeconomics*

## *Public Infrastructure, Services, and Utilities*

**Page 153, paragraph 2, sentence 3 - change to read:**

The storage capacity of the existing five reservoirs is ~~11~~ 17 million gallons.

## *Social Values*

**Page 157, paragraph 3, sentence 1 - change to read:**

The Olympic Power and Development Company, with financial backing from a Chicago investment firm and several Seattle businessmen initially drew public support for construction of the Elwha Dam.

# *Traffic*

## *Waste Disposal Areas*

**Page 163, paragraph 7, sentence 2 - change to read:**

It is a two-lane truck route ~~bypassing~~ located west of the City of Port Angeles downtown area.

# *Indian Trust Resources*

**Page 166, paragraph 5, sentence 2 - change to read:**

Relevant sections of this ~~DEIS~~ FEIS include Flooding, Public Health and Safety, Cultural Resources, Socioeconomics, Land Use and Aesthetics.

# *Recreation*

## *Recreational Facilities*

**Page 170, paragraph 3, sentence 2 - change to read:**

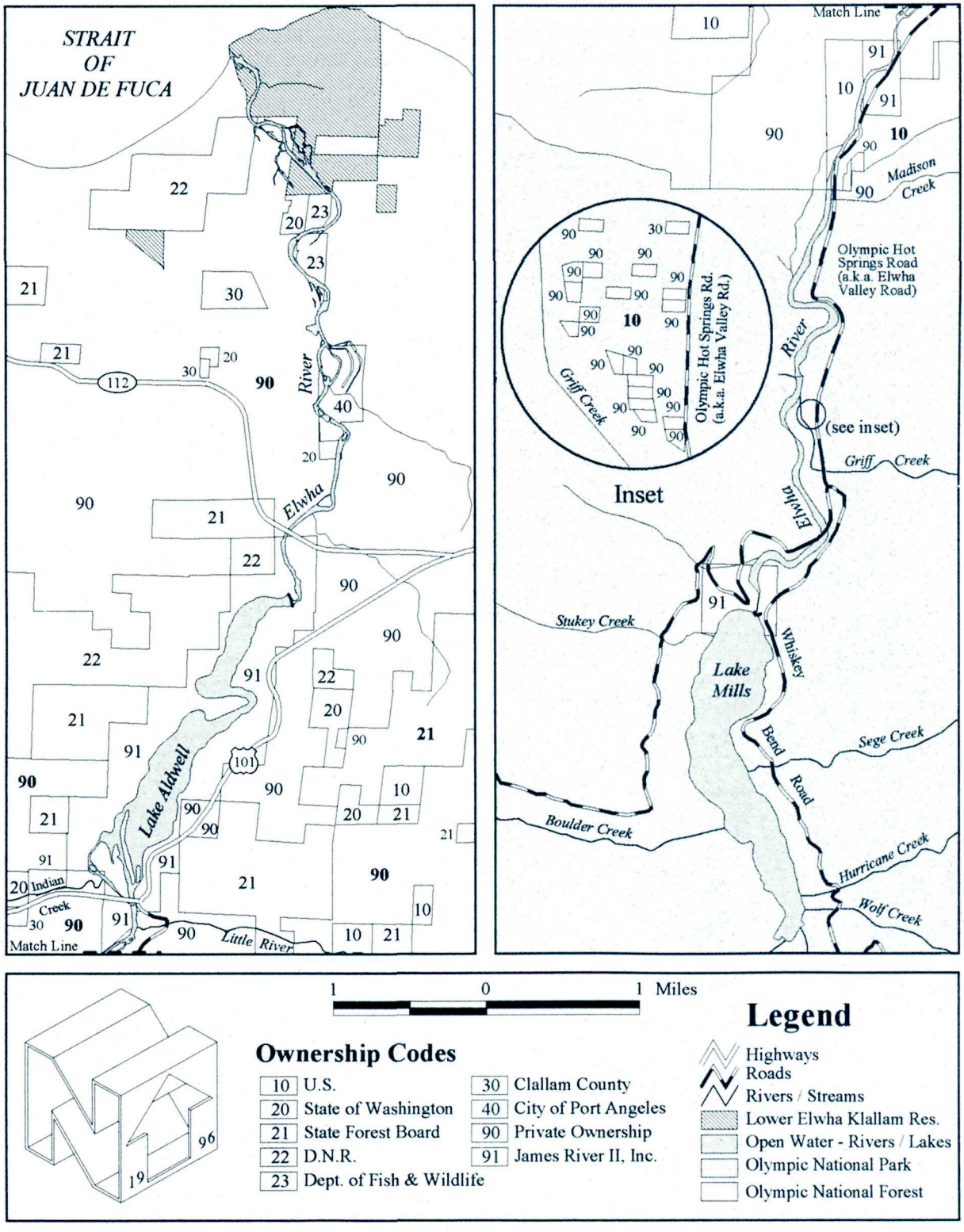
A spawning channel and a fishing site on the east side of the river as accessible from the ~~Olympic Hot Springs Road (Elwha Valley Road)~~ Crown Z Road.

# *Land Use*

## *Land Ownership*

**Page 175, Figure 16, Land Ownership - replace with the following corrected map:**

**Figure 16.** *Land Ownership*
*Olympic National Park*
*United States Department of the Interior — National Park Service*
*DSC — December 1995 - 149 - 20076A*



# *Aesthetic Resources*

## *Regional Landscape*

**Page 184, paragraph 2, sentence 1 - change to read:**

Old growth forest valleys include the Hoh Rain Forest, Bogachiel, Sol Duc, and Queets River valleys; the Hoh, Sol Duc, and Quinault Rivers are nationally famous for their scenic qualities.

# Impacts

## Fluvial Processes And Sediment Transport

### Methodologies for Analyzing Impacts

**Page 191, after paragraph 4 - add the following:**

...coastal zone were evaluated by comparison to regional coastal processes.

The U.S. Army Corps of Engineers computer program HEC-6 was used to model riverbed aggradation during and following dam removal (BOR 1996c). This moveable boundary model computes changes to and adjusts the cross section geometry and channel slope during the simulation. For each time step, this model computes hydraulics, sediment transport, and corresponding changes to the riverbed elevations and bed material size distributions. The model can compute vertical aggradation or degradation but cannot predict lateral changes. The model computes vertical riverbed aggradation if the rate of upstream sediment supply is greater than the computed sediment transport capacity. Sediment transport capacity, for a given flow and sediment size, is primarily related to river slope and velocity. Both slope and velocities tend to increase with riverbed aggradation. The Elwha River would respond to riverbed aggradation by evolving a steeper slope, not a flatter slope. Therefore, the rate of aggradation should decrease with time as the channel geometry evolves to a point of stability with its increased sediment load.

Roughness coefficients (an indicator of the resistance to flow created by the channel bed and banks) in the model were greater for the floodplains than the main channel but were assumed to be constant with time. These roughness coefficients were conservatively calibrated to low-flow conditions.

### Impacts of No Action

**Page 192, paragraph 1, sentence 1 - change to read:**

*Overall*. The river below Glines Canyon Dam ~~meanders~~ migrates less frequently...

**Page 192, paragraph 1, sentence 3 - change to read:**

The loss of riverbed material has also dropped the river's elevation in some places (especially below RM 2.5), and the water is now more confined within the channel boundaries.

**Page 192, paragraph 1, sentence 5 - change to read:**

This contributes to a channelized, rather than ~~meandering~~ migrating river morphology.

**Page 192, paragraph 1, sentence 8 - change to read:**

The loss of streambed material and its effect on reducing the ~~meandering~~ migrating nature of the river...

**Page 192, paragraph 1, sentence 3 - change to read:**

The loss of riverbed material has also dropped the river's elevation in some places (especially below RM 2.5), and the water is now more confined within the channel boundaries.

**Page 193, paragraph 1, last sentence - change to read:**

However, ~~it was not built to be structurally capable of constraining main channel migration if meander belt width expands, as would be expected in the long term following dam removal~~ the levee could fail during floodflows if the main river channel migrated over to and against the levee, because it was not built to withstand the relatively high velocities of the main river channel (COE 1987).

**Page 193, paragraph 3, sentence 3 - change to read:**

As a result, total sediment yields to the delta have dropped to 5,900 cubic yards per year, or approximately 2% of the pre-dam volume.

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 194, paragraph 1 - change to read:**

The US Army Corps of Engineers, which spends approximately $100,000 annually (January 1995 figures) to control further erosion of Ediz Hook, estimates that sediment supplied from the river before the dams were built was ~~between~~ 50,000 ~~and 80,000~~ cubic yards per year (Schwartz 1994). Currently, the river contributes a negligible volume of sediment to Ediz Hook (approximately 5,000 cubic yards per year). Marine cliffs east of the river mouth also supplied sediment to ~~the beaches and~~ Ediz Hook, but this source too ~~has been~~ was vastly reduced to 40,000 cubic yards per year when the cliffs were stabilized in 1930 and again in 1958 to control erosion and protect a city water supply pipeline at their base. An additional 10,000 cubic yards per year come from sources west of the river mouth. ~~In 1930 and again in 1958, these cliffs were stabilized to control erosion and to protect a city water supply pipeline at their base. It is estimated that the dams on the Elwha River have reduced sediment supply to the coastal zone between the Elwha River mouth and Ediz Hook by approximately 35%. Stabilization of the marine cliffs is estimated to have reduced beach and hook sediment supply by 55%.~~

**Page 194, paragraph 2, sentence 2 - change to read:**

The river channel is armored and ~~meanders~~ migrates over less of its floodplain as a result of the decreased sediment supply.

**Page 194, paragraph 6, sentence 2 - change to read:**

Of the 8.5 million cubic yards of coarse sediment currently trapped in both lakes, only about ~~14 - 30%~~ 15 - 32% (1.2 million to ~~2.6~~ 2.7 million cubic yards) would be eroded downstream from both reservoirs.

**Page 195, table 28 - replace with the following corrected table:**

***Table 28.*** *Range of Final Sediment Release During and Following Dam Removal — River Erosion Alternative (Proposed Action)*

| SOURCE OF IMPACT | TIME OF IMPACT | SUSPENDED SEDIMENT CONCENTRATIONS AND DURATION |
|---|---|---|
| **Begin lake drawdown for dam removal** | Starting in June, year 1[b] | 31 to 43 days less than 200 ppm[a]<br>123 to 217 days more than 200 ppm<br>52 to 170 days more than 1,000 ppm<br>0 to 26 days more than 10,000 ppm<br>6,700 to 43,000 ppm peak concentration |
| **Stop dam removal during winter floods and to protect migrating fish** | Starting in November, year 1 | 20 to 85 days less than 200 ppm<br>(close to background levels) |
| **Continue dam removal after winter floods** | Starting ~~between December, year 1 and February~~ in January, year 2 | 0 to 3 days less than 200 ppm<br>20 to 126 days more than 200 ppm<br>20 to 83 days more than 1,000 ppm<br>0 to 2 days more than 10,000 ppm<br>5,600 to 11,000 ppm peak concentration |
| **Stop dam removal during high spring runoff and to protect migrating fish** | Starting in April or May, year 2 | 80 to 100 days less than 200 ppm<br>(close to background levels) |
| **Complete dam removal after high spring runoff** | Starting in July and lasting to late October, year 2 | 0 days less than 200 ppm<br>90 to 111 days more than 200 ppm<br>87 to 108 days more than 1,000 ppm<br>3 to 25 day more than 10,000 ppm<br>15,000 to 51,000 ppm peak concentration |
| **Flood induced erosion following dam removal** | Starting ~~November~~ October, year 2 through September, year 4 | 606 to 698 days less than 200 ppm<br>9 to 103 days more than 200 ppm<br>5 to 79 days more than 1,000 ppm<br>2 to 6 days more than 10,000 ppm<br>21,000 to 38,000 ppm peak concentration |

[a] Parts per million (ppm) by weight

[b] Dam removal activities begin in November of the preceding year

**Page 195, paragraph 2, sentence 1 - change to read:**

Of the 9.2 million cubic yards of fine-grained sediment trapped in both lakes, between ~~52~~ 53 and 61% (~~4.8~~ 4.9 million to 5.6 million cubic yards) would be eroded downstream from both dams.

**Page 196, table 29 - replace with the following corrected table:**

***Table 29.*** *Sediment Before and After Dam Removal — River Erosion (Proposed Action)*
*(million cubic yards)*

| | LAKE MILLS | LAKE ALDWELL | TOTAL |
|---|---|---|---|
| **Fine-grained sediment (less than 0.75 mm) now** | 6.6 | 2.6 | 9.2 |
| **Fine-grained sediment released** | 3.6-4.1 | 1.2-1.5 | ~~4.8-5.6~~<br>4.9-5.6 |
| **Fine-grained sediment remaining** | 2.5-3.0 | ~~1.0-1.4~~<br>1.1-1.4 | ~~3.6-4.4~~<br>3.6-4.3 |
| **Coarse-grained sediment (larger than 0.75 mm) now** | 7.2 | 1.3 | 8.5 |
| **Coarse-grained sediment released** | ~~1.0-2.2~~<br>0.8-1.8 | ~~0.2-0.4~~<br>0.2-1.3 | ~~1.2-2.6~~<br>1.2-2.7 |
| **Coarse-grained sediment remaining** | ~~5.0-6.2~~<br>5.4-6.4 | ~~0.9-1.1~~<br>0.0-1.1 | ~~5.9-7.3~~<br>5.8-7.3 |

**Page 196, paragraph 1, sentence 1 - change to read:**

...sediment modeling done by the Bureau of Reclamation, table 29 ~~illustrates~~ lists the ~~percentage~~ volumes of coarse and fine-grained sediment predicted to erode from the reservoirs after dam removal.

**Page 196, paragraph 2, after last sentence - add the following:**

...and the coarser materials would tend to aggrade the riverbed. Fine materials would be suspended and carried out almost immediately and most of the coarse grained materials would erode out more slowly in the months and years following dam removal. In the channel, sand-sized material would be flushed quickly from the system, in months to a few years. Gravel would take longer, appearing in measurable quantity throughout the lower river within two to six years. Cobbles and larger sized material would take considerably longer to move through the system, possibly on the order of years to decades under average hydrologic conditions. As gravel and larger sized material move through the system, they will essentially be reestablishing pre-dam conditions on the riverbed.

**Page 198, paragraph 1, sentence 4 - change to read:**

For the first year of dam removal, water quality conditions would include months of high turbidity with suspended sediment concentrations in the range of ~~500~~ 200 to ~~6,000~~ 10,000 parts per million, and peaks could exceed ~~50,000~~ 40,000 during ~~high flows or~~ reservoir drawdowns (see table 28).

**Page 199, paragraph 2, after last sentence - add the following:**

...over a wider swath of the floodplain. Increased channel migration would potentially threaten the

integrity of the federal Lower Elwha Flood Control Levee as it was not designed or constructed to withstand high velocities of the main river channel.

**Page 199, paragraph 3, after sentence 5 - add the following:**

...with increased surface water elevations. If riverbed aggradation of up to 5 feet is assumed (a conservative estimate, see below), water surface elevations during the 100-year flood would increase by an average of 2.5 feet above current conditions. If such increases did occur, it could result in adverse impacts at some locations (see Impacts to Flooding).

**Page 199, paragraph 4, last sentence - change to read:**

Depending on the location in the river channel, 100-year flood elevations would increase 1 - ~~4~~ 5 feet in some flat areas. Modeling indicates that increases greater than 3.5 feet would occur only in a few short reaches of the river. Increases would typically be more in the range of 2 to 3.5 feet.

**Page 199, paragraph 5, last sentence - change to read:**

In reality, sediments could not erode from the reservoirs at this rate, but would remain in ~~and just downstream of~~ the reservoirs until there was excess transport capacity in the river.

**Page 199, paragraph 6, sentences 1& 2 - change to read:**

Figure 21 is a similar river profile with current conditions and predicted river stage after ~~50~~ 53 years. The long-term impacts shown in this figure include the short-term impacts shown in figure 20. This figure shows that within ~~50~~ 53 years, aggradation would be more evenly distributed throughout the entire lower reach of the river.

**Page 202, paragraph 1, sentence 2 - change to read:**

Coarse sediment redistribution would occur within ~~50~~ 53 years; in fact, it would probably occur much sooner, depending on flow conditions (see Impacts to Flooding for more information).

**Page 203, paragraph 4, last sentence - change to read:**

Long-term aggradation downstream from the dams ~~resulting~~ would continue in some reaches (especially below RM 2.5) from transport of the natural sediment supply. This could result in a total ~~would be expected to~~ increase in the 100-year flood water elevations ~~by~~ of up to ~~4~~ 3.5 - 5 feet at some locations, although typically, the increase would be ~~about 2 feet~~ in the range of 2.5 - 3 feet.

**Page 203, paragraph 5, sentence 1 - change to read:**

Between 1.2 and ~~2.6~~ 2.7 million cubic yards of ~~fine~~ coarse grained sediment and ~~4.8~~ 4.9 to 5.6 million cubic yards of ~~coarse~~ fine grained sediment would erode from the reservoirs following dam removal.

**Page 204, paragraph 1, sentence 2 - change to read:**

Dam removal would restore a more free-flowing river with more ~~meandering~~ migration over its floodplain and ~~increased bank erosion~~ localized increases in bank erosion.

## *Impacts of the Dredge and Slurry Alternative*

**Page 204, paragraph 3, sentence 1 - change to read:**

Use of a dredge and slurry pipeline would not completely ~~remove~~ eliminate all fine-grained sediment from the reservoirs during dam removal but would remove about 75%.

**Page 204, table 30 - replace with the following corrected table:**

***Table 30.*** *Fine-grained Sediment Behind Dams and Quantities Expected to Enter River upon Dam Removal — River Erosion (Proposed Action) and Dredge and Slurry Alternatives*
*( million cubic yards)*

| | LAKE MILLS | LAKE ALDWELL | TOTAL |
|---|---|---|---|
| **Fine-grained sediments (less than 0.75 mm) present now** | 6.6 | 2.6 | 9.2 |
| **Proposed Action- fine-grained sediments washed out by river erosion** | 3.6-4.1 | 1.2-1.5 | ~~4.8-5.6~~ 4.9-5.6 |
| **Dredge & Slurry- fine-grained sediments washed out by river erosion** | 0.9-1.0 | ~~0.35-0.4~~ 0 .3-0.4 | 1.2-1.4 |

**Page 205, table 31 - replace with the following corrected table:**

***Table 31.*** *Range of Final Sediment Release During and Following Dam Removal — Dredge and Slurry Alternative*

| SOURCE OF IMPACT | TIME OF IMPACT | SUSPENDED SEDIMENT CONCENTRATIONS AND DURATION |
|---|---|---|
| **Begin lake drawdown for dam removal** | Starting in June, year 1[b] | 41 to 81 days less than 200 ppm[a]<br>79 to 179 days more than 200 ppm<br>7 to 76 days more than 1,000 ppm<br>0 to 1 day more than 10,000 ppm<br>1,700 to 11,000 ppm peak concentration |
| **Stop dam removal during winter floods and to protect migrating fish** | Starting in November, year 1 | 20 to 119 days less than 200 ppm<br>(close to background levels) |
| **Continue dam removal after winter floods** | Starting ~~between December, year 1 and February~~ in January, year 2 | 0 to 36 days less than 200 ppm<br>20 to 84 days more than 200 ppm<br>12 to 38 days more than 1,000 ppm<br>0 days more than 10,000 ppm<br>1,400 to 2,700 ppm peak concentration |
| **Stop dam removal during high spring runoff and to protect migrating fish** | Starting in April or May, year 2 | 96 to 100 days less than 200 ppm<br>(close to background levels) |
| **Complete dam removal after high spring runoff** | Starting in July and lasting to late October, year 2 | 1 to 6 days less than 200 ppm<br>88 to 108 days more than 200 ppm<br>22 to 61 days more than 1,000 ppm<br>0 to 1 day more than 10,000 ppm<br>3,900 to 13,000 ppm peak concentration |
| **Flood induced erosion following dam removal** | Starting ~~November~~ October, year 2 through September, year 4 | 625 to 708 days less than 200 ppm<br>5 to 84 days more than 200 ppm<br>4 to 13 days more than 1,000 ppm<br>0 days more than 10,000 ppm<br>5,300 to 9,400 ppm peak concentration |

a Parts per million (ppm) by weight.
b Dam removal activities begin in November of the preceding year

# *Flooding*

## *Impacts of No Action*

**Page 207, paragraph 4, sentence 1 - change to read:**
Flooding now occurs along parts of the Elwha River (see figure 9, table 32, and appendix 4) but at a lower elevation in some places than before the dams were built.

**Page 208, paragraph 1, sentence 3 - change to read:**
The degree of degradation varies from Glines Canyon Dam to mouth of the river, and is generally more ~~obvious~~ pronounced in the ~~less steep sections such as in the~~ lower reach. In general, bedrock controls have prevented extensive degradation of the riverbed, especially in the middle reach between the two dams and for the mile of river below the Elwha Dam.

**Page 208, paragraph 2, sentence 1 - change to read:**
...in some cases has also reduced the width and amount of the river's ~~meander~~ migration.

**Page 208, paragraph 3, sentences 2 & 3 - change to read:**
...the river does not ~~meander~~ migrate as much as before the dams were built (see Sediment, Fisheries, and Vegetation Impacts of the proposed action). Also, reduced channel ~~meandering~~ migration and lateral adjustment result...

**Page 208, paragraph 5, sentence 2 - change to read:**
Degradation of the riverbed, caused by trapping coarse-grained sediment behind the dams, has caused flood stage from Glines Canyon Dam to the mouth of the river to be lowered in some places.

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 210, table 33 - replace with the following corrected table:**

***Table 33.*** *Water Surface Elevations Before and After Dam Removal with the 100-Year Frequency Flood Event*

| RM | | Existing Water Surface Elevation | Predicted Water Surface Elevation - long-term | Increase (feet) |
|---|---|---|---|---|
| 0.1 | Federal levee - downstream end | 7.4 | 8.4 | 1.0 |
| 1.4 | Elwha Place wells | 32.1 | 35.4 | 3.3 |
| 1.6 | Federal levee (upstream end) | 34.9 | 38.1 | 3.2 |
| 2.8 | Washington State Fish Rearing Facility, Ranney collector | 64.2 | ~~66.7~~67.3 | ~~2.5~~ 3.1 |
| 3.3 | Route 112 bridge | 76.0 | ~~77.9~~77.7 | ~~1.9~~ 1.7 |
| 3.3 | Industrial water intake | 77.6 | ~~79.5~~79.4 | ~~1.9~~ 1.8 |
| 3.5 | Private residences | 78.4 | ~~80.2~~81.8 | ~~1.8~~ 3.4 |
| 3.6 | Dry Creek Water Association wells | 83.3 | ~~84.6~~84.8 | ~~1.3~~ 1.5 |
| 4.9 | Elwha Dam | 109.7 | 111.5 | 1.8 |
| 7.7 | Hwy 101 bridge | 207.8 | 210.3 | 2.5 |
| 7.9 | Private well | 210.4 | 212.8 | 2.4 |
| 8.5 | USGS gauging station | 232.1 | 234.5 | 2.4 |
| 9.6 | ONP boundary | 258.9 | 260.3 | 1.4 |
| 11.0 | Elwha Campground | 325.0 | 326 | 1.0 |
| 12.0 | Elwha Ranger Station | 351.3 | 352.1 | 0.8 |
| 12.5 | Altaire Campground & bridge | 368.5 | 371.0 | 2.5 |

SOURCE: COE, 1995a

**Page 211, paragraph 1, last sentence - change to read:**

Over the long-term (up to 50 years and beyond), aggradation caused by deposition of coarser-grained sediments ~~would be greater than~~ would continue to add to the aggradation ~~that~~ caused by the short-term (up to five years) release of sediments from behind the dams.

**Page 211, paragraph 4, sentences 2 & 3 - change to read:**

With removal of the dams, the 100-year frequency flood water ~~level~~ elevation along the levee would increase from 1.0 foot at its downstream end to as much as to 4.0 feet near its middle and 3.0 feet at the upstream end. ~~One thousand feet of the levee would need to be raised an average of 3 feet and~~ The entire 8000 foot long levee would need to be raised an average of 3 feet, and 1000 feet of it armored with 2-foot thick riprap to retain the current level of flood protection.

**Page 214, paragraph 1, sentence 1 - change to read:**

After dam removal, water flow under four bridges - the Elwha ~~Valley~~ River Road near the fish rearing facility,...

**Page 214, paragraph 2, sentence 1 - change to read:**

As part of both action alternatives, ~~T~~table 34 identifies mandatory and recommended structural mitigation for all buildings, wells, roads, and bridges that may be affected by the removal of Glines Canyon and Elwha dams.

**Page 214, paragraph 2, after last sentence - add the following:**

...flood protection than now exists for these structures. Flooding may affect other structures or property not anticipated by sediment modeling. Interior has committed to working with property owners to address and mitigate these impacts should they occur as a direct result of dam removal.

**Page 214, paragraph 3, last sentence - change to read:**

Properties could be purchased from owners or exchanged for federal or state land so that they could relocate away from the Elwha River.

**Page 214, paragraph 5, sentence 1 - change to read:**

Riverbed aggradation and subsequent raising of the water surface elevation ~~up to 4 feet~~ in some places between Glines Canyon Dam and the river mouth ~~would cause~~ could result in more frequent flooding at some locations, causing major adverse impacts~~, although not significantly different from existing conditions~~.

**Page 215, table 34 - replace with the following corrected table:**

## *Table 34.* *Structural Mitigation for Flooding Impacts*

| LOCATION AND STRUCTURE | MITIGATION |
|---|---|
| **Lower Elwha flood control levee- RM 0.1-1.6** | raise entire levee an average of 3 feet and armor upstream 1,000 feet with 2 foot thick riprap (required) |
| **Locally constructed (nonfederal) levee - RM 0.0 - 0.1** | raise levee 1 foot and armor with 2 feet of graded riprap |
| **Private residences - RM 0.0 - 0.2** | raise structures by 1 foot or flood proof / extend federal levee to high ground |
| **Elwha Place Homeowners' wells and private residence - RM 1.4** | raise wellheads and residence up to 3 feet |
| **City of Port Angeles Ranney well collector - RM 2.8** | ~~raise well caisson and chlorine storage building 3 feet or~~ protect with levee (required) |
| **Washington State fish rearing facility - RM 2.8 - 3.0** | raise 3,000 feet of Crown Zellerbach Road by 5 feet (immediately west of facility) and add flap gate to entrance channel culvert |
| **Port Angeles industrial water supply channel - RM 2.8** | raise Crown Z Road as above (required) |
| **Water wells at fish rearing facility - RM 2.8** | raise wellheads 3 to 4 feet |
| **West bank residences - near RM 3.5** | raise structures or floodproof |
| **East bank residence - near RM 3.5** | raise structures or floodproof |
| ~~**Dry Creek Water Association wells and access road - RM 3.6**~~ | ~~raise road grade 1.5 - 6 feet, raise 2 well houses and 1 exterior wellhead (required)~~ |
| **Residences - near RM 8.4** | raise 2,000 feet of the Elwha Valley Road (Olympic Hot Springs Road) by 3.5 feet and raise or floodproof 3 houses |
| **River training dike - RM 8.5** | raise dike 3 feet and armor with riprap |
| **Residence - near RM 9.5** | raise structures or floodproof; armor channel bank with riprap 15 feet high and 3 feet thick |
| **Elwha Campground - RM 11** | close campground during high flows or relocate campground if suitable areas outside floodplain are available |
| **Elwha Ranger Station - near RM 12** | none necessary |
| **Altaire Campground - RM 12.5** | close campground during high flows or relocate campground if suitable areas outside floodplain are available |
| **Elwha Valley (Olympic Hot Springs) Road - 4 miles long** | raise about 1 mile of low elevation sections of the road by 1.5 feet (in park); raise 2/3 mile of road outside of park by 1.5 to 2.5 feet. Riprap select sections of road |
| **Bridges: U.S. Highway 101 - near RM 7.7<br>Elwha Valley Road - near Altaire Campground at RM 12.6** | add debris deflectors to the in-water piers |

SOURCE: COE, 1995A

## *Impacts of the Dredge and Slurry Alternative*

**Page 216, paragraph 3, sentences 5 & 6 - change to read:**

Restoring a coarse-grained sediment supply to the river would result in its ~~meandering~~ migrating over more of the floodplain and would have the beneficial impact of reestablishing natural fluvial processes. Conversely, such ~~meandering~~ migration could increase bank erosion and cause property damage along the river.

**Page 216, paragraph 4, sentence 2 - change to read:**

Riverbed aggradation and raising of the water surface elevation from 1 to as much as ~~up to 4~~ 5 feet in some places between Glines Canyon Dam and the river mouth would cause more frequent flooding at some locations, ~~causing~~ resulting in minor to major adverse impacts.

# *Surface Water*

## *Impacts of No Action*

**Page 218, paragraph 4 - delete entire paragraph:**

~~**Use**~~

~~The city of Port Angeles....high turbidity periods.~~

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 221, paragraph 2, sentence 1 - change to read:**

Turbidity levels would ~~far exceed water quality requirements~~ be very high during dam removal and have major adverse impacts to water quality, as well as to users if proposed water quality mitigation measures were not integrated into project design.

**Page 223, paragraph 4 - change to read:**

The infiltration gallery would naturally reduce sediment load in intake water by filtration through the river alluvium. ~~Each infiltration pipe would be surrounded by a graded sand and gravel filter that allows coarse particles to be filtered out of the inflowing water as it migrates~~ The gallery would be composed of a series of looped pipes to maximize surface area and volume of water entering ~~toward~~ the infiltration pipe. In addition, a series of pumps would be used to increase the volume of water drawn from the infiltration gallery and delivered to the pre-treatment facility (and later, following dam removal, to the mills). Hydraulic gradient, water velocities, and interstitial space would all increase moving from the riverbed to the pipe. Natural seasonal flooding and bed scouring would aid in removing filtered fine material from the upper portions of the riverbed.

**Page 224, table 39 - replace with the following corrected table:**

***Table 39.*** *Mitigation Measures Included — River Erosion Alternative (Proposed Action)*

| SURFACE WATER USER | MITIGATION MEASURE |
|---|---|
| **Industrial-Daishowa and Rayonier Mills** | Infiltration gallery<br>Open channel pre-treatment |
| **~~Mills and~~ State Rearing facility** | Relocated (short-term)<br>Infiltration gallery (long-term) |
| **Lower Elwha Klallam Tribal Fish Hatchery** | Add to infiltration gallery<br>Two new wells for dilution<br>Dredge existing outlet and create new bypass to Strait |

**Page 225, paragraph 1, sentence 3 - change to read:**

As high turbidity would often correlate to high flow conditions, the system would be removing the most sediment at the highest river flows and the return of settled solids would not induce a measurable increase in downstream turbidity. However, even during lower flows, the solids portion of flow returned to the river would be small compared to the average river flow, and impacts to the river would be minor or negligible.

**Page 226, paragraph 1, sentence 2 - change to read:**

Also, the river could ~~meander~~ migrate away from the gallery and decrease yield.

**Page 226, paragraph 4, sentence 1 - change to read:**

**Water Quality Monitoring.** A sediment management monitoring plan administered ~~by the US Geological Survey~~ by the National Park Service for ~~sediment management~~ would include sampling for critical and basic water quality parameters.

**Page 226, paragraph 4, after last sentence - add the following:**

...post-dam removal water quality impacts. Information gathered from the sites will be used to help determine the dosing frequency of flocculent at the pre-treatment facility and other treatment parameters during dam removal.

## *Impacts of the Dredge and Slurry Alternative*

**Page 228, paragraph 1, sentences 2 & 3 - change to read:**

It is estimated that 75% of the lake bed sediment could be dredged, leaving 1.2 to 1.4 million cubic yards of fine material, or peaks of up to 10,000 NTUs of turbidity, to enter the water column. The magnitude of impacts would be much less than under the River Erosion Alternative, where 4.9-5.6 million cubic yards of fine-grained material and peaks of up to 25,000 NTUs are possible. ~~but the~~ The durations of increased turbidity would be about the same for either alternative (see table 41).

**Page 228, paragraph 3, sentence 1 - change to read:**

Like the River Erosion alternative, an infiltration gallery, pumping stations and pre-industrial treatment are an integral part of the Dredge and Slurry alternative to protect the two mills now using the Elwha River water.

# *Groundwater*

## *Impacts of No Action*

**Page 231, paragraph 1, after the last sentence - add the following:**

...in place because of this phenomenon. The riverbed materials are capable of filtering out (removing) the fine grained sediment that could enter the wells that are hydraulically connected to the river. Following dam removal, it is possible that the river may migrate closer to the wells and remove some of the material that had previously filtered out these fine grained sediments.

**Page 231, paragraph 2, sentence 1 - change to read:**

...a large portion of the particulate matter. High turbidity in the river is therefore not usually reflected in water collected from the Ranney well. However, if the river rises quickly following a prolonged drought, soil around the base of the Ranney collector caisson dries and cracks, allowing surface water to bypass the filtration provided by the riverbed. During these "short-out" periods, turbidity in the Port Angeles municipal supply can be quite high. The 1994 measured mean turbidity of 0.08 NTU (nephelometric turbidity units - a measure of how ~~intensely~~ much light is scattered by particles in the water) normally does not exceed drinking water standards of 1.0 NTU.

**Page 232, paragraph 2, sentence 1- change to read:**

**~~Meander~~ River Migration and Flooding**

The dams have resulted in less frequent ~~meander~~ migration, flooding, and erosion.

**Page 232, paragraph 2, last sentence - change to read:**

Despite the reduction in ~~meander~~ migration frequency, the river has moved far enough away from the Port Angeles Ranney collector that yields have been affected.

**Page 232, paragraph 3, sentence 2- change to read:**

~~Meander~~ Migration and flood frequency have been reduced through elimination of sediment transport to the middle and lower reaches, resulting in the armoring of the downstream channel.

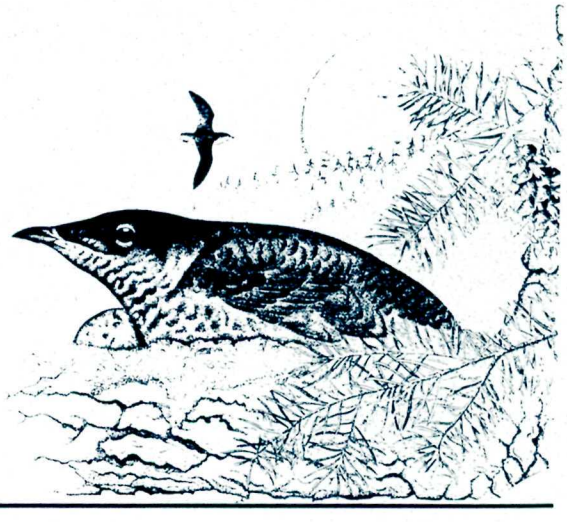
## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 234, table 43 - replace with the following corrected table:**

## ***Table 43.*** *Groundwater Impacts and Mitigation*

| GENERAL LOCATION[a] | POSSIBLE IMPACTS | PROPOSED MITIGATION |
|---|---|---|
| **Upstream of Hwy. 101 Bridge** | Increased flood potential (overtopping of wellhead) | Raise and modify wellhead |
| | Water quality degradation due to increased river turbidity | Temporary in-line sediment filter and bottled water as a backup |
| | Water quality degradation due to iron and/or manganese | Temporary storage tank and delivery of water to residences |
| **Upstream of Lake Aldwell, Indian Creek Valley** | Decreased piezometric level | Drill well or deepen existing well |
| | Increased flood potential | ~~Connect to new Ranney Collector~~ Raise or modify wellhead |
| **Dry Creek Water Association** | Water quality degradation due to increased river turbidity | Connect to new Ranney Collector |
| | Water quality degradation due to iron and/or manganese | ~~Water~~ Temporary water treatment system ~~(Port Angeles)~~ |
| **City of Port Angeles** | Possible decreased yield from existing Ranney Collector | Construct second Ranney Collector to provide supplemental flow |
| | Water quality degradation due to iron and/or manganese | ~~Water~~ Temporary water treatment system |
| **Lower River Valley Wells Including State Rearing Channel Wells** | Increased flood potential | Raise and modify wellhead for the new 100-year flood level |
| | Water quality degradation due to increased river turbidity | Temporary in-line sediment filter for residences |
| | Water quality degradation due to iron and/or manganese | Temporary storage tank and delivery of water to residence |
| **Elwha Place Homeowners' Association** | Increased flood potential | Modify wellheads and flood-proof pump house for the new 100-year flood level |
| | Water quality degradation due to increased river turbidity and/or iron and manganese | Temporary water treatment system |
| **Lower Elwha Klallam Tribe** | Increased groundwater levels | Modify about 10 conventional septic systems to mound systems with lift stations |
| **Unidentified Water Users** | Unanticipated impacts | Monitor groundwater quality |
| | | Contingency fund for mitigation |

a Not all wells within a given general location would have the same impact and mitigation. Individual well construction features and specific location would determine impact and mitigation at each specific site.



**Page 235, paragraph 2, sentence 1 - change to read:**
...would increase with riverbed aggradation and bank erosion due to increased river ~~meander~~ migration.

**Page 235, paragraph 2, sentence 3 - change to read:**
When a well is overtopped, raw, unfiltered river water ~~flows~~ can flow down from the top and contaminate~~s~~ the groundwater in the well.

**Page 235, paragraph 3, sentence 3 - change to read:**
...facilitate fish restoration. Therefore, mitigation for these users is ~~mandatory and~~ built into both action alternatives.

**Page 236, paragraph 2, last sentence - change to read:**
Cost estimates in this ~~DEIS~~ FEIS are based on Dry Creek Water Association connecting to the Port Angeles system.

**Page 236, paragraph 6, sentence 3 - change to read:**
If the river begins to ~~meander~~ migrate more frequently, it could eventually move closer to the wells, affecting their quality or stability.

**Page 238, paragraph 1, sentence 2 - change to read:**
Mitigation for Port Angeles, Dry Creek Water Association and the Lower Elwha Klallam Tribal Fish Hatchery is ~~mandatory~~ built into the proposed action and would effectively eliminate...

**Page 238, paragraph 6, sentence 3 - change to read:**
Mitigation for the protection of Port Angeles, Dry Creek Water Association, and the Lower Elwha Klallam Tribal Fish Hatchery is considered ~~mandatory~~ necessary and included as part of the Dredge and Slurry alternative.

# *Native Anadromous and Resident Fisheries*

## *Methodologies for Analyzing Impacts*

**Page 241, after paragraph 2 - add the following:**
...thresholds would be exceeded were determined (see discussion below).

Ricker modeling was used to estimate maximum sustained yield production and escapement for each species (FERC 1993). These production numbers have been extensively reviewed and represent the best estimate of potential fish production. The model incorporated data from field studies that determined the quality of fish habitat in the Elwha River conducted by a consultant for the project owner during the FERC relicensing process. These habitat data were combined with average fish densities, such as smolts per square meter, and freshwater survival rates observed in other comparable Washington streams (e.g., S.F. Skykomish River for coho salmon, Dungeness River for Pink Salmon) to gauge carrying capacity for affected species. Using the escapement needed to reach carrying capacity, average marine survival, and average freshwater survival, the total expected production of adult fish, by species, was calculated.

## *Impacts of No Action*

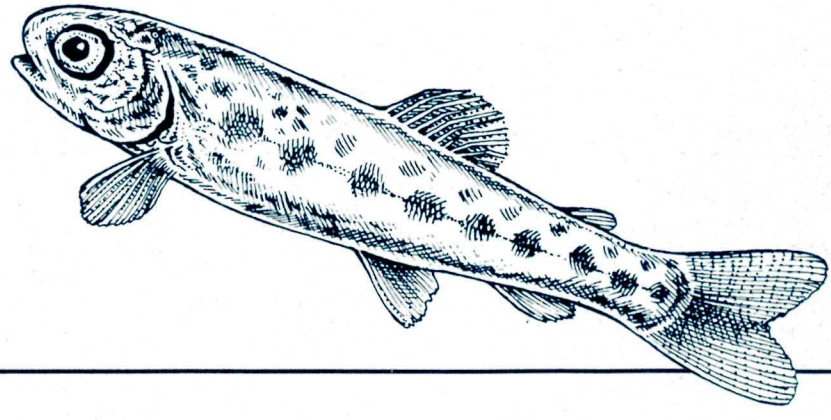
**Page 241, paragraph 5, last sentence - change to read:**
The channel is also migrating less ~~meandering~~ with little of the pool and side channel habitat fish need to successfully rear (see Impacts of No Action on fluvial processes and sediment transport).

**Page 243, after paragraph 2 - add the following:**
...average during late summer and early fall than upstream of the dams.

In addition, the size and complexity of the Elwha River estuary was reduced by as much as ½ mile when the river was dammed and coarse sediment and nutrient transport were blocked. This adversely affected anadromous fish, which use the estuary as a nursery.

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 254, paragraph 4, sentence 3 - change to read:**
...leading to more channel ~~meandering~~ migration and the creation of pool and side channel habitat that coho need to successfully rear.



**Page 257, table 46 - replace with the following corrected table:**

***Table 46.*** *Impacts of Suspended Sediments on Adult Anadromous Salmonids — River Erosion Alternative (Proposed Action)*

| Source of Impact | Time of Impact | Suspended Sediment Concentrations and Duration | Impacts | Stock Most Likely to be Affected |
|---|---|---|---|---|
| **Begin dam removal and lake drawdown** | Starting in June, year 1[a] | 123 to 217 days more than 200 ppm<br>52 to 170 days more than 1,000 ppm<br>0 to 26 days more than 10,000 ppm<br>Extremes of 6,700 to 43,000 ppm | Direct losses of fish from Lake Mills to mouth due to chronic or acute exposure. Avoidance and straying of returning adults. | Chinook, coho, pink salmon, and steelhead, and char |
| **Stop dam removal during winter floods** | Typically starting in November, year 1 | 20 to 85 days less than 200 ppm (close to background levels) | Adult fish would enter river for spawning and capture. | Chum and coho salmon; steelhead and cutthroat trout |
| **Continue dam removal after winter floods** | Typically starting ~~between Dec., year 1 and Feb.~~ in January, year 2 | 20 to 126 days more than 200 ppm<br>20 to 83 days more than 1,000 ppm<br>0 to 2 days more than 10,000 ppm<br>Extremes of 5,600 to 11,000 ppm | Direct losses of fish from Lake Mills to mouth due to chronic exposure. Avoidance and straying of returning adults. | Coho salmon and steelhead |
| **Stop dam removal during spring floods** | Starting in April or May, year 2 | 80 to 100 days less than 200 ppm (close to background levels) | Juveniles would migrate from the unaffected upper reaches to the Strait. Adult steelhead and spring chinook would enter the river. | Spring chinook and steelhead |
| **Complete dam removal after spring floods** | Starting in July and lasting to late Oct., year 2; or to Feb., year 3 | 90 to 111 days more than 200 ppm<br>87 to 108 days more than 1,000 ppm<br>3 to 25 days more than 10,000 ppm<br>Extremes of 15,000 to 51,000 ppm | Direct losses of fish from Lake Mills to mouth due to chronic or acute exposure. Avoidance and straying of returning adults. | Chinook, coho, chum, and pink salmon and steelhead |
| **After dam removal high flows erode fine reservoir sediments** | Winters & springs between ~~Nov~~ Oct. year 2 to Sept. year 4 | At least two 1 to 2 day periods with more than 10,000 ppm<br>Extremes of 20,000 to 40,000 ppm. | Some direct losses of fish. | Chum and coho salmon and winter steelhead |

a Dam removal activities begin in November of the preceding year

## Impacts of the Dredge and Slurry Alternative

**Page 263, table 48 - replace with the following corrected table:**

**Table 48.** *Impacts of Suspended Sediments on Adult Anadromous Salmonids — Dredge and Slurry*

| Source of Impact | Time of Impact | Suspended Sediment Concentrations and Duration | Impacts | Stock Most Likely to be Affected |
|---|---|---|---|---|
| **Begin dam removal and lake drawdown** | Starting in June, year 1[a] | 79 to 179 days more than 200 ppm<br>7 to 76 days more than 1,000 ppm<br>0 to 1 day more than 10,000 ppm<br>Extremes of 1,700 to 11,000 ppm | Possible direct losses of fish from Lake Mills to mouth due to chronic exposure. Avoidance and straying of returning adults. | Chinook, coho, pink salmon, steelhead, and char |
| **Stop dam removal during winter floods** | Starting in November, year 1 | 20 to 119 days less than 200 ppm (close to background levels) | Adult fish would enter river for spawning and capture. | Chum and coho salmon; steelhead and cutthroat trout |
| **Continue dam removal after winter floods** | Starting ~~between December, year 1 and February~~ in January, year 2 | 20 to 84 days more than 200 ppm<br>12 to 38 days more than 1,000 ppm<br>0 days more than 10,000 ppm<br>Extremes of 1,700 to 2,700 ppm | Some losses of fish from Lake Mills to mouth due to chronic exposure. Avoidance and straying of returning adults. | Coho salmon and steelhead |
| **Stop dam removal during spring floods** | Starting in April or May, year 2 | 96 to 100 days less than 200 ppm (close to background levels) | Juveniles would migrate from the unaffected upper reaches to the Strait. Adult steelhead and spring chinook would enter the river. | Spring chinook and steelhead |
| **Complete dam removal after spring floods** | Starting in July and lasting to November year 2. | 88 to 108 days more than 200 ppm<br>22 to 61 days more than 1,000 ppm<br>0 to 1 day more than 10,000 ppm<br>Extremes of 3,900 to 13,000 ppm | Possible direct losses of fish from Lake Mills to mouth due to chronic exposure. Avoidance and straying of returning adults. | Chinook, coho, chum, and pink salmon and steelhead |
| **After dam removal high flows erode fine reservoir sediments** | Winter & springs between ~~Nov~~ Oct. year 2 to Sept. year 4 | 0 days with more than 10,000 ppm<br>1 or 2 days with extremes of 5,000 to 7,600 ppm | Minor avoidance or stress. | Chum and coho salmon and winter steelhead |

[a] Dam removal activities begin in November of the preceding year

# Vegetation

## Impacts of No Action

**Page 266, paragraph 4, sentences 1 & 2 - change to read:**
The reservoirs inundated more than 5 linear miles or an estimated 534 acres of riparian ~~vegetation~~ habitat along the river. Riparian ~~vegetation~~ habitat is a critical component of the overall hydrologic processes of the Elwha River;...

**Page 267, paragraph 3, sentence 1 - change to read:**
A total of ~~562~~ 684 acres of potential natural vegetation and riparian habitat ~~is~~ inundated by the reservoirs and 31 acres are unavailable due to the dams and associated project facilities.

## Impacts of the Proposed Action — River Erosion Alternative

**Page 267, paragraph 4, after sentence 1 - add the following:**
...other vegetation in the reservoir beds. In addition, 122 acres of nonvegetated riparian / wetland habitat would be restored.

**Page 270, after paragraph 1 - add the following:**
...affected by reservoir draining.

Expansion of the Tribal hatchery would primarily take place within existing hatchery or rearing pond boundaries, or along the access road. Impacts to wetlands as a result of the expansion would be minor or negligible. Raising and strengthening the federal levee would also involve some very minor and temporary impacts to wetlands during construction activities.

# Species of Special Concern

## Impacts of No Action

**Page 276, paragraph 1, last sentence - change to read:**
With fewer large riparian trees dying due to reduced ~~meander~~, river migration, the number of snags has decreased that eagles could use as nesting, foraging, and roosting sites ~~has decreased~~..

**Page 276, paragraph 8, sentence 1 - change to read:**
Northern Goshawk. ~~This alternative would not impact goshawks~~. The loss of 418 acres of coniferous forest habitat resulting from the construction of the dams and reservoirs eliminated nesting habitat that was potentially used by the Northern goshawk.

## Impacts of the Proposed Action — River Erosion Alternative

**Page 278, paragraph 1, after last sentence - add the following:**
...along the shore temporarily. The Biological Opinion prepared in accordance with section 7 of the Endangered Species Act has determined that the proposed action "may affect but is not likely to adversely affect" bald eagles.

**Page 278, paragraph 4, after last sentence - add the following:**
...would not be expected to adversely affect spotted owls. In accordance with section 7 of the Endangered Species Act, the US Fish and Wildlife Service has determined in their biological opinion that the Elwha Restoration Project "may affect but is not likely to adversely affect" the northern spotted owl (see appendix 7 for more information).

**Page 278-279 last paragraph on 278 and 1st paragraph on 279 - delete and add the following:**
~~...northeast and sometimes northwest (Schwartz 1994).~~ The US Fish and Wildlife Service in its Biological Opinion determined the marbled murrelet is likely to be adversely affected by the proposed project because of higher turbidity levels in nearshore marine waters during dam removal. The impacts to

foraging murrelets are not expected to be severe since the general direction of the tidal currents is away from the shoreline to the northeast and northwest, there are strong tidal currents, turbid Elwha River water would be diluted when it flows into the strait, and there is better foraging habitat west of the river mouth.

**Page 279, paragraph 2, after last sentence - add the following:**
...increases in turbidity. Increased turbidity in marine waters, even with conservation measures, has the potential to adversely affect marbled murrelets in the short term. Suspension of reservoir drawdown periods, November 15 to December 15, and May 1 to June 30, will be required as a mandatory condition of the Biological Opinion.

**Page 279, paragraph 3 - change to read:**
~~Construction activity could adversely affect murrelets as they fly between the coast and their nest sites. Although murrelets primarily follow the river on these daily forays, it is expected that localized activity at either damsite would simply be avoided and would not interrupt movement patterns. If nesting birds and fledglings were in the vicinity of the dams, they might be adversely impacted from construction noise and activity. However,~~ Mmarbled murrelet surveys conducted in 1990,1995 and 1996 did not uncover any nesting murrelets in the vicinity of either dam. The surveys indicated low numbers of birds traveling through the project area but no evidence of nesting in the vicinity of either dam, Lake Mills, Lake Aldwell, or associated access roads. ~~Murrelet surveys are planned for 1996 to comply with US Fish and Wildlife Service survey protocol which requires two consecutive years of survey to assess murrelet presence at a particular location.~~ Since the completion of these surveys have now verified that marbled murrelet nesting does not occur within the vicinity of the two dams, restrictions on dam removal activities to protect nesting murrelets pursuant to the Endangered Species Act would not be required. The US Fish and Wildlife Service Biological Opinion states, "Terms and Conditions 1 through 4 would not be required should completion would not be required should completion of ongoing surveys indicate murrelets do not occupy the area within 1 miles of the dams to be removed." See appendix 7 for further details.

**Page 279, paragraphs 4 & 5 - delete entire paragraphs**
~~Construction activity...Endangered Species Act.~~

**Page 280, paragraph 1 - delete entire paragraph**
~~The biological assessment...not last longer than two years.~~

**Page 280, paragraph 2, sentence 4 - change to read:**
~~Conservation~~ Mitigation measures ~~expected to be~~ imposed by the US Fish and Wildlife Service include minimizing hovering...

**Page 280, paragraph 7, sentence 1 - change to read:**
Nesting peregrines ~~would not be impacted~~ may be affected, but are not likely to be adversely affected by the proposed action.

**Page 281, paragraphs 1-6 - Only the Bull Trout is a Federal Candidate Species. Pacific Fisher, Harlequin Duck, Northern Goshawk, and Northern Red-Legged Frog are now considered "Species of Concern" to the US Fish and Wildlife Service. Move these paragraphs to a new section after paragraph 3, page 282:**

## *Federal Species of Concern to USFWS*

*Pacific Fisher.*
...

*Harlequin Duck.*
...

*Northern Goshawk.*
...

*Northern Red-Legged Frog.*
...

**Page 284, paragraph 1 - change to read:**
The following species would be adversely impacted in the short term, most of them by turbidity or increased noise during the two year construction period: ~~bald eagle, northern spotted owl~~, marbled murrelet, harlequin duck, and bull trout. The degree of impact to all ~~but the marbled murrelet~~ would be minor. ~~Additional surveys necessary to comply with the Endangered Species Act and any appropriate mitigation would determine the degree of impact and appropriate mitigation for murrelets~~. Appropriate conservation measures have been included for the protection of the marbled murrelet.

**Page 284, paragraph 6, sentences 2, 3 & 4 - delete**

**Page 284, paragraph 6 - add the following:**
...when compared to the proposed action. Noise from the generators would be expected to be audible for long distances; however, based on the 1995 and 1996 surveys documenting the absence of nesting, it would not be expected to impact nesting in the vicinity.

# *Living Marine Resources*

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 289, paragraph 4, sentences 2-4 - change to read:**
The cliffs originally supplied approximately ~~270,000~~ 280,000 cubic yards of sediment to the nearshore environment each year. This was reduced to an estimated ~~90,000~~ 40,000 cubic yards annually when the bluffs were stabilized to protect a water supply line into Port Angeles (Schwartz 1994). Since waves in the vicinity have the ability to transport ~~270,000~~ 280,000 cubic yards of ~~material~~ sediment per year, beaches and the nearshore habitat have been steepened and now provide a greatly reduced intertidal zone.

## *Impacts of the Dredge and Slurry Alternative*

**Page 291, delete paragraph 1 - add the following:**
~~and the Lower Elwha Klallam Tribe...minor or no impact with mitigation.~~ Although the outfall would be placed in an area with a strong current to help disperse fine sediments, some turbid water would inevitably move to Freshwater Bay and along the shore east of the river mouth, as in the proposed action. Turbidity in these areas would be less than under the proposal. The increased total amount of fines reaching saltwater, though, and the additional fines discharged from the river, would combine to make the overall effects of this alternative similar to those of the proposed action. Coarse sediments would reach saltwater via the river in the same timeframes and would cause the same impacts as under the proposed ction.

# *Noise*

## *Impacts of the Proposed Action - River Erosion*

**Page 302, paragraph 2, sentence 1 - change to read:**
Continuous noise levels from construction equipment could have short-term (~~18 months to~~ 2 years) minor adverse impacts on residents living within one-mile of the Elwha damsite,...

# Cultural Resources

## Impacts of No Action

**Page 305, paragraph 2, last sentence - change to read:**
Elwha Dam includes"...a rare, early example of the multiple-buttress type" structure and Glines Canyon Dam is significant because of "its association with the evolution of power plant design and contribution to the development of the automation of hydroelectric installation."

# Socioeconomics

## Methodologies for Analyzing Impacts

**Page 311, after paragraph 3 - add the following:**
...an update of the analysis (Meyer 1995).

To determine local business and job impacts from construction expenditures under the preferred alternative, project engineers examined each construction line item in the EIS cost estimate, and drawing upon their experience in the northwestern part of Washington state, estimated the proportion of purchases and job hires that would be local vs. nonlocal.

These data were then fed into a regional economic impact model (IMPLAN), which predicted total changes in income and employment in the local economy, given these initial project expenditures. The IMPLAN Model is discussed further in the supporting economic analysis technical report (Meyer, et al. 1995).

The estimate of non-market value associated with dam removal was obtained by directly asking a sample of residents of Clallam County, the rest of Washington state, and the United States as a whole how much in taxes they would pay to restore the Elwha River. The survey was conducted by Dr. John Loomis of Colorado State University in November, 1994. The procedure used is described in the technical literature as "contingent valuation."

Contingent valuation is a standardized and widely used method for estimating the willingness of citizens to pay for recreation and for restoring or preserving natural attributes. It is recommended for use by federal agencies performing benefit-cost analysis and for valuing natural resource damages, and has been upheld as valid in the federal courts.

## Impacts of No Action

**Page 312, paragraph 3, sentence 1 - change to add:**
Under the No Action alternative, rapid demographic changes are not projected; however, the ongoing transition from extraction and harvest to tourism and service-based industries would be gradual~~. and lessen any acute changes in social conditions.~~

**Page 312, paragraph 4, last sentence - change to read:**
An additional ~~$8.7~~ $9.0 million in repair costs are expected in the near future (FERC 1993 p. 2-19) if the dams remain.

**Page 312, after paragraph 7 - add the following paragraph:**
...decline of commercial or sport fishing locally.

Survey data from Loomis (1995) indicate that water supply, fish and wildlife habitat, and scenic beauty are the elements of rivers considered most important by citizens of Clallam County, Washington State and of the United States in general.

**Page 313, paragraph 3, sentence 1 - change to read:**

There would be no additional costs or benefits over existing conditions, except for the ~~$8.7~~ $9.0 million in repair costs if the dams were not removed.

**Page 313, paragraph 3, sentence 3 - change to read:**
Business benefits from fisheries would continue at $840,000 per year or could decline further.

**Page 314, paragraph 1, sentences 3 & 4 - change to read:**
It is estimated that present construction cost projections of between ~~$111.1~~ $113.1 million and ~~$127.4~~ $130.1 million will generate between $60 and $65 million in business activity in Clallam County over the 10-year construction period and an additional $32-$34 million in personal income. An estimated total of between 1,150 and 1,240 jobs would also be generated over the 10-year construction period (Meyer, et al. 1995);...

**Page 314, paragraph 4, sentence 4 - change to read:**
~~Even though they come from outside the region, all workers~~ Although Interior plans to use as much local labor as possible (up to 75% of the workforce could come from the local area), even a 100% outside workforce could be accommodated by occupying these vacant units.

**Page 316, paragraph 1, sentence 2 - change to read:**
Over the 100 years following dam removal, additional recreation and tourism benefits (discounted at 3%) would total ~~$133~~ $132.3 million, expressed in present value terms.

**Page 317, table 63 - replace with the following corrected table:**

***Table 63.*** *Summary of the Net Present Value of Elwha River Restoration Market Benefits over Project Life — at 3% Discount Rate*

| MARKET BENEFITS | BOTH DAMS REMOVED (millions of dollars) |
|---|---|
| Commercial Fisheries (Tribal & Non-tribal) | 30.1 |
| Sport Fish Business | 4.5 |
| Ediz Hook | 0.9 |
| Recreation and Tourism | ~~132.6~~ 132.3 |
| **Total Market Benefits** | ~~163.6[a]~~ 162.7[a] |

[a] Excludes sport fish business net revenue to avoid double counting

**Page 318, paragraph 3, sentences 2 & 3 - change to read:**
Estimated comparative business benefits ~~and project costs~~ are summarized and displayed on this basis as single present dollar totals in tables ~~61 and 62~~ 63. For the proposed action, benefits from increased recreation and tourism would amount to ~~$134~~ $132 million over the life (100 years) of the project.

**Page 318, paragraph 4, after sentence 1 - add the following:**
...Alternatives section of the EIS. The preferred alternative of River Erosion would cost $113.1 million. Using the Dredge and Slurry approach would cost $130.1 million.

**Page 319, paragraph 3, sentence 1 - change to read:**
The estimated cost of implementing the proposed action is ~~$111.1~~ $113.1 million. ~~, although further refining of costs and increased certainty of costs may reduce this figure.~~

# *Public Health and Safety*

## *Earthquakes*

### *Impacts of No Action*

**Page 321, paragraph 3, sentence 2 - change to read:**
Uncertainties about the ~~location~~ recurrence interval of recently discovered faults in the Puget Sound region suggest that the maximum credible earthquake rating may need to be reevaluated.

## *Hazardous Materials*

### *Impacts of the Proposed Action — River Erosion Alternative*

**Page 327, paragraph 5, after sentence 3 - add the following:**
...no hazardous materials would enter the river during dam removal. Some of the materials, including solvents, fuels, and lubricants would be salvaged and recycled. Other materials would be placed in drums and trucked to an approved disposal site. Contaminated soil would be excavated to the deepest detected contamination and removed, as would contaminated concrete and transformers.

# *Recreation*

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 345, paragraph 5, after sentence 1 - add the following:**
...limitations on access to the watershed during construction. Access to Altaire campground, where a whitewater guide service currently launches, would be closed to unrestricted public access during dam removal.

**Page 345, paragraph 6, sentence 2 - change to read:**
River features that would be created by dam removal are uncertain, and recreational access, including take out sites for whitewater rafting, would be planned when they are better known.

# *Land Use*

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 350, paragraph 5, sentence 3 - change to read:**
At Lake Aldwell, 268 acres of lakebed and 750 acres (~~1018 acres project lands minus 268~~) of additional lands would be converted to one of several different possible uses.

**Page 351, paragraph 4, sentence 5 - change to read:**
Natural resource management activities may include riparian protection, viewshed protection, creation of primitive recreational opportunities, selective small-scale harvest of timber on long rotations, vegetative management for cultural resources, and wildlife habitat management.

**Page 352, after paragraph 1 - add the following:**
...may have additional indirect impacts on the resources described above.

The Elwha Restoration Act also authorizes leases of federal land to the tribe and the city of Port Angeles on Ediz Hook, and the acquisition of unspecified lands in Clallam County for the tribe. The act specifies the land for the tribe on Ediz Hook is to be used for a tribal cultural facility.

Generally, impacts of leasing land to the tribe include the following: it would prevent its use for other purposes and involve impacts associated with development. These may include grading, removing vegetation, noise and its impacts to wildlife or human populations, construction traffic, dust, etc. Use of a cultural facility on Ediz Hook would require utilities and may generate some small amount of traffic. Transfer of fee land to the United States in trust for the tribe may result in a reduction in the county's property tax base.

At this time, there is no specific proposal for lease or use of the federal land, or for acquisition or use of other lands in Clallam County. Because the specifics are not known, a detailed environmental assessment of the proposal or alternatives to it is impossible.

**Page 353, paragraph 6, sentence 3 - change to read:**
If the slurry pipeline is placed in the riverbed, river recreation users would be adversely affected during the ~~18 month to~~ two-year dam removal period.

# *Aesthetics*

## *Impacts of the Proposed Action — River Erosion Alternative*

**Page 357, paragraph 3, after sentence 4 - add the following:**
...leaving exposed sandbars throughout the river's movement zone. Should these earlier successional species be left in place long enough, they would eventually be succeeded by a forest dominated by Western hemlock or Douglas fir.

**Page 358, paragraph 2, sentence 2 - change to read:**
The other (not in this ~~DEIS~~ FEIS but available from the National Park Service) shows...

# *Required Impact Sections*

## *Impacts on Energy Consumption*

**Page 365, paragraph 1, after sentence 1 - add the following:**
...grid (FERC appendix A, Part 9). BPA has a power surplus and has projected that the surplus will last through the five-year planning period.

## *Unavoidable Adverse Impacts*

**Page 365, paragraph 4, after last sentence - add the following:**
...some other wildlife at Lake Aldwell. Groundwater levels in the Lower Elwha Valley, and particularly for Lower Elwha Klallam Reservation residents, would be permanently raised. Other residents near Lake Aldwell may experience lowered water or well levels as a result of the restoration of natural hydrologic processes.

## *Short-term Uses vs. Long-term Productivity*

**Page 366, paragraph 7, sentence 2 - change to read:**
Dam removal, and hence impacts from construction noise and traffic, would be completed in ~~18 months to~~ two years.

**Page 366, paragraph 7, sentence 2 - change to read:**
Dam removal, and hence impacts from construction noise and traffic, would be completed in ~~18 months~~ two years.

# *Consultation and Coordination*

Pages 369 - 371 and pages 378 - 382 of the draft Implementation EIS have been reprinted with corrections in the Consultation and Coordination section of this document.

# *Preparers and Contributors*

## *Preparers*

**Page 372 - 374 - add 1 year experience to the EXPERIENCE column of all preparers and contributors**

**Page 373, Bruce Stoker - delete reference to ~~Traffic~~ in Title/Responsibility column**

## *Contributors*

**Page 376, add after Dan Drake:**

| | |
|---|---|
| Jerry Gilbert | Geologic studies |

**Page 376, add after Bill Holbert:**

| | |
|---|---|
| Richard Link | Geologic studies |

**Page 378, add the following after Fred Watts:**

| | |
|---|---|
| M.J. Welling | Traffic; TDA |

# *References*
## *Bibliography*

**Page 384, BOR references:**
The following BOR references were finalized from draft versions and the dates should be changed to 1996.

(**Note** that these dates have **not** been changed throughout the FEIS and updated changes in this document are based on citations in the draft EIS):

~~1995b~~ 1996b ~~Report of Water Quality Task Group, Elwha River, Washington (currently in draft).~~ Water Quality Analyses and Mitigation Alternatives, Elwha River Dam Removal.

~~1995c~~ 1996c

~~1995i~~ 1996i

1995f - delete reference in bibliography and replace with:

1996f Sediment Analysis and Modeling of the River Erosion Alternative. Elwha Technical Services, PN-95-9. Pacific Northwest Region, Boise, ID.

1995j, 1995k, 1995l - these references have been incorporated into 1995b

**Page 385 - add the following references under BOR:**

1995m *Memorandum: Literature Review of and Visit to Glines Canyon Dam; Safety Examination of Existing Dams (SEED) Program; National Park Service, Olympic National Park, WA.* (Letter to Regional Director, Northwest Region, National Park Service). Operation and Structural Safety Group, Technical Service Center, Denver, CO.

1996j *Alluvium Distribution in the Elwha River Channel between Glines Canyon Dam and the Strait of Juan de Fuca, Washington* (Elwha Technical Series PN-95-5). Pacific Northwest Region, Boise, ID.

1996k *Report of Sediment Management Task Group, Elwha River, Washington* [currently in draft] (Elwha Technical Series PN-95-12). Pacific Northwest Region, Boise, ID.

**Page 386, after Calambokidis 1994 - add the following reference:**

Campbell, O. W.
1996 *Emergency Power for Port Angeles.* James River Corporation, Port Angeles, Washington. 7 pages.

**Page 387, after Dean Runyan Associates - add the following reference:**

DeLarm, M.R., E. Wold and R.Z. Smith.
1989 "Columbia Fisheries Development Program, Fishways and Stream Improvement Projects". *NOAA Technical Memorandum NMFS F/NWR-20.* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Portland, OR.

**Page 387, after DeShazo, J.J. - add the following reference:**

DOA (Department of Agriculture)

1989 "Forested Plant Association of the Olympic National Forest." *R6 ECOL Technical Paper 001-88.* Henderson, J.A., D. H. Peter, R.D. Lesher, and D.C. Shaw. USDA Pacific Northwest Region.

**Page 389, FWS 1986 reference - change to read:**

FWS ~~1986~~ 1986a

**Page 389, after FWS 1986 - add the following reference:**

1986b *Field tests of data collection procedures for the Elwha salmonid survival model.* Wunderlich, R.C., and S.J. Dilley. U.S. Fish and Wildlife Service, Fisheries Assistance Office, Olympia, Washington. 61 p.

**Page 389, after FWS 1986 reference - add the following reference:**

1990 *Juvenile chinook passage at Glines Canyon Dam, Elwha River, 1989-1990.* Dilley, S.J., and R.C. Wunderlich. U.S. Fish and Wildlife Service, Fisheries Assistance Office, Olympia, Washington. 41 p.

**Page 389, after FWS 1995d - add the following reference:**

1995e "1995 Survey of Trumpeter Swans in North America" compiled by David F. Caithamer, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, 11500 American Holly Drive, Laurel, MD 20708-4016.

**Page 390, after Hathorn, A.W., 1995 - add the following reference:**

Hathorn, A. W., C. Byrnes, T. DaSilva, P. Happe.

1996 "Marbled murrelet surveys in the Lower Elwha River Valley, Olympic National Park and vicinity - 1996 project completion report." Prepared for Olympic National Park, Port Angeles, WA.

**Page 390, after Heaton T.H. 1984 - add the following reference:**

Henderson J.A., D.H. Peter, R.D. Lester and D.C. Shaw

1989 "Forested Plant Association of the Olympic National Forest." R6 ECOL Technical Paper 001-88, USDA Pacific Northwest Region.

**Page 392, after Johnston, J.M.... - add the following reference:**

Jones, R.P., Jr., and E.O. Salo

1986 "The status of anadromous fish habitat in the North and South Fork Toutle River watersheds, Mount St. Helens, Washington, 1984." *Fisheries Research Institute Completion Report FRI-UW-8601.* School of Fisheries, University of Washington, Seattle. 53 p.

**Page 393, after MacDonald, L.H. - add the following reference:**

Martin, D.J., L.J. Wasserman, R.P. Jones, and E.O. Salo.

1984 "Effects of Mount St. Helens Eruption on salmon populations and habitat in the Toutle River." *Fisheries Research Technical Completion Report FRI-UW-8412*, School of Fisheries, University of Washington, Seattle. 130 p.

**Page 394, after Mausolf, R.G., and D.B. Sundvick - add the following references:**

McHenry, M.L.

1996 *Freshwater habitat conditions affecting Strait of Juan de Fuca populations of coho salmon*. Report to the Pacific Fishery Management Council, Portland. 46 p.

McHenry, M.L., J. Lichatowich, and R. Kowalski-Hagaman.

1996 *Status of Pacific salmon & their habitats on the Olympic Peninsula*. Washington. Lower Elwha Klallam Tribe, Port Angeles, Washington. 240 p.

**Page 394, after Meyer, P. A. 1995 - add the following reference:**

Meyer Resources, Inc.

1996 *Economic Analysis of Proposals by the Elwha Citizen's Advisory Committee Concerning Restoration of the Elwha River, Washington*. Prepared for US Dept. of the Interior. Davis, California.

**Page 394, after Naiman, R.J.... - add the following reference:**

National Academy of Sciences

1996 *Upstream: Salmon and Society in the Pacific Northwest*. Committee on Protection and Management of Pacific Northwest Anadromous Salmonids, Board on Environmental Studies and Toxicology, Commission on Life Sciences.

**Page 396, after NPS 1995b - add the following reference:**

1995c *Analysis of Suspended Sediment Increases From Dam Removal and River Erosion of Stored Sediments: Glines Canyon Dam, Olympic National Park* , (NPS 1995C), National Park Service Water Resources Division, Fort Collins, Colorado. June 22, 1995. Draft Report. 14 p.

**Page 397, after Port Angeles Evening News - add the following reference:**

Powers, P.D., and J.F. Orsborn.

1985 "Analysis of barriers to upstream fish migration." *Part of BPS Fisheries Project 82-14, Part 4 of 4.* Dept. Civil and Environ. Engr., Washington State University, Pullman, WA.

**Page 397, Randle... - change to read:**

Randle, T. And ~~V~~. J. Lyons

# Glossary and Acronym List

**Page 404, discount rate - change to read:**

**discount rate** - ~~The interest deducte d in advance in purchasing, lending or selling something~~. The rate at which future benefits and costs are discounted because of positive time preference, or because of the existence of a positive real rate of power (i.e., placing higher value on current consumption or income than accruing it in the future).

**Page 405, GWH - change to read:**

**GWh** - Gigawatt is a unit of electrical power, one thousand times larger than a megawatt and one billion times larger than a watt, it is a measure of the number of hours of electrical power used.

**Page 405, KWh - change to read:**

**kWh** - ~~A Kilowatt is a unit of electrical power equal to 1,000 watts of power applied over one hour.~~ A measure of the quantity of electrical power used, equal to 1,000 watt hours.

**Page 406, MWh - change to read:**

**MWh** - Megawatt hour, ~~a unit of electrical energy equal to~~ quantity of electrical power consumed, equal to one million watt-hours of electrical power.

**Page 406, NTU - change to read:**

**NTU** - Nephelometric turbidity unit is a measure of how ~~intensely~~ much light is scattered by particles in the water.

**Page 407, real costs - change to read:**

**real costs** - ~~Baseline c~~Costs that do not account for inflation.

**Page 407, after riprap - add the following:**

**Roughness coefficient** - Is an indicator used in modeling of the resistance to flow created by the channel bed and banks.

# *Appendixes*

## *Appendix 1.*

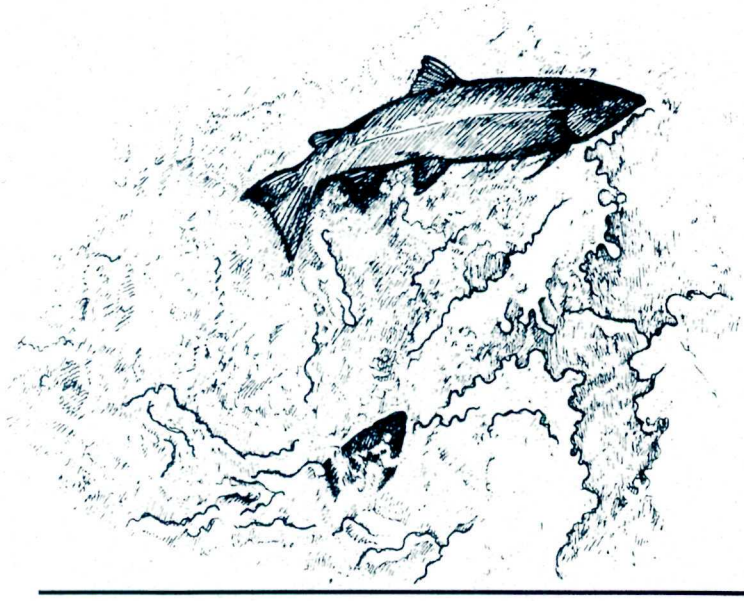
### *Public Law 102-495 • Elwha Restoration Act*

**Page 418, Paragraph 2, last line of Sec. 7 - change to read:**
~~authrozation~~ authorization $4,000,000 to carry out the land acquisition purposes of this section.

## *Appendix 2.*

### *Elwha River Fish Restoration Plan*

**Page 439, table 5 -** replace with the following corrected table:



## *Table 5.* *Hatchery-related Capital Costs*

| Item | | Cost ($K) | |
|---|---|---|---|
| **Tribal Fish-Production Facility** | | | |
| ~~-Increase water supply~~ | | ~~250~~ | |
| ~~-Upgrade incubation facilities~~ | | ~~380~~ | |
| ~~-Upgrade brood holding and rearing~~ | | ~~1040~~ | |
| ~~-Upgrade support facilities~~ | | ~~470~~ | |
| -Mobilization | | 176.4 | |
| -Upgrade existing production wells | | 60 | |
| -Install new site supply drain | | 190 | |
| -Construct new broodstock holding facilities | | 320 | |
| -Construct new incubation facility | | 380 | |
| -Construct 8 new intermediate raceways | | 640 | |
| -Site electrical distribution | | 100 | |
| -Upgrade utility and install new service entrance | | 125 | |
| -Upgraded and new standby power generation | | 150 | |
| -Alarm and control monitoring system | | 75 | |
| -Equipment storage shed | | 20 | |
| -Upgraded and new fish rearing units | | 80 | |
| -New outfall | | 280 | |
| -Administration, contingency, engineering | | ~~991~~ 1,460.6 | |
| | **Sub-Total:** | | ~~3131~~ 4,057 |
| **WDFW Fish-Production Facilities** | | | |
| -Build additional incubation facilities at Soleduc Hatchery | | ~~137~~ 114 | |
| -Move fish to Soleduc Hatchery and mark them | | ~~589~~ 491 | |
| -Move fish and incubation facilities back to Elwha, administer program | | ~~228~~ 190 | |
| - Indirect Costs | | 199 | |
| | **Sub-Total:** | | 994 |
| **Outplanting and Evaluation Equipment** | | | |
| -Boat | | 10 | |
| -Truck | | 25 | |
| -Distribution Tank | | 3 | |
| -Miscellaneous | | 20 | |
| | **Sub-Total:** | | 58 |
| | **Total:** | | ~~4,363~~ 5,109 |

# *Appendix 3.*
## *Revegetation Plan*

**Page 450, after paragraph 4 - add the following list:**
...is included in Table H-1 of the Elwha Report, Appendix H.

**Primary**

| | |
|---|---|
| *Pseudotsuga menzeisii* var. *menzeisii* | Douglas fir |
| *Alnus rubra* | Red alder |
| *Tsuga heterophylla* | Western hemlock |
| *Acer macrophyllum* | Bigleaf maple |
| *Salix spp.* | Willow |
| *Mahonia nervosa* | Oregon grape |
| *Gaultheria shallon* | Salal |
| *Rubus spectabilis* var. *spectabilis* | Salmonberry |
| *Polystichum munitum* | Sword-fern |

**Secondary**

| | |
|---|---|
| *Populus balsamifera* var. *trichocarpa* | Black cottonwood |
| *Thuja plicata* | Western red cedar |
| *Abies grandis* | Grand fir |
| *Holodiscus discolor* var. *discolor* | Ocean-spray |
| *Rubus parviflorus* var. *parviflorus* | Thimbleberry |
| *Rosa gymnocarpa* var. *gymnocarpa* | Baldhip rose |
| *Vaccinium parvifolium* | Red huckleberry |
| *Achlys triphylla* | Vanilla leaf |

Misc. native grasses and sedges
10-20 additional species

**Tertiary**

| | |
|---|---|
| *Cornus stolonifera* var. *stolonifera* | Red-osier dogwood |
| *Sedum spathulifolium* var. *spathulifolium* | Stone crop |

# *Appendix 4.*

## *Flooding Impacts Associated with Removal of the Elwha and Glines Canyon Dams*

**Page 451, paragraph 1, sentence 8 - change to read:**
In summary, these studies have shown that (1) removal of the dams would not alter the ~~existing hydrology~~ flow regime downstream because of the dams...

**Page 453, paragraph 3, sentences 5 & 6 - change to read:**
The 3 to 5-ft estimate of aggradation was based on apparent historical evidence of pre-dam channel configuration in some portions of the valley downstream from Elwha Dam (BOR 1995b). Water surface increases based on assumed aggradation of 3-5-ft in the river reach between the dams are thought to represent a conservation assumption due to the large sediment transport capacity of this portion of the river (~~see Sediment Report~~ BOR 1996f.).

**Page 456, paragraph 3, sentence 1 - change to read:**
(1) Lower Elwha Flood Control Levee. The federally constructed levee would require an average raise of ~~2.5~~ 3 feet its entire length to retain its present level of protection.

**Page 457, table 1 - replace with the following corrected table:**

***Table 1.*** *Current and Predicted Increases in Water Surface Elevations Following Dam Removal*

| Cross Section | RM | Water Surface Elevation (feet) | | Increase (feet) |
|---|---|---|---|---|
| | | Existing | Dams Removed | |
| 1+00 (Levee) | 0.2 | 7.4 | 8.4 | 1.0 |
| 2+00 " | 0.5 | 13.6 | 16.4 | 2.8 |
| 4+00 " | 0.8 | 20.4 | 24.1 | 3.7 |
| 5+00 " | 1.1 | 28.4 | 32.4 | 4.0 |
| 6+00 " | 1.2 | 32.1 | 35.4 | 3.3 |
| 7+00 " | 1.4 | 34.9 | 38.1 | 3.2 |
| 7+50 | 1.6 | 40.4 | 43.7 | 2.3 |
| 8+00 | 1.9 | 44.7 | ~~47.7~~ 47.9 | ~~3.0~~ 3.2 |
| 9+00 | 2.2 | 49.6 | ~~52.1~~ 50.4 | ~~2.5~~ 0.8 |
| 10+00 | 2.5 | 54.6 | ~~56.6~~ 57.6 | ~~2.0~~ 3.0 |
| 11+00 | 2.6 | 60.4 | ~~61.5~~ 62.1 | ~~1.7~~ 1.1 |
| 12+00 (Fish Facility) | 2.8 | 64.2 | ~~67.3~~ 66.7 | 3.1 2.5 |
| 13+00 | 3.0 | 69.9 | ~~72.3~~ 74.8 | ~~2.4~~ 4.9 |
| 16+00 (Bridge) | 3.3 | 76.0 | ~~77.9~~ 77.7 | ~~1.9~~ 1.7 |
| 17+00 (Intake) | 3.35 | 77.6 | ~~79.5~~ 79.4 | ~~1.9~~ 1.8 |
| 19+00 | 3.5 | 78.4 | 80.2 81.8 | ~~1.8~~ 3.4 |
| 20+00 (DC Wells) | 3.7 | 83.3 | ~~84.6~~ 84.8 | ~~1.3~~ 1.5 |
| 21+00 | 4.8 | 104.9 | 106. | 1.6 |
| 22+00 (Elwha Dam) | 4.9 | 109.7 | 111.5 | 1.8 |
| 23+00 (101 Bridge) | 7.7 | 207.8 | 210.3 | 2.5 |
| 24+00 | 7.9 | 210.4 | 212.8 | 2.4 |
| 25+00 (USGS Gauge) | 8.5 | 232.1 | 234.5 | 2.4 |
| 26+00 | 9.0 | 239.8 | 241.6 | 1.8 |
| 27+00 (Park Bdry) | 9.6 | 258.9 | 260.3 | 1.4 |
| 28+00 | 9.8 | 262.2 | 264.1 | 1.9 |
| 29+00 | 10.8 | 307.7 | 308.5 | 0.8 |
| 30+00 | 11.5 | 337.9 | 339.4 | 1.5 |
| 31+00 (Rangr Station) | 12.0 | 351.3 | 352.1 | 0.8 |
| 32+00 (Bridge) | 12.5 | 368.5 | 371.0 | 2.5 |
| 33+00 | 13.0 | 397.4 | 400.6 | 3.2 |
| 34+00 | 13.2 | 407.1 | 409.3 | 2.2 |

**Page 459, paragraph 3, last sentence - change to read:**
...removed 100-year water surface elevation -~~72~~ 68 feet at the downstream end of the well field to ~~71~~ 72 feet at the upstream end of the field.

# Appendix 6.
## Requirements for Completing the Proposed Action

**Page 480, after last paragraph - add the following:**
An NPDES permit for the discharge of filtration backwash from the infiltration gallery for both the tribal hatchery and for supply water to the industrial pre-treatment facility may be required, although the material being discharged would largely be sand and fines already present in the river under normal conditions. The discharge of flocculent sludge during dam removal into the river is likely to require a water quality modification from the Washington Department of Ecology (WDOE). The modification would include stipulations on the kind of flocculent, timing of release and other factors to ensure the minimum environmental impact.

# *Consultation and Coordination*

# Consultation and Coordination

## History of Public Involvement

The Federal Energy Regulatory Commission (commission) indicated its intent to write an environmental impact statement on whether to issue licenses for the Elwha and Glines Canyon dams by a Notice of Intent in the Federal Register on August 17, 1989. Formal scoping, or the early effort to involve agencies and the general public, was initiated in December 1989. Commission staff contacted interveners, state and federal agencies, Native American organizations, and members of the public who could provide input on the document. Two public scoping meetings were held in the state of Washington to identify issues and solicit public comments. After review of the comments, the commission wrote a scoping document that identified objectives, issues, and alternatives including **Dam Retention** (described in FERC 1993) and the **No Action** alternative. The No Action alternative was later eliminated as unreasonable.

A draft environmental impact statement (draft EIS) was prepared by the commission and distributed to affected agencies and interested members of the public in February 1991; its Notice of Availability was published in the Federal Register March 1, 1991. Comments on the draft EIS were reviewed and responded to in a two-volume document that normally would have been the final environmental impact statement (final EIS).

Prior to release of the final EIS, in October 1992, congress enacted Public Law 102-495, The Elwha River Ecosystem and Fisheries Restoration Act. Under the act, the secretary of the Department of the Interior (Interior) was directed to study ways to restore the native anadromous fisheries and ecosystem of the Elwha River. The act stayed the licensing process for both dams until the required studies were completed. Interior requested that the commission environmental impact statement be forwarded to the Interior to be used as supplementary information when preparing the study. The commission's environmental impact statement was then finalized as the *Draft Staff Report*, dated March 1993, and released to Congress and the Interior. The final report and response to comments were not released to the general public.

The *Elwha Report*, mandated by Public Law 102-495, was made available for public review and comment from October 4 to November 8, 1993. An open house to discuss the *Elwha Report*, held during October 1993 in Port Angeles, was attended by approximately 200 persons. Staff from the agencies responsible for preparing the report (departments of the interior and commerce and the Lower Elwha Klallam Tribe) answered questions and recorded attendees' comments. The report was completed in January 1994 and submitted to Congress in June 1994. Portions of the report were modified based on comments that were received. Appendix M of the final document contains direct responses to public comments.

On August 1, 1994, a Notice of Intent was placed in the Federal Register describing the National Park Service's intention to prepare two environmental impact statements. The first environmental impact statement, which relied heavily on both the FERC *Draft Staff Report* (adopted most of it) and the *Elwha Report* (incorporated the entire report by reference), examined whether to remove the dam(s). This environmental impact statement has been prepared to analyze a range of alternative ways to remove the dams and manage the sediment trapped behind them. The National Park Service is the "lead agency" responsible for the coordination and writing of both environmental impact statements. The US Bureau of Reclamation, US Bureau of Indian Affairs, US Fish and Wildlife Service, US Army Corps of Engineers, and the Lower Elwha Klallam Tribe are cooperating agencies. Members from each of these agencies make up the "EIS team." The agencies conducted the bulk of the studies required for the environmental impact statements and have provided extensive review and comments on both.

The first draft environmental impact statement, *Elwha River Ecosystem Restoration Draft Environmental Impact Statement*, released for public review and comment in October 1994, analyzed a range of alternatives to restore the Elwha River anadromous and native fisheries and ecosystem: (1) No Action,

(2) removing either of the dams and providing fish passage measures on the remaining dam, (3) retaining both dams with fish passage measures on both, and (4) removing both dams. Public workshops to receive comments on the draft environmental impact statement were held in Seattle and Port Angeles in November 1994. In addition, interested parties were invited to submit written comments during the 60-day public review and comment period.

This document is the second of the two environmental impact statements prepared to analyze native anadromous fisheries and ecosystem restoration on the Elwha River. It is entitled *Elwha River Ecosystem Restoration Implementation Environmental Impact Statement*. Public scoping sessions for this document were held in conjunction with the public meetings for the draft of Interior's first, or programmatic environmental impact statement (*Elwha River Ecosystem Restoration Environmental Impact Statement*).

This environmental impact statement does not evaluate partial dam removal or other alternatives; this was done as part of the previous programmatic environmental impact statement. The focus of this implementation document is the safe, environmentally sound, and cost-effective removal of both Elwha and Glines Canyon dams. After beginning with a full range of options for dam removal and sediment management, the major sources of impact in this project, the EIS team analyzed whether any technical, safety, cost or environmental limitations made them infeasible (see Alternatives Considered but Rejected section in the Alternatives chapter). If two alternatives had identical environmental impacts and were equally technically feasible and safe, the less expensive of the two was selected for further analysis. One set of dam removal and two of sediment management remained after these criteria were applied. The sediment management scenarios are **River Erosion** and **Dredge and Slurry** Alternatives. The **No Action** Alternative was also included for comparison purposes.

To make these alternatives environmentally sound, mitigation for: surface and groundwater users, downstream residents who may experience slight increases in frequency of flooding, anadromous fish (both hatchery produced and native), nesting marbled murrelets (a species listed as threatened on the Endangered Species Act list that may be present in the project area), native vegetation affected by the invasion of nonnative weeds and plants, slopes now inundated by reservoirs that may require revegetation, marine life impacted by the discharge of sediment from the slurry pipeline, individuals experiencing increased noise or dust from the construction sites, cultural resources, workers and downstream resident's safety during dam removal, and local residents and visitors affected by closing the Elwha subdistrict in Olympic National Park has been analyzed and proposed in this document. Mitigation that is required as part of the Elwha Act has been built into the alternative and other mitigation, although not specifically required by the act, has been recommended by the EIS team (see Alternatives chapter for a listing of specific mitigation measures and individual impact topic sections for additional details).

# *Scoping Issues*

Oral and written comments on scoping issues for the Implementation EIS were received at the public meetings held in Port Angeles and Seattle on November 14 and 15, 1994. Written comments were also received during the 60 day public comment period on first programmatic environmental impact statement. The EIS team responded to many of the scoping issues in the final version of the programmatic environmental impact statement, released in June 1995. Some issues were eliminated as less important; a summary of these issues and issues raised and subsequently eliminated by the EIS team is presented in the Purpose and Need chapter, "Issues dismissed from further analysis" section. Issues and concerns retained for further analysis in the implementation EIS are identified in table 3 in the Purpose and Need chapter in a section entitled "Issues and concerns."

# *Public Review of the Draft Environmental Impact Statement / Comments and Responses*

Public comments on the draft EIS were received in writing during the 60 day public comment period and orally at public meetings in Seattle and Port Angeles, Washington on May 21 and 22, 1996. All comments were examined and considered by the National Park Service according to requirements of 40 CFR 1503 (implementing regulations of the National Environmental Policy Act). The comments that were considered "substantive", and not just statements for or against the proposal were responded to in the section entitled "Response to Comments".

# *Record of Public Comment*

A Notice of Availability for the *Elwha River Ecosystem Restoration Implementation Draft Environmental Impact Statement* was published in the Federal Register on April 26, 1996. The 60 day public comment period for the draft EIS extended from April 26 through June 27, 1996. Approximately 1200 copies of the draft EIS were distributed to individuals, government agencies, special interest groups, and businesses for their review. Excluding individuals, everyone that received a copy of the draft EIS is recorded in the List of Recipients in this section of the document.

# *Public Workshops*

Three public workshops were held in Seattle and Port Angeles, Washington to solicit public input on the project. Notification of the workshops was sent out with each EIS, published in local newspapers, and broadcast over local radio stations.

The public workshops provided an opportunity for participants to have technical experts answer their questions on a one-to-one basis, and allowed oral and written comments to be recorded. Sixty-four persons attended the evening workshop in Seattle on May 21, 1996. Workshops held during the afternoon and evening of May 22, 1996 in Port Angeles, Washington had 35 and 52 persons in attendance respectively. The public was offered the opportunity to spend several hours visiting the following topic areas that were set up with visual displays and staffed by technical experts: fisheries; wildlife and living marine resources; flooding, water quality and quantity, and sediment management; dam removal and public health and safety; land use, recreation, aesthetics and traffic; and socioeconomics. Each group had a facilitator that summarized and recorded the comments and questions raised by the participants. Responses to the substantive comments recorded at the public workshops are grouped by topic and answered in the Responses to Comments section of this document.

# *Written Comments*

Three hundred and seventy four letters were received from government agencies, businesses, special interest groups, and individuals during the public comment period. Fifty-six of these letters contained substantive comments that required clarification of information in the draft environmental impact statement, modification of text or direct responses. The comments are grouped by topic (i.e., fisheries, flooding) and are set up in a question and answer format in the Responses to Comments section of this document. All of the agency, special interest group, and business letters are reprinted for the public's information in the Comment Letters section of this document.

# *Preparers and Contributors*

See corrections to the preparers and contributors lists in the errata sheets.

# Agencies and Organizations That Received Copies of the Final Implementation Environmental Impact Statement

## Federal Department, Agencies, Committees and Laboratories

Department of Energy
Department of the Interior
Environmental Protection Agency
Federal Emergency Management Agency
Federal Energy Regulatory Commission
General Accounting Office
House Fisheries and Wildlife Committee
House Natural Resources Staff
Idaho National Engineering Laboratory
National Academy of Sciences
National Biological Service
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
National Park Service
- Channel Islands National Park
- Mount Rainier National Park
- Olympic National Park
- Redwood National Park
- Rocky Mountain National Park
- St. Croix Scenic Riverway
- Yosemite National Park

Natural Resources Conservation Service
Pacific Fishery Management Council
President's Council on Sustainable Development
Senate Appropriations Committee
Senate Energy & Natural Resources Committee
U.S. Army Corps of Engineers
U.S. Bureau of Indian Affairs
U.S. Bureau of Land Management
U.S. Bureau of Mines
U.S. Bureau of Reclamation
U.S. Coast Guard
U.S. Congress Office of Technical Assessment
U.S. Fish and Wildlife Service
U.S. Forest Service
- Columbia Gorge
- Olympic National Forest

U.S. Geological Survey
U.S. Office of Surface Mining
U.S. Office of the Regional Solicitor
Washington Area Power Administration

## Tribal Governments and Organizations

Columbia River Intertribal Fisheries Commission
Confederated Tribes of the Umatilla Reservation
Covelo Indian Community - Round Valley Reservation
Elwha Klallam Tribe
- Lower Elwha Fisheries
- Elwha Tribal Council

Jamestown S'Klallam Tribe
Makah Indian Tribe
Northwest Indian Fisheries Commission
Point No Point Treaty Council
Port Gamble S'Klallam Tribe
Puyallup Indian Tribe
- Puyallup Fisheries Department

Quileute Indian Tribe
Skokomish Indian Tribe
Shoshoni Bannock Tribe
- Shoshoni Bannock Fisheries Department

Small Tribes Organization of Western Washington
Yakima Nation

## States Agencies and Organizations

State of California
- Department of Fish and Game

State of Michigan
- Department of Natural Resources
- Fisheries Division

State of Montana
- Environmental Quality Control

State of New York
- Power Authority

State of Oregon
- Department of Fish and Wildlife
- Natural Resources Council

State of Washington
- Department of Community Development
- Department of Ecology
- Department of Fish and Wildlife
- Department of Health
- Department of Natural Resources
- Department of Trade and Economics
- Department of Transportation
- Governor's Office
- Historic Preservation Office

Parks and Recreation Commission
State Energy Office
Water Power Authority
State of Wisconsin
Department of Natural Resources

## Congress people

Honorable Norman Dicks
Honorable Jennifer Dunn
Honorable Diane Feinstein
Honorable Slade Gorton
Honorable Richard Hastings
Honorable Jim McDermott
Honorable Jack Metcalf
Honorable Patty Murray
Honorable George Nethercutt
Honorable Linda Smith
Honorable Randy Tate
Honorable Rick White

## County and Local Governments

City of Forks
City Council's Office
City Planner / Attorney
City of Port Angeles
City Attorney's Office
City Council's Office
City Light
City Manager
Planning Department
Utilities Department
City of Sequim
City Council's Office
Planning Department
Clallam County
Commissioner's Office
County Administrator
County Attorney's Office
Department of Community Development
Department of Roads and Public Works
Clallam County Public Utility District #1
Commissioner's Office
General Manager
King County
King County Surface Water Mgt.
Port of Port Angeles
Commissioner's Office
Executive Director
Seattle
City Light Water Dept.
Snohomish County
Surface Water Management
Tacoma
Public Utilities

## Organizations and Business

Adele McCall
Allegheny Electric Cooperative, Inc.
American Rivers
American Whitewater Affiliation
Appalachian Mountain Club
Aquaculture Research Institute
Battelle Northwest
Beak Consultants
Bonneville Power Administration
Buchanan Ingersoll
Carolina Power and Light Company
Century 21 Harbor Lights
Chinook Northwest Inc.
Clallam County - Sekiu Chamber of Commerce
Clallam County Grange
Clallam County Historical Society
Clallam County Public Utility District #1
Coastal Consultants, Inc.
Columbia Basin Fish & Wildlife Authority
Columbia Gorge Audubon Society
Common Sense Resource League
Crescent West Inc.
Cuttler and Stanfield
Daishowa America Inc.
Decision Data
Dorsey & Whitney
Dry Creek Grange #646
Dry Creek Water Association, Inc.
EA Enginering
Ellison Timber and Properties
Elwha Place Homeowners' Association
Environmental Impact Services
Environmental Planning Strategies
Federation of Fly Fishers
First Federal Savings and Loan
Fish Pro
Fletcher Far Ayotte
Forks Chamber of Commerce
Forks High School
Foster Wheeler Environmental
Friends of the Cowlitz
Friends of the Earth
Friends of the Eel
Friends of the Elwha
Gehrke's Gink

Glen Canyon Environmental Studies
Granite Construction Company
Grant County Public Utilities District
Graystone
Greater Ecosystem Alliance
Green Crow Partnership
Harza Engineering
HDR Engineering, Inc.
Hood Canal Environmental
Hung West & Associates, Inc.
Hydro-Triad Limited
Idaho National Engineering Laboratory
Idaho Rivers United
Indian Creek Campground
Infraspect
Inside Passage
International Archeological Research Institute
International Rivers Network
IRN
James River Corporation
Jones & Jones
Jorgensen Engineering
King County Parks, Planning and Resources
Klahane Club
Lane & Lane Associates
Lipman Auto
Lighthawk
Log Cabin Resort
Mazamas
McGavick Graves Attorney at Law
Mendocino Environmental Center
Metamorphosis
Meyer Resources, Inc.
Montesano Vidette
NW Conservation Act Coalition
National Outdoor Leadership School
National Park Foundation
National Parks & Conservation Association
National Wildlife Federation
Native American Fish and Wildlife Society
Neahkanie Mountain
North Olympic Environmental Resource Center
North Olympic Land Trust
North Olympic Peninsula Visitor and Convention Bureau
North Olympic Salmon Coalition
North Peninsula Home Builders Association
Northrop, Devine and Tarbell
Northwest Chapter - Wilderness Watch
Northwest Economic Association
Northwest Ecosystem Alliance
Northwest Hydraulics Consultants
Northwest Power Planning Council
Northwest Sportfishing Industry Association
Okanogan Resource Council
Olympic National Resources Center
Olympic Outdoor Sportsmen's Association
Olympic Park Associates
Olympic Park Institute
Olympic Peninsula Audubon Society
Olympic Raft & Guide Service
Olympic Rivers Council
Outside Connection
PacifiCorp
Pacific Fishery Management Council
Pacific Northwest Trail Association
Pacific Power and Light Company
Pacific State Marine Fisheries Commission
Pacific Rivers Council
Parametrix
Perkins Coie
Phelps Dodge Corporation
Port Angeles Chamber of Commerce
Port Angeles-Victoria Visitor Bureau
Portland General Electric
Port Townsend Chamber of Commerce
Preston, Gates and Ellis
Preston, Gates, Ellis & Raivela Meeds
Puget Sound Power and Light Company
Puget Sound Water Quality Authority
Radin and Associates, Inc.
Rainier Evergreen Inc.
Rayonier Inc.
Recreational Equipment Inc.
Redwoods Science Lab
Rescue Elwha Area Lakes
Riddell, Williams, Bullitt & Walkinshaw
Ridolfi Engineering & Associates
Rio Grande Restoration Project
Rivers Council of Washington
Rivers Network
Robbin B. Sotir & Associates
RUST Environment & Infrastructure, Inc.
Save Our Wild Salmon Coalition
SCS Engineers
Seattle Aquarium
Seattle Audubon Society
Sequim Chamber of Commerce
Shapiro and Associates
Sierra Club
Sierra Club Legal Defense Fund
Simpson, Thacher & Bartlett
Sol Duc Hot Springs Resort
St. John's River Water Management District
Stone and Webster Engineering Corporation
Summit Technology
TDA, Inc.
Total Quality NEPA
Terrestrial Ecology
Tetra Tech

The Mountaineers
The Rockey Company
The Trust for Public Land
The Wilderness Society
Triangle and Associates
Trout Unlimited
Trumpeter Swan Society
Twanoh Group Sierra Club
U.S. Savings Bank of Washington
Van Ness Feldman
Washington Appellate Defender Association
Washington Environmental Council
Washington Sea Grant Program
Washington State Grange
Washington State Sportsman's Council
Washington Wilderness Coalition
WEC
Wells National Estuarine Kraver & Quinn Research Reserve
Roy F. Weston, Inc.
Whidbey Islanders for a Sound Environment (WISE)
Wilkinson Barker
Wise Use Movement
Woodward Clyde
Wrong Mountain Wildlife Preserve

## Libraries

Aberdeen Timberland Branch Library
Bellevue Branch Library
Bremerton Branch Library
Clallam Bay Branch Library
Colorado State University
Everett Public Library
Forks Branch Library
Holland Library - Washington State University
Hoodsport Timberland Branch Library
Kirkland Branch Library
Kingston Branch Library
Mansfield Library
Port Angeles Branch Library
Redmond Branch Library
Renton Public Library
Sequim Branch Library
Port Townsend Public Library
Seattle Public Library
Tacoma Public Library
University of Washington
Washington State Department of Fish & Wildlife Library
William G. Reed Branch Library

## Academic Institutions

Albion College
Central Washington University
Charles Wright Academy
Colorado State University
Ferris State University
Humboldt State University
Kansas State University
Michigan State University
Northwestern University
Oregon State University
Peninsula College
Pitzer College
St. Johns University
The Evergreen State College
University of California at Davis
University of Montana
University of Oregon
University of Washington
University of Wyoming
Washington State University
Western Washington University
Williams College

## Newspapers

Associated Press
Bellingham Herald
Citizen's News
Daily Journal of Commerce
East County News
Everett Herald
Forks Forum
High Country News
Hydrowire Newsletter
Jimmy Come Lately Gazette
Land Use Chronicle
McClatchy Newspaper
Montesano Vidette
Out West Newspaper
Peninsula Daily News
Peninsula Gateway News
Port Townsend Leader
San Francisco Chronicle
Seattle Post Intelligencer
Seattle Times
Sequim Gazette
Shelton-Mason County Journal
Tacoma News Tribune
The Citizen News
The Daily News
The Daily World
The Olympian

The Sun
USA Today
UPI

### Magazines

Backcountry TV
Backpacker
Current
National Fisherman
National Geographic Society
New York Times Magazine
Outside Magazine
Pacific Northwest Magazine
Peninsula Magazine
Popular Mechanics
Seattle Weekly
Signpost Magazine
Sunset Magazine
The Christian Science Monitor
U.S.A. Weekend Magazine

### Radio/TV Stations

CNN
KSOH-FM
KAPY
KAYO Aberdeen
KBAM Radio
KBWK Radio
KGHO
KGY Radio
KING TV and Radio
KIRO TV and Radio
KJR Radio
KKMO Radio
KMAS
KMPS Radio
KOMO Radio and TV
KONP
KPLU
KQEU
KRKO
KSTW TV
KUOW
KVAC/KLLM
KVOS TV
KXLY TV
KXRO/KDUX
National Public Radio
Northland Cable News (NCN)
Seattle / King County News Bureau
WNYC News

# *Responses to Comments*

# *Responses to Substantive Comments Made on the Draft Environmental Impact Statement*

## *Purpose of Final EIS and Methodology*

The final environmental impact statement is to be an accurate analysis of impacts of the proposed action and its alternatives. Public and agency review of the draft statement helps to ensure its high quality.

Interior received 374 comment letters on its Elwha Ecosystem Restoration Implementation draft EIS, as well as many questions and comments delivered orally at three public workshops held in May 1996. The National Park Service and cooperating federal agencies reviewed and responded to all comments which were not simple statements pro or con the proposal, i.e., those requiring additional explanation, analysis of data or those which debated facts or conclusions reached in the draft EIS. These are called "substantive" comments.

Substantive comments were either answered in the question and answer section which follows, through changes in the text of the EIS, or in both places. Because many comments were duplicative, Interior summarized the substantive comments by resource concern ("Flooding," for example), and then further defined subtopics ("Protection of Property," as an example) as presented in comment letters and at the workshops. This allows the reader interested in a particular topic to review the substance of the issue and the EIS team's response. In some cases, summaries of the agency response have also been integrated into the errata sheets of the final EIS, so that anyone reading the final document will have a complete picture of the overall proposal, its alternatives and their impacts.

## *Organization of Comments and Responses*

There are two indexes pertaining to the comments received on the draft EIS. The "Index by Author" lists authors of substantive comment letters by category or type of group: Public Agencies; Special Interest Groups, and Private Individuals. The authors in each category are presented alphabetically, with an assigned number. The author's name is then followed by one or more **code words or topic** areas which pertain to the major topics or resource concerns presented by the author to the EIS team, i.e. "fisheries." The reader can find the team's response to his/her comment by referring to the "fisheries" section of the question and answer section. In Responses to Comments, each author's letter number, as well as the paragraph of that letter being addressed (e.g. 180 "C") in the response, is noted. The "Index of Topics" presents the major topic or resource of concern followed by a list of authors and the number of the correspondence. All of the substantive comment letters (with the exception of letters from individuals) are reprinted in the following section in the order that they were received.

In the question and answer section which follows, both environmental impact statements prepared by Interior to analyze ecosystem restoration for the Elwha River are referenced. The *Elwha Ecosystem Restoration EIS*, finalized in June 1995, is referred to as Interior's "programmatic EIS." A decision to remove the Elwha and Glines Canyon Dams was made using the programmatic EIS (and other information), and a second *Implementation EIS* to analyze dam removal and sediment management options was prepared. The draft of the *Elwha Ecosystem Restoration Implementation EIS*, released in April 1996, is referenced as the "draft EIS." Changes made to the text of the draft EIS and the Responses to Comments are part of the final *Implementation EIS*, referred to as "this EIS."

When an appendix is cited (such as, see appendix 6), it is always referring to the draft *Implementation EIS* (i.e. draft EIS), unless otherwise stated in the sentence.

# *Index of Substantive Comment Letters by Category of Topic*

(Comment letters from individuals are listed for information purposes only. Responses to substantives are in the following section, but the letters have not been reprinted in the FEIS).

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Rescue Elwha Area Lakes - 148
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**Electrical Power**
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Washington Wilderness Coalition - 178
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**General**
Olympic Park Associates - 280
Washington Department of Natural Resources - 180
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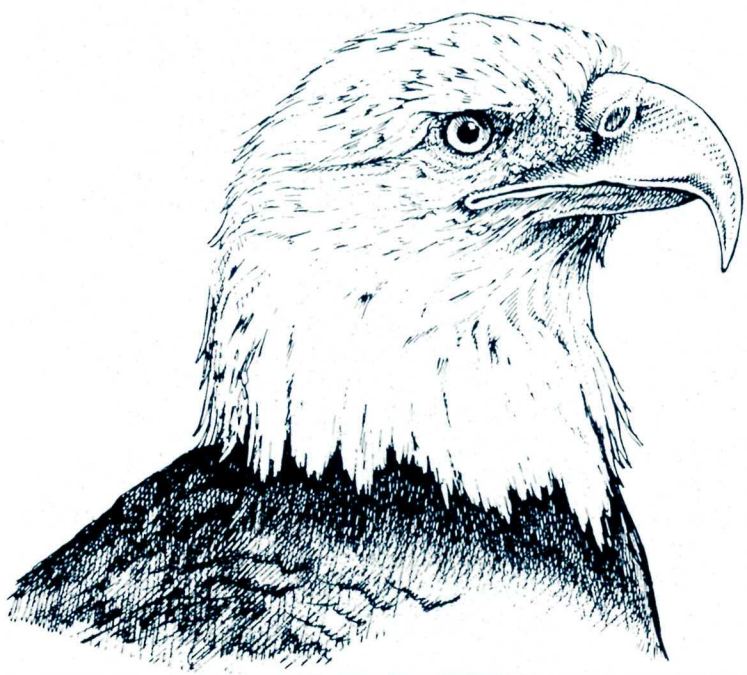


# *Responses to Comments*

## *Sediment*

### *Sediment Transport*
### *Channel Migration/Morphology*
### *Aggradation*
### *Beach/Estuary Changes*
### *Alternatives*
### *Analogies*
### *Erosion of Delta*
### *Sediment Studies/Modeling*
### *Sediment Monitoring*

## *Sediment Transport*

**How much of the fine and/or coarse sediment in the reservoirs would the river move? Over what period of time? Won't remaining sediments be unstable for a long period of time? (Washington Wilderness Coalition, 178A; workshop)**

Between 15 and 32 percent of the coarse sediment and about 50 percent of the fine sediment would be eroded from the reservoirs. As table 29 (revised) shows, 4.9-5.6 million cubic yards of the 9.2 million cubic yards of fine-grained, and 1.2-2.7 million cubic yards of the 8.5 million cubic yards of coarse-grained sediments stored behind the dams are expected to wash out under "river power." Sediments that are readily accessible would be eroded by the river in a few years. Most of the remaining sediment would become revegetated on the former lake beds, and would not be readily accessible for fluvial transport. However, over very long periods of time (centuries) it is possible that much of this material, too, would be eroded and transported downstream by the river.

Whereas fine material would be suspended and carried out almost immediately by the river, most of the coarse material in the reservoirs would erode out more slowly in the months and years following dam removal. In the channel, sand-sized material would be flushed quickly from the system, in months to a few years. Gravel would take longer, appearing in measurable quantity throughout the lower river within two to six years. As gravel and larger sized material move through the system, they would essentially be reestablishing pre-dam conditions on the riverbed.

**Why are coarse sediment release peaks so high? (workshop)**

Coarse sediment transport rate peaks related to dam removal are high because the material (mostly sand) is readily erodible (which was learned during the drawdown experiment in April 1994). When a notch is removed from the dam, a channel is cut very rapidly down to the new base level. This rapid erosion of coarse deposits provides a large amount of material in a short time for the river to transport.

**Where is the river channel in the cross section of the reservoir? (workshop)**

The previous river channel of the Elwha River is currently inundated by the reservoirs and buried by delta sediments. After dam removal the river course is expected to approximate its old alignment. In some areas, the course of the river would be constrained by bedrock canyons (such as the dam sites).

**Please clarify the relationship between frequency of flood events and additional "spikes" in sediment flushing. Is this a concern or a benefit? (workshop)**

After dam removal is complete, the river channel would continue to erode to greater widths as larger flood events occur. Each widening episode would release a spike of sediment associated with the erosion of the channel to a greater width. It is interesting to note that increments to channel width become smaller with increasing flow (and decreasing flood frequency) and, since there is more dilution capability with high discharge, extremely high concentrations of sediment are not associated with erosional events caused by successive high flows after the first one or two high flows. This process is not viewed as a project benefit or concern.

**Won't fine material transported by the river in the proposed action become deposited in the lower river, raise the riverbed, and become entrained and eventually vegetated? Wouldn't this mean that flooding impacts of the two alternatives are different? (Clallam County Commissioners, 192D, N, O)**

It is the coarse, rather than fine, sediments which are expected to cause increases in river stage flood frequency. The amount of fine material that could be deposited on the floodplain is not enough to significantly alter channel capacities or reduce flood conveyance, as the vast majority would be transported completely as "wash load." A small amount of fine-grained sediment could deposit in very quiet, isolated (from the current) backwaters, but any in the river channel itself would remain too erosive to provide channel structure or influence channel morphology. Should overbank flooding occur during dam removal, some fine sediment may settle out on floodplains and help replenish and rejuvenate riparian soils eroded since dam construction. Fine sediment deposition in floodplain riparian zones is seen as a benefit to riparian vegetation dynamics. Since substantial quantities of fine-grained sediment would not be deposited in the lower river, and coarse-grained sediments would be allowed to erode naturally with both alternatives, the flooding impacts would be the same for both action alternatives.

**How long would dam removal take if you released a tolerable amount of sediment (1000 ppm) for fish at each notching? Is this better or worse for fish? (workshop)**

It would be very difficult (if not impossible) to release a constant and pre-defined concentration of suspended sediment during dam removal. If it could be done, assuming average flows in the river, a constant 1000 parts per million (ppm) suspended sediment concentration, and transport of about 5.5 million cubic yards of fine lakebed sediment, it would take about 3.75 years. From the fisheries standpoint though, short-duration high suspended sediment concentrations would be preferable to a longer sustained, lower level of suspended sediment concentration in the river.

**Won't river erosion result in silt depositing itself in between the gravels? Won't silt cover all the marine life if it is transported in a pipeline to the strait? (James Sewell, 84A; Robert Bessey, 267A)**

Analysis shows that silt and clay stay in suspension, both in the river and to some degree in the strong marine currents expected at the pipeline outfall location (see draft EIS, p. 195).

Because the Elwha River is relatively large and has a steep gradient, it can move fine sediment quickly through the system. The outfall for the slurry pipeline (off Angeles Point in water 60-100 feet deep) was chosen based on relative scarcity of substrate organisms. Underwater surveys at this location found that beyond 50 feet water depth, kelp and macroalgae concentrations decrease substantially (draft EIS, p. 290).

In either alternative, fine sediment would temporarily be deposited on marine life in the area, but strong currents in the strait are expected to quickly dilute and disperse these sediments and rapidly carry them eastward. Coarse sediment would have a greater impact than fine material on marine life at the mouth of the river, and would result in a changed community of nearshore organisms (see Impacts to Living Marine Resources, pp. 288-289 of draft EIS).

**Please explain how stopping work during dam removal can stop silt entering the river. How can turbidity be considered "background" during these work stoppages, particularly if flows are high? (Rescue Elwha Area Lakes, 148L; Clallam County Commissioners, 192B)**

Erosion of the reservoir sediments would occur during periods of dam removal. This vertical erosion would decrease and begin to stop when dam removal activities are stopped temporarily. When a relatively large reservoir pool remains, sediment concentrations in top-released lake water would quickly reduce to low values (the lake can serve as a settling basin for sediments eroded by the river upstream), but may not necessarily correspond to "background" levels. However, these concentrations should be substantially less than those that would occur during the active downcutting associated with dam notching. If dam removal were halted for a long-enough period, erosion of the reservoir sediments would stop.

**How does 15,000-50,000 ppm of sediment compare to turbidity in other rivers that empty into the strait? (workshop)**

It is expected that between one and three million cubic yards of sediment could move through the Elwha River in three years. This is comparable to what much larger rivers, such as the Skagit and Frasier rivers combined, discharge into northern Puget Sound (see p. 202 of the Draft EIS). The Elwha River would intermittently deliver sediment to the coast for three or four years at about the same amount as these large rivers.

## *Channel Migration/Morphology*

**How would the channel downstream of the dams change shape and how would this affect flow and flooding? Has the river been stable in its meander below the dams? (Melanie Caltrider, 181AA; Clallam County Commissioners, 192P; workshop)**

The draft EIS provides an in-depth description of the Elwha River channel morphology as it is now on pp. 104 to 107, and of the relative size of floodplains on pp. 107 to 109. The specific impact the dams have had on channel morphology is described on pp. 192 to 193. The impact of dam removal is described on pp. 198-202. To summarize, the Elwha River below Glines Canyon Dam migrates less frequently and over less of its floodplain than before the dams were built. This is because sediment transport has been blocked, and riverbed sand and gravel are largely absent.

Increasing the sediment supply to alluvial reaches would have an effect on channel morphology. However, it is not likely that a "massive reshaping over a period of several decades" would occur, as one commentor claimed. There is no evidence that a massive reshaping of the channel occurred after the sediment supply was shut off, so the morphology associated with the natural configuration is not vastly different from the existing condition. Since the dams were constructed, the Elwha River between Lake Mills and Lake Aldwell (and in the mile-long canyon reach below Elwha Dam) has responded by bed armoring and stabilization of channel features. The present river slope does not differ appreciably from the 1926 river slope, indicating that channel incision below Glines Canyon Dam has not occurred. Excessive channel migration has not occurred in this reach because the channel is fixed by the canyon walls. The river reach between RM 2.5 and RM 4.0 is a transition section between the bedrock controls of the upper reach and the lack of bedrock control of the lower reach. The Elwha River below RM 2.5 is not confined by canyon walls, and has responded to the dams by moderate channel migration and channel downcutting. Increases in both the frequency of channel migration and aggradation of the bed are expected in this section following dam removal.

**Where is channel migration expected to be greatest? Won't it threaten the levees, or flow behind them? What would the channel look like near the mouth? (Melanie Caltrider, 181AA; Clallam County Commissioners, 192J; workshop)**

The alluvial reaches, particularly the reach immediately above the mouth, would be more dynamic in terms of lateral adjustment when the dams are removed. For the most part, this return to dynamic behavior is a desired outcome of the project that would enhance the quality of the riparian/floodplain zone of the river and aquatic habitat. In the unlikely event that channel migration threatens levees or other infrastructure, relatively simple improvements can be made to protect these facilities (several are already included in the draft EIS, p. 215).

Any number of channel configurations would form at the mouth of the Elwha River as more sediment is available to the river following dam removal (see p. 203, draft EIS). Even though the channel would have a tendency to migrate more near the mouth of the river, its movement is constrained by the levees on the east and west sides of the river. Typically during high flows, a large amount of sediment is shifted about within days. At the river mouth, floodwaters would deposit sand and gravel bars 100 to 500 feet wide. Channels are continuously cut through these bars by the river, waves, and tidal currents. The floodwaters spread the sediment into side channels and onto terraces.

## *Aggradation*

**Increased surface elevations may eliminate Bosco Creek, but a new outlet to the strait may improve water quality in the river. (Clallam County Commissioners, 192S)**

As stated in the draft EIS (p. 226, third paragraph), increased water surface elevations could result in the elimination of Bosco Creek, where outflow from the hatchery now exits. The contingency plan proposed in the draft EIS includes dredging the creek, and constructing a new outlet from the fish hatchery to the Strait of Juan de Fuca. The impacts to river water quality of rerouting the hatchery flow to the strait are unknown, although changes are expected to be minimal.

**Won't armoring banks to protect critical areas result in a coarser substrate and limit fisheries recovery? (Clallam County Commissioners, 192NN)**

This paragraph of the draft EIS (p. 462) makes provision for what should be done in the unlikely case critical areas are threatened. Should bank armoring be needed, a very small reach (or reaches) of river channel would be affected and loss of "naturally-sized" substrate would be negligible.

## *Beach/Estuary Changes*

**Would littoral movement west of the river mouth cause fine-grained sediments to be deposited on the beach? Won't this reduce flood hazards from storms, wind, and tsunamis? (Clallam County Commissioners, 192G)**

The sequence of events expected at the river mouth as sediment transport is restored is described in the Department of the Interior's (Interior) programmatic EIS, p. 185 ("Increased sediment impacts to the Elwha River estuary"). To summarize, coastal currents would move coarse sediment deposits eastward into a spit-like landform that would form elongated offshore bars. This would allow mixing of saltwater and freshwater over a larger area, increasing the size of the estuary. Wave action would bring deposited sediments into beaches to the east of the mouth, widening them and reducing the steep profiles they now have. We agree that this would somewhat lessen the flood hazard from storm tides, wind, and tsunamis to residents near the mouth of the river.

Fine-grained materials (silts and clays) would not tend to accumulate on the beach in the nearshore zone because of ebb and flood tides in the estuary and washing by waves.

**Bluff erosion was responsible for less erosion of Ediz Hook than the EIS says. (Harry Lydiard, 13D)**

Prior to construction of the dams, approximately 350,000 cubic yards per year ($yd^3/yr$) of sediment was supplied to Ediz Hook; 50,000 to 80,000 $yd^3/yr$ were contributed by the Elwha River and the remainder (270,000 to 300,000) by the bluffs between the delta and Ediz Hook. The sediment load has been greatly reduced by the dams and armoring of the bluffs near the mouth of the river. FERC (1993, pp. 3-19 and 4-2) estimated that the present day sediment yield from the Elwha River is between 4,000 and 6,000 $yd^3/yr$ and is about 40,000 $yd^3/yr$ from the bluffs. This estimate is based on the sediment rate below Elwha Dam being proportional to the watershed area.

**What is the cost of maintaining Ediz Hook? Would this change following dam removal? (Harry Lydiard, 13D)**

Periodic nourishment of Ediz Hook would continue to be required even with the removal of the Elwha River dams. The delta and coast would take some time to adjust to the increase in sediment which would be provided from the Elwha River. In addition, stabilization of a portion of the shoreline which also contributed sediment to Ediz Hook has eliminated a significant source of sediment. It currently costs approximately $100,000 per year to maintain Ediz Hook. This could decrease by about $28,000 per year with the dams removed.

**The seawall that has inhibited bluff erosion between the Elwha estuary and Ediz Hook should be eliminated to fully restore sediment transport. (Welden and Virginia Clark, 235D)**

The seawall was built to protect the city's water supply pipeline. Removing it would contribute additional sediment to Ediz Hook, but would also have significant cost impacts. Interior has the task of restoring the Elwha River ecosystem. Restoring full sediment transport to Ediz Hook is outside the scope of this project, and hence this EIS.

**Using a 1926 baseline to determine the change in the delta/estuary is incorrect. By then, 3.36 million cubic yards of sediment (280,000 per year) would have been blocked by the Elwha Dam. (Eric Hartman, 245F)**

On p. 286, the draft EIS indicates that the Elwha River delta extended an additional 0.5 miles seaward in 1926 (based on a historic map) and that the delta would have continued to extend at least that far if the dams had not reduced the river's sediment supply. The exact size of the pre-dam (1913) delta is not known. It is not correct to assume that the Elwha River delta would have continued to build at a rate of 280,000 cubic yards per year since construction of Elwha Dam in 1913 because the strong currents of the strait would have continued to rework and carry away delta sediments.

## *Alternatives*

**It would have been more prudent to select the Dredge and Slurry alternative, since modeling always involves assumptions which may not be correct. For instance, the river may not return to background turbidity within two to six years. If your assumptions are incorrect, the Dredge and Slurry option would have had less impact. (Robert Bessey, 267D, E)**

The Dredge and Slurry alternative may appear to have significantly less risk of adverse consequences than the River Erosion alternative. However, since only about 75% of the fine sediment would be dredged under the Dredge and Slurry alternative, river turbidity would still be high during dam removal. (Water quality mitigation would still be required at almost the same expense as under the River Erosion alternative.) This is because submerged stumps and logs along the reservoir bottom preclude dredging all fine sediment from the reservoirs. In addition, a total of 2.4 million cubic yards of fine sediment is buried within the delta of the two reservoirs and could not be dredged without also dredging 7.9 million cubic yards of sand, gravel, and cobbles at considerable cost.

Although it is true that modeling involves assumptions, the computer models have been calibrated and verified with empirical data (drawdown tests). Interior chose to make conservative assumptions when

assumptions were needed, and so impacts described in the draft EIS tend to either overestimate or predict the upper end of a range of reasonable impacts. Further, success of the River Erosion alternative is not dependent on computer model results, but rather on monitoring data which would be collected during dam removal. Actual flooding and water quality impacts depend greatly on the rate of dam removal, which would be slowed, if necessary, so as not to create adverse impacts greater than those described in the EIS.

The actual time required for river turbidity to return to natural conditions after dam removal (estimated as two to six years)would depend on future river flows (especially floods), and the amount of sediment remaining in the reservoirs. Floodflows can erode and transport sediment from the reservoirs, but each subsequent floodflow would have to be larger to erode significantly more sediment. Also, each larger floodflow would erode less sediment (because of previous erosion and vegetative growth) and would occur less frequently. Turbidity levels under the Dredge and Slurry alternative are expected to be 25% of those under the River Erosion alternative, but the duration of turbidity levels greater than natural conditions would be about the same. Therefore, the time it takes the river to return to background turbidity would more likely be due to the pattern and magnitude of floodflows than the choice of alternative implemented. Peak turbidities from either alternative would have significant impact on aquatic life and water users regardless of which alternative is selected.

The choice of the River Erosion alternative was made based on these and other factors. For instance, the pipeline could affect land use, wildlife, river recreation activities, and aesthetics. The dredge would be a noisy, mechanical operation for several months that would affect wildlife and recreationists. When restoration was complete, additional impacts would occur as a result of removing the pipeline. River erosion was also preferable because it offered a natural ecological and cost-effective option to the engineered solution of dredging and slurrying the fines.

**What is the feasibility of vacuuming fines over a long period of time to keep water quality costs down? (workshop)**

The Dredge and Slurry alternative was designed to mitigate the effects of fine-grained materials that would otherwise erode from the deltas in Lake Mills and Lake Aldwell and increase the suspended sediment and turbidity in the river. With this alternative, the fine-grained materials would be removed by a suction dredge (like a vacuum) and transported through a slurry pipeline to the Strait of Juan de Fuca. The draft EIS has a more complete description of this alternative on pp. 67-75.

## *Analogies*

**Cite case studies where catastrophic floods or sediment releases (i.e., Mount St. Helens) have occurred and what we learned. (National Parks and Conservation Association, 198G)**

Patterns of sediment transport on the North Fork of the Toutle River were analyzed by the National Park Service Water Resources Division as part of this EIS (NPS, 1995c). This analysis contributed, conceptually, to the development of the suspended sediment model used in the analysis of Elwha River dam removals.

In the North Fork Toutle River, extremely high suspended sediment concentration spikes corresponded to periods of high flow during the fall/winter period following the eruption. Peak sediment concentration measured on the Toutle River after the Mount St. Helens eruption was 180,000 mg/l. Massive sediment aggradation was reported and sediment retention dams were constructed by the U.S. Army Corps of Engineers. Sediment concentrations and riverbed aggradation in the Elwha River after dam removal are expected to be much less. However, as predicted for the Elwha River, there is a marked reduction in suspended sediment concentration upon the recession of high flows. Also, over time, successive high flows tended to produce ever-decreasing peak suspended sediment concentrations. By the third year following the eruption, there was a marked and statistically significant reduction in suspended sediment concentrations. The volumes of sediment delivered to the North Fork Toutle River were orders of magnitude greater than those stored in the Elwha River. Nevertheless, the river quickly and dramatically

recovered from the immediate effects of the eruption. The first adult summer steelhead was observed in the North Fork Toutle River in August 1980, only three months after the eruption. Steelhead redds (nests) were observed in Alder Creek, a North Fork tributary, in the spring of 1981. (Please see Interior's programmatic EIS, pp. 157-158, for more information on the Mount St. Helens example and others).

**The Toutle River analogy may not be appropriate because of the totally different geologic conditions. The EIS should use the Fraser River example instead. (Clallam County Commissioners, 192HH)**

The North Fork Toutle River is not an exact analogy to the Elwha River. However, in many ways it represents a "worst case" situation with regard to the patterns of suspended sediment transport following a massive loading of sediment to the channel. No published reports of sediment transport on the Fraser River associated with dam removal were identified, so it was not used in developing sediment transport analyses for the Elwha River. The primary factor controlling sediment concentrations in the Elwha River would be the rate at which, through downcutting, widening, and lateral migrations, the river accesses suspendable sediments. This was all factored into the modeling of sediment concentrations following dam removal.

With regard to fisheries recovery, the material released by Mount St. Helens was primarily "solid glass or obsidian-like pieces, or more porous-looking particles" (programmatic EIS, p. 158), which are abrasive to fish gills. Since the sediments in the Elwha River basin are glacial and not abrasive, fisheries restoration in the Elwha is expected to happen more quickly than in the Toutle River.

**Wouldn't the removal of Sweasey Dam on the Mad River be an appropriate comparison? It (the removal) resulted in an unstable river course, negative impacts on fish spawning grounds from sedimentation, and decreased river depth downstream. (Melanie Caltrider, 181AA, BB, J)**

The Sweasey Dam on the Mad River was removed in northern California in 1970 and was not used as an analogy for some very important reasons: unique geologic conditions and human-induced impacts. Ecosystem and fisheries restoration continues to be a problem on the Mad River for these reasons, which are not true of the Elwha River.

Specifically, sediment loads in the Mad River are much higher than in the Elwha. The heavier sediment load is caused by highly erodible rock and soils, active tectonics (i.e., earthquakes and landslides), and human activities, such as logging. The reservoir impounded by the Mad River greatly, but artificially, reduced this high suspended sediment concentration in the river below the dam. When Sweasey Dam had to be removed, severe turbidity and adverse impacts to fisheries resulted as normal sediment loads were reestablished. Also, although the Mad River watershed is twice the size of the Elwha, it has significantly less discharge, and so was unable to adequately flush the stored sediments. When the Sweasey Dam was removed, the sediment exceeded the transport capacity of the river and it was deposited in the river channel, causing aggradation as the commentor mentioned. In contrast, modeling of the Elwha River indicates that there is excess transport capacity available to remove the sediments that would be eroding from the reservoirs. Although modeling predicts some aggradation, in most cases it is two feet or less.

Also, although Elwha and Glines Canyon dams would be removed in controlled increments over a two-year period, Sweasey Dam was removed with explosives in August 1970 during a low-flow period. Controlling releases would encourage erosion and redeposition of reservoir sediments as the dams are removed, depositing them as a series of relatively stable terraces along the margins of both lakes, unlike the high steep banks created by sudden dam removal. Computer modeling by the BOR (BOR 1995f) indicates that turbidity in the river resulting from the release of these fine-grained sediments carried in suspension would be in the range of 500 to 600 parts per million (ppm) for the first year following dam removal. The terraces would become revegetated quickly, and turbidity would return to background levels in the river within two to six years following dam removal. See also Fisheries response to comments section.

## Erosion of Delta

**How well can the river remove existing delta sediments behind the dams? Would they need to be regraded or sluiced? (Bob Powne, 200A, B)**

Sediments, even including the larger delta deposits, are expected to be rapidly and easily downcut by the river. This expectation is based on observations made during the drawdown test on Lake Mills in April 1994. The test was conducted during a period of low to moderate flow rates (900 to 1,800 cubic feet per second) and in coarse delta deposits of sand, gravel, and cobbles. The river readily incised channels through armor layers of cobbles up to 12 inches in diameter. Erosion of delta sediments would be monitored, and if some grading of remaining sediments is necessary for long-term safety or revegetation purposes, it can be accomplished as part of the revegetation effort.

## Sediment Studies/Modeling

**What type of lakebed or other studies were done to determine the percentage of fine and coarse material? (workshop)**

Several geologic investigations were conducted to determine the distribution, size gradations, and quantity of sediment in Lake Mills and Lake Aldwell. Hosey and Associates Engineering Company did a reconnaissance level sampling program of the nearshore sediments in the reservoirs in 1988. In 1989, Hosey collected data to determine the bathymetry of the reservoirs, the extent, thickness, and composition of the sediments in the reservoirs, expected plant growth on the drained reservoirs, and the effects of a 20 foot drawdown of Lake Mills. This information was gathered by taking various drill-hole and piston-core samples, thickness-probe tests, and by conducting seismic-refraction and ground-penetrating surveys.

In April 1994, Daishowa America and the James River Corporation reduced the lake level by 18 feet, and BOR with the assistance of the National Park Service and Lower Elwha Klallam Tribe, conducted geologic mapping, photography, and sampling of the upper portion of the delta in Lake Mills. Sediments were collected and analyzed for size gradations and contaminants.

Geologic mapping of Lake Aldwell was conducted by BOR in September and October 1994 by mapping the delta surface by boat and foot, and by digging tests pits and drilling from a barge. A dive team mapped underwater alluvial sediments during October 1994.

The information collected in 1994, bathymetric data, geologic models of delta areas, and computer modeling resulted in determining the sediment distribution, thickness, size gradations, composition, and volumes that have been deposited in the reservoirs. This information is summarized in a report prepared by the U.S. Bureau of Reclamation. (BOR 1996j)

**Does the sediment model take into account changes in river transport capacity as the channel morphology changes, changes in channel shape over time due to sediment input, and variations in flow? (Clallam County Commissioners, 192C, 192MM; Robert Bessey, 267B)**

The U.S. Army Corps of Engineers computer program HEC-6 was used to model riverbed aggradation during and following dam removal (BOR, 1996f). This moveable boundary model computes changes to and adjusts the cross-section geometry and channel slope during the simulation. For each time step, this model computes river hydraulics, sediment transport, and corresponding changes to the riverbed elevations and bed material size distributions. The model can compute vertical aggradation or degradation, but cannot predict lateral changes. The model computes vertical riverbed aggradation if the rate of upstream sediment supply is greater than the computed sediment transport capacity. Sediment transport capacity for a given flow and sediment size is primarily related to river slope and velocity. Both slope and velocities tend to increase with riverbed aggradation. The Elwha River would respond to riverbed aggradation by evolving to a steeper slope, not a flatter slope (as suggested by the commentor).

Below RM 2.5 the river has increased its length (decreased its slope) through meandering since construction of the dams.

Roughness coefficients (an indicator of the resistance to flow created by the channel bed and banks) in the model were greater for the floodplains than the main channel but were assumed to be constant with time. These roughness coefficients were conservatively calibrated to low-flow conditions which, at higher flows, tend to overestimate channel depth and aggradation, and underestimate sediment transport capacity.

**Were storm tides considered in your estimates? They would reduce transport capacity, cause aggradation, raise the water table, and result in sediment trapped by vegetation. (Clallam County Commissioners, 192E, F)**

The effects of tides were considered in the HEC-6 model simulations. For sensitivity testing, tide elevations of 6.6, 3.6, and 0.0 feet were assumed. High-tide elevations were found to increase river stages from the mouth to 1.8 miles upstream. These stage increases also increased the amount of riverbed aggradation, although this would be temporary, as the river would again transport deposited sediments following the return to normal tide elevations. Because of this, tide elevations were assumed to be 0.0 feet during final short and long-term simulations.

Water surface profiles for the 100-year flood were computed at the end of the HEC-6 simulations and compared with initial conditions. All 100-year flood elevations were computed assuming a high tide elevation of 6.6 feet (mean of the highest daily tides plus 1 foot). The effects of floodplain vegetation were simulated in the model by assuming very high roughness coefficients (Manning's $n$ of 0.10). The high roughness coefficients resulted in slow velocities and floodplain aggradation.

**Was the bridge at Highway 101 modeled as a constriction to sediment transport? Is it designed for the new sediment and river regimes? Can this reach be modeled? (Clallam County Commissioners, 192K)**

The Highway 101 bridge was modeled as a constriction. The large cobbles and boulders in the riverbed immediately downstream from the bridge are believed to be of pre-dam origin. River stages under this bridge are also believed to be about the same as under pre-dam conditions. Sediment transport capacity analysis indicates that aggradation of eight feet in the pool under the bridge would only increase river stages by 0.5 feet during the 100-year flood and the sediment transport capacity was calculated to be 15,000,000 tons/day. The floodflow capacity under the Highway 101 bridge is expected to be adequate even with assumptions of riverbed aggradation.

**Isn't the ability to predict the effect of sediment and effectiveness of water quality mitigation poor? How far "off" could the modeling be? What are your contingencies? Wouldn't it make more sense to remove Elwha Dam and use your experience to calibrate the model before you remove Glines? (Elwha Citizens Advisory Committee, 182EE; National Parks and Conservation Association, 198H)**

Sediment modeling has been calibrated with measurements from the 1994 Lake Mills drawdown test. Hydraulic modeling of the lower river has been calibrated by matching computed water surface elevations to measured elevations.

There is uncertainty in sediment modeling, but study conclusions indicate that removing Glines Canyon Dam at a rate of 7.5 feet every two weeks, during periods of low flow, would not cause excessive aggradation of the riverbed. An extensive monitoring program would be implemented prior to, during, and following dam removal to verify model predictions. The rate of reservoir sediment erosion and release downstream can be controlled by controlling the rate of dam removal. The rate of dam removal would be decreased if the sediment release rates were too high.

Additional information on how sediment would erode would be learned by the removal of Elwha Dam first. However, when compared to concurrent dam removal, removal of Elwha Dam first would cost more money, delay river restoration and associated benefits, and result in impacts occurring over two dam removal periods.

**To what degree would sediments be stabilized following dam removal? (Melanie Caltrider, 181AA)**

An alternative to mechanically relocating and stabilizing fine-grained reservoir sediments within each lake was considered but rejected (see p. 82 of the draft EIS). This alternative was rejected because fine sediment would be difficult to stabilize over the long term and would periodically erode and increase turbidity during floodflows, a condition that could delay restoration of fish populations.

Under the proposed action, more than half of the current reservoir sediments are expected to remain in a series of terraces along the margins of the former lake beds. These terraces are expected to revegetate within a year and stabilize to the point that turbidity drops to background levels within two to six years. Some regrading of the slopes to facilitate revegetation may be needed, and is included in the revegetation plan (see appendix 3).

## *Sediment Monitoring*

**Please elaborate on the sediment monitoring program proposed for during and after dam removal. (Washington Wilderness Coalition, 178A)**

The proposed sediment monitoring program consists of cross surveys along the river channel and reservoirs, aerial photography, and stream gauging of flow and sediment (see pp. 58 and 59 and cost tables on pp. 68 and 74 of the draft EIS). The monitoring program would be intensive over the short term while conditions rapidly changed and less intensive over the long term while conditions changed more slowly. Final details would be coordinated with appropriate agencies.

**To what extent would sequential dam removal be safer than the proposed action, particularly since the model has not been empirically tested? What about massive releases or accumulation of sediment? (Elwha Citizens Advisory Committee, 182EE)**

The model was calibrated with empirical evidence collected from the two drawdown tests in 1989 and 1994. These tests confirmed that the Elwha system could move lake sediment deposits in a relatively short time frame, and with only mitigatable impacts. It is true that uncertainties regarding the hydrology of a given day or week and assumptions inherent in modeling mean that we cannot predict the exact number of days it would take to flush stored lake sediment or precisely how much or where aggradation would occur. We can state with some certainty, though, that the river would be able to erode and transport sediment in a reasonably brief time frame.

The proposal also has a built-in control of sediment release in the form of controlling the rate of dam removal. The decision to slow down (or speed up) dam removal would be made based on feedback from an intensive sediment monitoring program during removal (see pp. 58 and 59 of the draft EIS).

# Flooding

## Protection of Property
## Levees Near the Mouth
## Ecosystem Restoration/Levee Removal

## Protection of Property

**What are the provisions for protecting private property from flooding? Subject property (vacant land) is at upstream end of federal levee and would flood after dam removal. (Marilyn Hill, 157A; Marilyn Hill, 199A, B)**

Specific structural measures to protect private property from damage caused by dam removal are included in the draft EIS (p. 215). Other non-structural mitigation has also been included in the draft EIS, including flood insurance for affected property owners and possible land trades or purchases, or relocation. Property situated behind the federal levee on the east side of the river would be protected by raising the levee three feet and armoring the upstream most 1,000 feet with riprap. Part of the subject property is located at the upstream end of the levee and should be protected by this mitigation. Discussions with property owners at the final design stage of dam removal would be necessary to refine or alter these measures if needed.

**Would the tribal cemetery be flooded after dam removal? (Morrison Kingsley, 261B)**

The Lower Elwha Klallam Tribal Cemetery, located behind the federal levee on Place Road, is protected against a 200-year-frequency flood. Since the levee would be raised to maintain the current level of flood protection, it would not be flooded with any higher frequency after dam removal.

**Would the reservation be flooded out if the dams are removed? (workshop)**

No. The reservation would not be flooded out if the dams are removed because the levee currently protects it from 200-year-frequency floods. It would be raised and strengthened to maintain the present level of flood protection before the dams are removed.

**Won't installing or upgrading dikes just create the flooding problem somewhere else, particularly for vacant land? (workshop)**

Much of the upgrading of the levees done for this project would be along the margins of the floodplain and would have little effect on flooding elsewhere.

**The EIS has not adequately addressed flood protection mitigation. (Dorothy Duncan, 204A; Morrison Kingsley, 261A; Bruce and Marian Brennan, 81A)**

Mitigation measures have been adequately and specifically addressed in the draft EIS on pp. 214 and 215. Mandatory and proposed mitigation measures have been described for all buildings, roads, and bridges that may be affected by the removal of Glines Canyon and Elwha dams. Discussions with property owners at the final design stage of dam removal may change or refine these measures if needed.

**During high flow would the river go dike to dike at the mouth? (workshop)**

Yes. Even under existing conditions, the river could inundate the area between the federal levee on the east side of the river and the private levee on the west side during a high frequency flood. Once flood waters recede, the Elwha River would return to its channel.

## Levees Near the Mouth

**The EIS states that the levees at the east and west side of the mouth offer unequal protection. Why? Why is mitigation for the east levee required, but only recommended for the west? (Bruce and Marian Brennan, 81A)**

The levee on the west side of the river, constructed in 1964, is privately owned and locally constructed. Currently built, this levee provides a level of protection to withstand floods with the frequency of 25 to 50 years. In contrast, the levee constructed in 1988 on the east side of the river by the U.S. Army Corps of Engineers was built to withstand a 200-year flood.

Interior is committed to mitigating impacts to property owners that are direct results of dam removal. Therefore, it would strengthen (by raising and armoring) the west side levee to withstand the 25- to 50-year new flood level, which is expected to be from 1 to 3 feet higher near the mouth of the river. It would normally also strengthen the east side levee to a 100-year flood level. However, the U.S. Army Corps of Engineers has indicated that strengthening the levee to retain the previously authorized 200-year flood level protection is mandatory, i.e., a permit condition, of dam removal.

**Won't the high bank on the west side of the mouth be eroded? Or would more sediment in the river help? What mitigation do you propose if the impact is adverse? (Scott Ewing, 233A, B, workshop)**

Currently, the river is flowing along this bluff. Dam removal would not aggravate the situation, so no mitigation is proposed. In fact, aggradation of the west side of the lower river as a result of the return of natural sediment transport conditions may cause the channel to migrate east into the broad, flat floodplain and help alleviate current conditions. In addition, since the river would be transporting more sediment during dam removal, it would have less erosion capability, again helping, rather than hurting the existing situation.

**Who would pay for upgrading the levee on the west side of the mouth of the river? (Morrison Kingsley, 261A, workshop)**

Interior is committed to funding and completing actions taken to mitigate impacts from dam removal, including the recommended upgrade of the west side levee to maintain the current level of flood protection. This includes raising it as needed and armoring it with two feet of graded riprap. Local landowners may elect to increase the level of flood protection at their own expense.

**Won't the west side levee isolate fish in the estuary? Can it be relocated? (Washington Department of Natural Resources, 180F)**

The west side levee could be realigned in a northwesterly direction to provide more lateral space for the channel to migrate within the confines of the floodplain without compromising the existing flood control protection it provides.

**Can the federal (i.e., east-side) levee withstand increased sediment loads and meanders? (Clallam County Commissioners, 192L)**

The federal levee has not been designed to withstand the relatively high velocities of main channel flow. The levee would be reinforced with riprap prior to dam removal to protect the structure in case the main channel migrates eastward across the floodplain and comes in direct contact with the levee.

## *Ecosystem Restoration/Levee Removal*

**Define short term and long term. Is sediment removal or increased flood potential compatible with full restoration? (Clallam County Commissioners, 192I)**

For the purposes of this EIS, short term is defined as within five years of dam removal. Long term is defined as 50 years and beyond. The potential for aggradation in both cases was modeled, and flood control measures designed for the maximum reasonable expected levels. The goals of the project are to restore natural physical and ecological functions and anadromous fisheries to the Elwha River ecosystem. Returning natural sediment transport and any accompanying aggradation would not only be compatible with these goals, but would be instrumental in fulfilling them.

**The levees must be removed to fully restore the ecosystem. The EIS should more fully explore non-structural mitigation, including outright purchase of lands expected to be flooded. (Washington Department of Natural Resources, 180C, H; Melanie Caltrider, 181G, H; Clallam County Commissioners, 192L, M; Eric Hartmann, 245G; workshop)**

Removing the levees along the river would add slightly to the degree to which full ecosystem restoration could be achieved. However, the Elwha Act includes language to protect water users. Interior has interpreted the act to also call for protection of existing human uses in general, including protection from floods. The dam removal and ecosystem restoration processes balance these human uses while maximizing the ecological functioning of the river and its watershed. Restoring natural physical and ecological processes and returning anadromous fisheries to the Elwha River do not require removing the levees or exposing property to additional flooding, and yet accomplish the goals of the act.

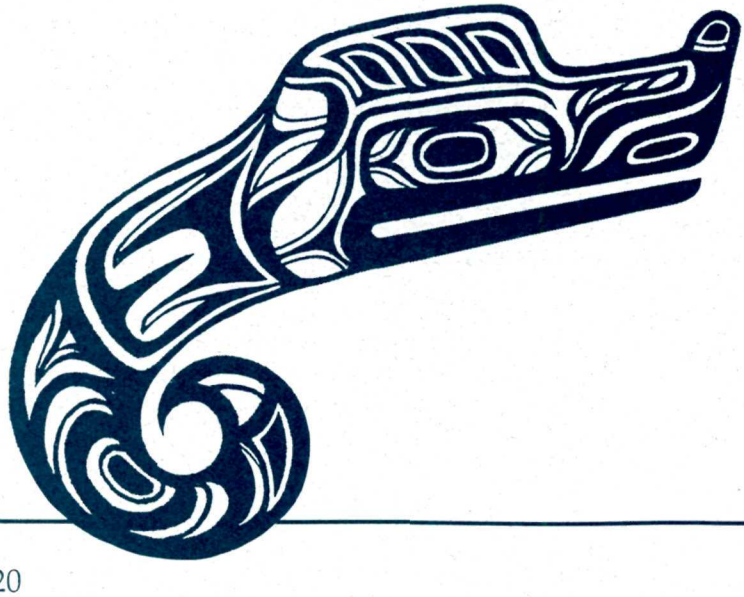
The federal levee on the east side of the river protects 700 acres, much of it in the Lower Elwha Klallam Reservation, and the tribal hatchery, required for fish restoration purposes, from flood frequencies of 200 years or less. It was constructed a distance from the main channel, largely behind the historic meander belt of the Elwha River. Because of the setback, the presence of the levee does not significantly affect channel morphology, wetlands, or the riparian zones in the lower river. Removing the levee would restore a very small wetland area that would be influenced by the river on an infrequent basis, but would result in major damage to property on the reservation, and would require the relocation of the fish hatchery.

The levee on the west side of the river cuts off a small portion of the former estuary and constrains westward movement of the river. It also protects approximately 30 acres of private property and homes from a 25- to 50-year-frequency flood. Although removing this levee would result in a small increase in the size of the estuary, it would be at the cost of major damage to property. Interior does not believe that the removal of either the west or east side levee is required to restore natural ecological processes or anadromous fisheries to the Elwha River, or is consistent with the goals of the act.

Even though structural solutions (e.g., raising the levees) to protect these uses have been recommended, non-structural mitigation is also an option. Non-structural measures such as flood insurance, purchase of property or development rights, land exchanges, land-owner relocations, and temporary flood protection measures are all possible if individual property owners and Interior agree that these are preferred options. Specific mitigation options for individual property owners would be discussed and decided at the final design stage of the project.

**Structural mitigation for flooding does not factor in long-term maintenance costs, whereas non-structural would. (Washington Department of Natural Resources, 180D)**

Maintenance costs are the responsibility of the local sponsor and have not been included in dam removal and restoration costs. Since modifications would improve the structural integrity of the levees, maintenance costs should not be significantly different from existing costs, and possibly less. The local sponsor of the east side levee is the Lower Elwha Klallam Tribe; on the west side, it is the Lower Elwha Klallam Tribe and the private landowners adjacent to the levee.



# Surface Water

## Industrial Pre-Treatment Facility Effectiveness
## Industrial Pre-Treatment Flocculent Sludge
## Water Quality Treatment Existing Conditions
## Water Treatment General
## Miscellaneous

## Industrial Pre-Treatment Facility Effectiveness

**At what level of sedimentation would Rayonier mills photographic paper manufacturing process be affected differently than it is now with the pre-treatment facility in place during dam removal? Aren't the costs of the pre-treatment facility underestimated? (Clallam County Commissioners, 192Q; William Jensen, 197B)**

The mitigation facilities for water treatment are designed so that there would not be a level of sedimentation during dam removal that would adversely affect the Rayonier mill process through altered water chemistry. In other words, the treatment facility is designed to supply water of the same quality as the mills receive now, with the dams in place. Costs are realistic estimates of construction.

**Would the pre-treatment facility meet the mill's requirement for water quality at all times, or just on average? What about during landslides (such as described on p. 227 of the draft EIS)? (Daishowa America, 244A)**

The pre-treatment facilities would meet the mill's requirement for water quality at all times. The cumulative impacts, described on p. 227 of the draft EIS, refer to an unlikely scenario of simultaneous natural disasters which could cause abnormally high and overloaded river sediment loads. We do not expect that the proposed water mitigation facilities would be able to treat the required flows during these unusual events.

**The EIS does not cite which standards would be employed in design, construction, and operation of the pre-treatment facility. (Daishowa America, 244B)**

Design, construction, and operation of the proposed water treatment facilities would follow standards of the state of Washington. The design and operation of the facilities would be in accordance with Washington Administrative Codes. These WAC codes define the necessary design requirements and the design submission and review process, as well as requiring water quality protection through proper operation and monitoring of the treatment plant and process.

Construction would be required to follow all local, state, and federal codes. On-site construction management would ensure compliance with specifications, design, permits, and safety. Project specifications would be prepared in accordance with either the Construction Standards Institute (CSI) or Bureau of Reclamation standards.

**Who would operate the industrial pre-treatment facility during dam removal? How would it be paid for? How would the infiltration galleries be monitored and by whom? (Daishowa America, 241W; workshop)**

Federal government personnel trained in water treatment would operate the pre-treatment facilities during dam removal. After a period of time the government would decommission the plant and salvage the equipment. Interior would appropriate the funds to operate the plant during the impact period.

Real-time water quality data would be used to control the infiltration gallery and pre-treatment facilities. These data would come from the existing monitoring station upstream of Lake Mills and from sensors that would be installed at the treatment channel as part of the proposed facilities.

**What are the cost assumptions for the pre-treatment facility? Do they provide for uninterrupted service? Repair and maintenance? For how long? (Daishowa America, 244E)**

The cost estimates allow for the continuation of water service to the mills during construction of the water treatment facilities and during removal of the existing rock diversion dam. This continuation of service would be accomplished through the use of a temporary pump station to pump water to the mill's 72 inch pipe during construction of the water treatment facilities. In addition, this pump station would be relocated to pump to these new treatment facilities while the existing rock diversion dam is removed.

Routine maintenance and repair of the facilities are parts of the operations and maintenance (O and M) costs for the water treatment facilities. O and M costs have been estimated for both the River Erosion and the Dredge and Slurry alternatives for dam removal for an impact period of four years.

**Are mitigation measures adequate to permit the mill's water treatment facilities to meet the following water quality requirements: maximum allowable solids, 0.05 ppm, targeted filtered water, 0.01 ppm? What are the peak sediment values expected at the mills with treatment? (Rayonier, 262A; workshop)**

The proposed pre-treatment facilities would be designed to provide the mills with at least the same level of water quality they have been receiving with the dams in place. Preliminary jar-test results indicated no problem removing even very high sediment loadings down to about 10 NTU of turbidity, comparable to turbidity levels in the water treated by the mills now. Therefore, these levels of water quality should still be achievable by the mill's water treatment plant.

**The EIS should analyze the effectiveness of the infiltration gallery and open channel pre-treatment. (Rayonier, 262B)**

The infiltration gallery and pre-treatment facility have been designed to provide the mills with water of the same quality as they receive with the dams in place. The details of the design (or "effectiveness") are in the Bureau of Reclamation's technical report on water quality.

**The method the Bureau of Reclamation used to design the pre-treatment facility is flawed. The facility needs to reduce peak turbidities as well. (Rayonier, 262C)**

"Averaging" is a way to describe the accountability from year to year of solids removed from the river and is not the basis of design of the pre-treatment system. The pre-treatment facilities are designed to produce a consistent effluent quality. Pre-treatment facilities would reduce the peak sediment loads.

**Won't the pre-treatment facility be overloaded when turbidity peaks continue for a period of time? Then turbid water would enter the mill. (Rayonier, 262D)**

The pre-treatment facilities are designed to produce a fairly consistent effluent quality by separating the solids from the water. The solids would be returned to the river in a manner that protects the equipment and does not harm the environment. The system would be designed to prevent "overloading" through the use of redundant units, and complete monitoring of all components of the sludge handling system. In addition, incoming river flow and turbidity would be monitored so that appropriate operational changes to the pre-treatment plant can be made.

## *Industrial Pre-treatment Flocculent Sludge*

**To what degree would adding flocculent to the river affect its ability to carry sediment, and result in increased accumulation? (Clallam County Commissioners, 192R)**

Flocculent is not added directly to the river so there would not be any change in river water character from changed water chemistry. After reacting with the river solids, flocculent, in reacted form, would be admitted to the river in the sludge, or the agglomerated colloids plus flocculent. The feed rate of polymer would be automatic and would be proportional to the level of suspended sediment measured upstream of the water treatment facilities.

An excess amount of flocculent fed at the treatment plant could potentially cause an excessive discharge to the river. This situation would only be the result of a failure of several pieces of chemical feed instrumentation and monitoring devices.

Generally, the return of high sediment loads usually coincides with high river flow periods so that the impact to the river is expected to be negligible. Flocculated particles require quiescent conditions to settle out, like those with extremely low flow-through velocity. The velocity in the river would not allow for much solids deposition, and the solids are expected to be deposited in the Strait of Juan de Fuca, where they would naturally settle if not for the dams.

**The EIS says flocculent would be discharged only during periods of high turbidity, but this may not be true. It may be settling during high turbidity but discharged as sludge after the turbidity event is over. (Washington Department of Ecology, 259A; Rayonier, 262F)**

It is true that the sludge created by settling sediment out of the water coming from the industrial infiltration gallery would not always be returned to the river during the highest flows or highest turbidity. The Glines Canyon Dam would be notched during January through March and June through October, the latter a period of relatively low flows. (A period of high flow, November to December, is preserved as a clean-water time for fish to move into the river, where they would be captured for stock building and preservation, during which no dam removal would take place.)

However, the solids portion of flow returned to the river would be small compared to the average river flow, and impacts to the river would be negligible. This is in part because the high turbidity associated with dam removal would already have had a significant adverse impact on aquatic life before discharge of the sludge is required.

**The water quality technical report for the EIS says suspended solids can be settled to 20%. Is this feasible? Won't it alter the size of the sedimentation basins if 20% is unreasonable? (Daishowa America, 244C; Rayonier, 262G)**

The pre-treatment facilities are designed to produce a consistent effluent quality, not a desired concentration of solids in the sludge. The percent solids in the returned sludge depends on the amount and settleability of the sludge and the time provided for settling. If a lower value than 20% solids occurs, the returned sludge would be lighter than predicted and would be more easily transported down river to the Strait of Juan de Fuca. It also would be more voluminous at a lower solids concentration, but, having a higher water content, would more closely resemble water and natural suspended material. Since the time for settling is limited, monitoring the incoming turbidity and the sludge in the sedimentation basin is planned to control the rate at which sludge is returned to the river.

The estimate of 20% solids by weight is based on actual experience from a water treatment facility. Final design of the sludge handling facilities for Elwha would consider a lower percent solids concentration for a conservative design. This would result in pumping at a higher flow rate.

**Won't the settling area be depleted during days or weeks of high turbidity? (Rayonier, 262E)**

The pre-treatment facilities would be designed and operated in a manner that permits the solids to be returned to the river quickly and safely. Historic data show that there would not be periods of high turbidity of such duration that would cause overloading of the pre-treatment facilities.

**Aren't permits required to return the flocculents to the river? This is not mentioned in the EIS. (Daishowa America, 244D)**

The return of flocculent sludge to the river would be regulated by a discharge permit with involvement from the Department of Ecology. The permit would be issued in accordance with the state's administrative code, or would be a National Pollutant Discharge Elimination System (NPDES) permit. Precautions would be taken to ensure that any effect the flocculated material could have on the river is minimized.

## *Water Quality Treatment Existing Conditions*

**Please clarify to what extent the reservoirs lower turbidity during a storm vs. dampen peaks and extend the time the water is turbid. Is p. 10 of the draft EIS correct? (Rescue Elwha Area Lakes, 148D)**

The commentor is correct in stating that both lakes have trapped sediment (a total of about 18 million cubic yards since 1913). This comment is consistent with the draft EIS which states on p. 10 that "The reservoirs have affected water quality by acting as a large setting basin during floods, landslides, or other events which would normally produce surges of turbidity downstream." The EIS also correctly points out that the reservoirs do not trap all of the inflowing sediment, especially during floods. Inflowing sediment mixes with the lake water and the peak sediment concentration released downstream is less, and the duration of elevated concentration is longer, than compared with reservoir inflow.

**Interior has said the river would never return to its present clarity. Is this true? (Rescue Elwha Area Lakes, 148E)**

The river would be as clear as it is now during low or normal flows. However, when higher flows occur (from storms or snowmelt), peak turbidities would be higher than they are now. As the draft EIS explains, the peaks would be higher, but pass more quickly than they do now. This is because the reservoirs dampen, but extend high turbidity levels over a longer period of time.

**What is the pollution level entering the Elwha from Indian Creek and the Lower Elwha River users, particularly septic systems? Is the state failing to enforce its own regulations? (workshop)**

Specific water quality data from Indian Creek are not available. However, Indian Creek drains from Lake Sutherland, which has adequate water quality to meet state standards (Port Angeles Regional Watershed draft report, 1994). Indian Creek flows through timberland and farm land and some bank erosion has occurred near homes along the creek. Due to the land use, there is a potential for some non-point source pollution along the Indian Creek corridor. The lower Elwha River (below the Indian Creek confluence) has high water quality, and the community water systems with wells adjacent to the river meet all state drinking water standards. Though exempt from state regulation, the Lower Elwha Tribe community wells also meet state drinking water standards.

**To what degree do diversions of Elwha River water affect supply? What happens to users at low flow? Are fish protected? (Clallam County Commissioners, 192W; workshop)**

The Elwha and Glines Canyon projects are operated in run-of-river mode, which means that the amount of water entering the reservoirs is immediately discharged at the dams. The operators accomplish this by keeping the reservoir elevations as stable as possible, although some fluctuation of Lake Mills does occur. Since the reservoirs are not now used for storage for the later release of water during low flow periods, removal of the dams would not change water availability for water users or fish. However, the construction of a new Ranney well system for the city of Port Angeles, as partial mitigation of dam removal, would provide the city greater flexibility in meeting water demands.

The state of Washington has not identified minimum instream flows needed for resource protection for the Elwha River. Therefore, it is not possible to estimate possible impacts to fisheries resulting from water diversions.

## *Water Treatment General*

**Can you shift to a different water treatment technology during removal if needed? Does the estimate for water quality treatment include a contingency for it not working as modeled? (workshop)**

The water quality treatment facilities are designed based on proven technology, and are expected to work as stated. Contingencies are built into the design for factors such as changes in construction conditions and unanticipated rates of inflation. Also, a contingency fund is part of the water quality mitigation package. Money in the fund would be used to mitigate unforseen impacts, primarily to individual well users.

There would be flexibility built into the design of the pre-treatment facility and other mitigation to accommodate small changes, such as the type and amounts of chemicals used to remove the sediment from the water prior to delivery to the mills.

**Would creating an outlet from the tribe's hatchery directly to the Strait improve water quality in the river? (Clallam County Commissioners, 192S)**

No data are available on the quality of water released from the tribal hatchery. However, water quality leaving the hatchery currently is improved before entering the river by settling effects in ponds located downstream of the rearing vessels and in Bosco Creek. The extent to which water quality would change by routing outflow to the Strait rather than to the river is unknown.

**The EIS is not detailed enough on water quality mitigation. Where are the design specifications, drawings, etc.? (Melanie Caltrider, 181M)**

Two feasibility level drawings were prepared for the water treatment facilities and four feasibility level drawings were prepared for the rapid infiltration gallery and pump station facilities. These drawings plus associated cost estimates and further descriptions are available in the Bureau of Reclamation's technical report on water quality. Full design specifications are not prepared before the project reaches the pre-construction stage (budget year 1).

## *Miscellaneous*

**How far in advance of notching Glines Canyon Dam are the mills notified? (workshop)**

A specific schedule for notifying the mills of notching progress has not been determined. This schedule would be determined as part of preconstruction activities.

# Groundwater

## City of Port Angeles Municipal Supply
## Other Wells/Private Property
## Miscellaneous

## City of Port Angeles Municipal Supply

**There would be a minor adverse impact on the city's water supply from the slight drop in pH predicted (from leaching of the metal in the distribution system). (City of Port Angeles, 241E, Y)**

Neutralizing the pH of the water (i.e., raising the pH back up from the oxidation process) with sodium bicarbonate (soda ash) would ensure that the pH leaving the plant is within acceptable limits to the city. The cost for this is included in costs for the plant.

**When and how would the decision be made on a filtering system for treating iron and manganese? (City of Port Angeles, 241C, N)**

The preferred alternative includes iron and manganese treatment for both Ranney collectors during the dam removal period. This would also serve to filter out turbidity during the time it is in operation.

**Are costs to dispose of backwash from the city treatment filters included? (City of Port Angeles, 241M)**

Backwash from the temporary filters would either be disposed of with flocculent sludge from the industrial pre-treatment facilities, or with the filters as solid waste. No specific additional cost has been identified.

**Would the Dry Creek Water Association be connected to the new Ranney collector or to a separate system? (City of Port Angeles, 241D)**

At this time, it is expected the association would be connected to the proposed new Ranney collector.

**Would the Ranney collectors be protected from flooding? (City of Port Angeles, 241G)**

Yes. The pump deck of the proposed new collector would be located above the 100-year floodplain. A dike would be constructed to protect the existing Ranney collector, the Washington Department of Fish and Wildlife rearing channel, and the industrial diversion channel against 100-year floods.

**Would aggradation increase the frequency of the "short out" to the city Ranney well? Because of this "short out," the Ranney collector and the surface water in the river are hydraulically connected, and long-term turbidity would increase. (City of Port Angeles, 241H, I, J, K; workshop)**

Aggradation is not likely to increase the frequency of the "short out" at the existing Ranney collector. The short-out tends to be associated with a rapid rise in river water surface elevation following a prolonged period of low flow (which has allowed soil around the based of the collector caisson to dry out and crack, thus providing an infiltration path which bypasses the filtration provided by the riverbed.) Generally, increased turbidity in the river would not affect the Ranney supply. However, the proposed new Ranney collector would be designed to offset any impact by providing water to the city and Dry Creek Water Association during periods when the existing collector has to be shut down because of high turbidity.

**The municipal water treatment facility to treat iron and manganese should be permanent. Costs should not be much higher to make a permanent facility. (City of Port Angeles, 241B, J, K, BB, CC)**

The project cost estimates reflect the assumption that the proposed filtration facilities to protect the city of Port Angeles and the Dry Creek Water Association from the potential impacts of dissolved iron and manganese associated with the proposed action would be temporary. These entities have the option of acquiring the facilities permanently by purchasing them from the United States government at the end of the construction period.

Project impacts associated with the "short-out" problem experienced by the existing Ranney collector are anticipated to be negligible. It is anticipated that the number of days the existing collector is shut down due to high turbidity would not increase over existing conditions when the dams are removed, although the peaks during these shutoffs may be higher.

**The EIS says river water and the Ranney well are not hydraulically connected. This is not always true. (City of Port Angeles, 241Q)**

The draft EIS has been changed to add a sentence on the "short-out" experienced by the Ranney well during high flows following a prolonged dry period.

**Removing the dams is going to increase the number of days where turbidity approaches or exceeds 1 NTU. Although 5 NTU is allowable, the city shuts off its Elwha supply when 1 NTU is reached. (City of Port Angeles, 241R, BB, CC)**

The number of days where water from the existing Ranney collector exceeds 1 NTU is not expected to increase as a result of dam removal.

**Won't the Ranney collector(s) be "overcome and blocked by material" during dam removal? (Rescue Elwha Area Lakes, 148F)**

The draft EIS indicates that some fine sediment could lodge in the spaces between sediment grains in the river bed, potentially reducing recharge to the city of Port Angeles Ranney collector(s). This is a conservative statement, as the river flow velocity sufficiently exceeds the infiltration velocity to nearly preclude plugging. Also, periodic reworking of the riverbed by high flows would tend to clean out any settled fine material. The impact of any clogging would be minor compared to the loss in yield resulting from the river channel migrating away from the collector.

**What are the potential future EPA requirements concerning public surface supplies? Wouldn't the city of Port Angeles need to upgrade their water treatment when these requirements take effect with or without dam removal? Would the proposed mitigation keep the city's supply in compliance with these regulations and therefore be a benefit of the project? (Friends of the Earth, 185D)**

It would be speculative to discuss whether the mitigation proposed for the city's municipal supply would meet future EPA standards.

## *Other Wells/Private Property*

**Would wells on the west side of the mouth be protected? Those on the high bank and beach area also? (workshop)**

No impact to the wells is expected in those areas.

**Would the septic systems of residents other than the tribe be affected? (Clallam County Commissioners, 192T; workshop)**

A few of the septic systems for homes along the beach on the west side of the river could be affected. A groundwater-table rise is expected in the lower delta area, based on estimates of aggradation and rise of river stage. Some of these homes have water levels at 5 to 10 feet and may find their septic system drain

lines inundated during high flow periods after the dams are removed. If so, mitigation would be the same as for the tribe, that is, to convert the conventional systems to mound systems. Interior would pay for such mitigation, if required, out of a contingency fund set aside to resolve unanticipated impacts on water users.

**Roads, foundations, agricultural uses, and other activities would also be affected by raising the water table. (Clallam County Commissioners, 192U)**

Currently, there are no agricultural activities or deep building foundations in the area expected to have adverse water level impacts. One farm along Lower Elwha Road, on the east side of the delta, is mostly hay and pasture ground and has a current water table deeper than 10 feet. The residential homes in the area are generally built with relatively shallow footings and pad foundations. It is possible that in some areas where the water table is already less than about five feet deep (primarily on the west side of the river near the mouth; tribal reservation land), the rise of the water table could weaken the load-bearing capacity of the foundation material. Whether this is true depends on a variety of factors, including soil types, water levels, bearing loads, and use. Because road use within the reservation is light, impacts are not expected.

## *Miscellaneous*

**Wetlands and rearing habitat would not form between the river and the levees. Sediment deposition downstream would cause aggradation, and the river would not be the low point - the water table would be raised under the river. (Clallam County Commissioners, 192H)**

Groundwater level measurements and water balance data suggest that the river discharges to the groundwater system in the lower reaches. Sediment aggradation in the riverbed and raising of the river stage would not change the direction of the groundwater gradient in this area.

**It is incorrect to say the dams do not alter existing hydrology, as removal would cause aggradation, a rise in the water table, and a "loss" of the flow to groundwater. (Clallam County Commissioners, 192LL)**

It would be more correct to say the flow regime, i.e., the amount and timing of river flow, would not be changed. The EIS has been changed to reflect this.

**The EIS talks about increased fines during dam removal and its impact on groundwater users. Won't there be increases in turbidity following dam removal as well? (City of Port Angeles, 241AA)**

Yes. See p. 232 of the draft EIS, "The primary impact to wells ... in both the long and short term would be from increases in turbidity."

# Fisheries



## *Status of Elwha Stocks*

**Isn't the urgency of the decline of Elwha stocks understated? When would Elwha stock become extinct without hatchery supplement? Are stocks steadily declining? (The Mountaineers, 141A; Save Our Wild Salmon Coalition, 184C; Friends of the Earth, 185G; National Parks and Conservation Association, 198C; Weldenn and Virginia Clark, 235A; American Rivers, 236A; Trout Unlimited, 271C)**

For some species, the dropoff is very serious, while the coho salmon run is relatively secure. For those species in rapid decline, government agencies and the Lower Elwha Klallam Tribe are working together to try to stabilize populations. For instance, the Elwha summer/fall chinook salmon run has declined seriously in recent years, largely as a result of disease-related pre-spawning mortalities. This is despite hatchery assistance. The Washington Department of Fish and Wildlife and the tribe, in consultation and coordination with federal agencies, undertook emergency measures in 1996 to protect this stock. In addition, only about 200 chum salmon continue to spawn in the Elwha, most in a single side channel area in the lower river. The tribe is attempting to spread out the spawning distribution of these fish to protect against a catastrophic loss. In contrast, the coho salmon run is relatively stable, being produced at the tribal hatchery.

While it is impossible to accurately predict a specific year in which any Elwha stocks would become extinct, it is accurate to say that the risk of extinction increases each year restoration is not begun.

**Would shortening the permit process help stock recovery? (National Parks and Conservation Association, 198D; Tim McNulty, 225A)**

Stock recovery would benefit from the earliest possible implementation of the restoration process. However, because water quality mitigation measures must be in place before dam removal can be initiated, the permitting process could be shortened as much as one year and still not speed restoration (see appendix 6). Decreasing the time needed to obtain the water quality permits could accelerate the process, except that the various federal and state permitting agencies and their statutory responsibilities would dictate the speed at which permits can be secured. Interior would work with these agencies to accelerate the process as much as possible, while fully complying with applicable regulatory requirements.

**What do we know about the genetic integrity of the Elwha stocks, and whether this has changed since the dams were built (i.e., the 100 lb. question)? Can these stocks "genetically adapt" over time? (workshop)**

This question was addressed in Interior's programmatic EIS, pp. 158-159. To summarize, the genetics seem to be intact for most stocks, including chinook, coho, winter steelhead, cutthroat trout, char, and chum salmon.

**Discuss whether there are thresholds (numbers and genetic diversity) below which each stock would be lost. (workshop)**

Population sizes and genetic testing are being used as part of the stock-status assessment to determine the suitability and availability of each stock for restoration (see Appendix 2: Elwha Fish Restoration Plan). Preliminary results of this assessment were used to help determine the potential for restoration of each Elwha stock (see table 45, p. 250, in the draft EIS). Specific thresholds were not determined.

**Discuss the apparently unique opportunity to restore a truly native wild stock (steelhead). (workshop)**

The indigenous rainbow trout population in the upper Elwha River produces seagoing fish (smolts) and is thought to be descended from the original Elwha steelhead. If these fish survive in the ocean, they return as either summer-run or winter-run steelhead. The rainbow trout population is the broodstock of choice for restoring steelhead.

**Why do earlier Elwha reports rate stock viability as marginal or nonexistent, yet the EIS concludes that dam removal would result in "good" to "excellent" fish runs? How were stocks chosen for restoration? (Melanie Caltrider, 181R; workshop)**

Even where some Elwha River stocks are extinct, closely related stocks may be used for restoration. For example, Dungeness River pink salmon can be used to restore Elwha River pink salmon (see also appendix 2 of the draft EIS, and pp. 159 and 164-166 of the programmatic EIS).

## *Impact of Harvest*

**Can the ecosystem and anadromous fisheries be fully restored given the rate of tribal, commercial, and sport fisheries? How would the fish harvest be managed to ensure full stock recovery? Explain "harvestable surplus." (Jim Ruff, 147C, D; Clallam County Commissioners, 192EE, JJ, OO, PP, X; Robert Bessey, 267F)**

This question was asked and answered in Interior's programmatic EIS. See pp. 164-170 for a detailed response, and discussion of assumptions and methodology.

The state and tribe would manage Elwha River fisheries based on estimates of spawning needs and the numbers of returning fish, as they do today. The spawning escapement would likely need to be adjusted as monitoring data allow refinement. "Harvestable surplus" refers to the number of fish over and above the number needed to "escape" to spawn and seed the river system to maintain harvestable production (often referred to as maximum sustained yield or optimum sustained yield). (This is also discussed in pp. 164-170 of the programmatic EIS, mentioned above.)

**Won't this project benefit the tribal fishery at the expense of the non-tribal fishery? (Rescue Elwha Area Lakes, 147B)**

Table 62 of the draft EIS (p. 316) compares benefits to tribal, commercial, and sport fisheries from dam removal. All three benefit enormously from removing the dams and restoring the ecosystem.

## Hatchery Fish to Restore Stocks

**Hatchery stock are not as well adapted to natural conditions as wild fish, yet you propose using them to reestablish populations in the Elwha River. Why? Could you try natural recolonization first and use hatchery supplements if it fails? (Rescue Elwha Area Lakes, 148G; Nick Gayeski, 162B, C, D, E; Clallam County Commissioners, 192CC, KK; Arthur Whiteley, 243A; Eric Hartmann, 245B; workshop)**

The proposal to simply remove the dams and allow "natural" recolonization of the river (with no directed intervention from hatcheries) has considerable merit and appeal. However, this option was declined in favor of using releases of fish from hatcheries for most stocks to speed restoration with little or no compromise of genetic conservation goals (see below). It is the strong feeling of many concerned parties (e.g., state, tribe, commercial and sport fishing interests, private citizens) that restoration must be achieved as quickly as possible once the dams are removed, and that reliance on natural production and straying into the river system, especially during the current period of generally depressed salmon numbers, likely would require a much longer time, thereby threatening populations that are in low numbers.

Following are several of the considerations leading to Interior's proposed fish restoration plan.

- The sooner restoration is achieved, the sooner the continued direct influence of hatchery programs would be eliminated; the tribe and the state have agreed to terminate competing releases of hatchery fish into the Elwha River when natural populations are restored. Current expectations are that hatcheries would be used for only two generations (e.g., six years for coho salmon), after which they could be used to help restore fish in other Strait of Juan de Fuca river systems. If restoration fails because hatchery fish are poorly adapted for natural rearing, the options of using wild fish from other proximate river systems or of allowing natural recolonization would remain (see appendix 2).

- Fish produced by the hatcheries (coho, chinook, and steelhead) and their progeny would continue to enter the Elwha River after the dams come down, even if the hatcheries stopped immediately. Direct releases of hatchery fish into these reaches would therefore have little effect other than to speed recovery.

- The wild Elwha genetics are best preserved in hatchery stock for chinook and coho. The available information shows that the chinook salmon from the lower Elwha River and hatchery are crosses of hatchery and wild stock. The coho salmon from the Elwha Tribal Hatchery consist of the ancestral stock of the Elwha River, albeit modified by the hatchery program and by some interbreeding with Dungeness River coho salmon. Hence these stocks are judged the donor stocks of choice.

- Data indicate that the resident rainbow in the Elwha River are descended from the native steelhead, and efforts are underway to identify which portions of the rainbow population have the least genetic influence from historic releases of hatchery rainbow trout in the system. Efforts to accelerate restoration of steelhead would employ the progeny of these wild resident rainbow trout and perhaps the progeny of the few wild steelhead originating from the lower Elwha River. Fish derived from Chambers Creek or Skamania steelhead would not be released into the newly accessible reaches of the Elwha.

- Only offspring of chum salmon from the lower Elwha River would be released into newly accessible reaches, but pink salmon have been judged to be extinct in the Elwha River. Attempts are underway to increase the populations of pink salmon in the Dungeness River, the closest river to the Elwha, and then to use these fish for restoration in the Elwha.

- In recognition of the genetic issues with hatcheries, such as loss of fitness in hatchery fish for natural rearing, the restoration plan would emphasize releases of juvenile fish at the earliest practicable stages of the life cycle (e.g., as "button-up" fry, having incubated on temperatures mimicking those in the portion of the Elwha system to receive these fish) to decrease exposure to

the hatchery environment and increase exposure of these fish to natural selection in streams. This strategy is expected to decrease the time for restoration, defined by genetic adaptation to local conditions as well as by numbers of fish, by one generation.

- In recognition of uncertainties in the restoration effort, a program of genetic marking will be employed to allow us to evaluate the relative contributions of the proposed restoration effort and natural colonization through straying.

**Are there any plans to control or reduce predation during the operation of the hatchery until natural production takes over? Any plans for predatory control during pulsed releases from hatchery? (workshop)**

No. Natural predation is considered normal in the Elwha River. In addition, predation increases generally lag behind population increases, allowing recovery to take hold. Hatchery fish would be released to balance survival and interaction with the natural environment.

**Would there be assurance that hatchery fish would be marked to distinguish them from the wild stocks? (workshop)**

All hatchery steelhead and a portion of the hatchery chinook and coho salmon would be ad-clipped. The least invasive mark is clipping the adipose fin (the fleshy appendage on the back of the fish between the dorsal and caudal fins).

**What are the cost savings and "research opportunities" of using natural recolonization? (Washington Department of Natural Resources, 180L)**

The cost savings would vary by species and would accrue from the elimination of hatchery modifications, raising of fish, and outplanting (see appendix 2, table 3). The costs of monitoring could be similar. However, the straying of existing hatchery fish into the upper watershed would complicate research looking at natural recolonization of wild stocks.

## *Restoration Potential*

**Unless nutrients (fish carcasses) and gravel are added between the dams, dam removal is a prerequisite to full restoration, isn't it? Are there any plans to provide nutrient enrichment for juveniles? Would the upper river, since it is at carrying capacity now, need nutrients added before anadromous fish can be restored? (Clallam County Commissioners, 192Y; National Parks and Conservation Association, 198B; workshop)**

As Interior's programmatic EIS shows, dam removal is a prerequisite to full restoration of the anadromous fisheries. Even adding gravel and fish carcasses would not restore habitat (for instance, pool and riffle habitat would be limited, the reservoirs would still present a huge and, in some cases, insurmountable barrier to juvenile emigration, water downstream would continue to be too warm during low flow late summer months, etc.), and fish passage measures installed on the dams would continue to be a source of fish mortality.

Creel and snorkeling surveys and fish trapping suggest that the upper river is not at carrying capacity for resident fish. Also, although there is some overlap, juvenile anadromous fish occupy different in-stream microhabitats than resident trout. Existing nutrient sources, including fine organic matter and dissolved nutrients from the surrounding forest, leaf litter from riparian vegetation, terrestrial and aquatic insects, and resident fish carcasses, as well as the carcasses of returning anadromous fish, would be adequate for the early years. This is supported by studies of juvenile salmon and steelhead outplanted in the upper river that found existing average to high survival rates, such as 31% for steelhead fry to smolt survival (Wunderlich and Dilley 1986). While in-stream nutrient levels would increase as salmon runs recover, adding fish carcasses is not necessary to begin restoration.

**How would freshwater habitat problems on the Elwha's tributaries (Little River, etc.) affect the success of the restoration effort? (workshop)**

Little River and Indian Creek have been adversely affected by land management practices. Overall restoration would be little affected by habitat limitations in these streams, but Lake Sutherland restoration would likely benefit from improved passage conditions in Indian Creek.

**Would regional salmon runs be higher if this money was spent on several restoration projects rather than just the Elwha? (workshop)**

The EIS team is unaware of any restoration opportunities that offer such a large return, both in terms of fish and economics.

**During low flows, would there be enough water for fish after the city and mills use theirs? Would a reservoir or other storage be a good idea for these periods? (workshop)**

A minimum in-stream flow has not been identified for the Elwha River. However, numerous scientific studies indicate that reductions in summer low flows often reduce coho salmon and steelhead production. Constructing a reservoir large enough to sustain in-stream flows during the low flow period would not be practical.

**What are the factors (variables, limitations, assumptions, etc.) that justify the fish restoration model results and the model itself? In other words, defend the fish production model and its results. (Rescue Elwha Area Lakes, 148J; Clallam County Commissioners, 192AA; workshop)**

Field studies to determine quality of fish habitat in the Elwha River were conducted by a consultant for the project owner during the FERC licensing process. These habitat data were combined with average fish densities, such as smolts per square meter, and freshwater survival rates observed in other comparable Washington streams (e.g., S.F. Skykomish River for coho salmon, Dungeness River for pink salmon) to gauge carrying capacity for affected species. Using the escapement needed to reach carrying capacity, average marine survival (see below), and average freshwater survival, the total expected production of adult fish, by species, was calculated.

Ricker modeling was used to estimate maximum sustained yield production and escapement for each species (FERC 1993; vol. 2, pp. F-456 to F-462). These production numbers have been extensively reviewed and represent the best estimate of potential fish production. Numerous coded-wire tagging studies conducted in the 1980s and 1990s allow estimation of ocean migration patterns and current harvest rates. These data will allow fisheries managers to manage harvest rates to return adequate escapements to the Elwha River. Tagging studies of restored runs would permit refinement of harvest regimes.

**Pinks are nearly extinct. How can you predict that 274,000 would return? (Rescue Elwha Area Lakes, 148K)**

Although low numbers (fewer than 10) of pink salmon are seen annually in the Elwha River each odd year, Elwha pink salmon are believed to be extinct: fish seen in the Elwha are likely strays from other rivers. The restoration plan relies on broodstock from the Dungeness River with an initial outplant of 350,000 eggs. This would require 233 females (at 1,500 eggs per female) or 466 adults (at 50:50 sex ratio). Rounded to 450 adults, FERC's Ricker model was modified to reflect this higher starting point in Interior's plan. Efforts have already begun to assist Dungeness pink salmon recovery to allow transfer of fish to the Elwha.

**The sediment model is based on assumptions which may not be correct. For instance, fish habitat may not be restored in the two to six years the EIS predicts, and fine sediment may become embedded and enmeshed. (Robert Bessey, 267D, E)**

Although it is true that modeling does involve assumptions, the computer models have been calibrated and verified with empirical data (drawdown tests). Interior chose to make conservative assumptions when assumptions were needed, and so impacts described in the draft EIS tend to either overestimate or predict the upper end of a range of reasonable impacts. Further, success of the river erosion alternative is not dependent on computer model results or even the alternative selected, but rather on monitoring data, which would be collected during dam removal. Actual flooding and water quality impacts depend greatly on the rate of dam removal, which would be slowed, if necessary, so as not to create adverse impacts greater than those described in the draft EIS.

Both modeling and empirical data show that fine material would be suspended and carried out almost immediately by the river, and not become embedded or enmeshed. In the channel, sand-sized material would quickly be flushed from the system, much of it in a matter of months. Gravel would take longer, and under normal hydrologic conditions, would appear in measurable quantity throughout the lower river within two years. If flows were lower than average during dam removal, bed load would move more slowly, and be reestablished closer to the six year prediction.

**What level of turbidity can fish live with downstream? (workshop)**

See the Impacts of the River Erosion alternative on Native Anadromous and Resident Fisheries section in the draft EIS (pp. 239-265) for a discussion on the levels of turbidity and suspended sediment that fish can tolerate.

**How long would it take after dam removal to get good spawning gravels? (workshop)**

Depending on hydrologic conditions, spawning habitat is expected to improve to near natural conditions within two to six years.

**Is returning 14%-30% of the coarse material stored in the reservoirs enough for fish? (workshop)**

The amount of coarse material trapped in the reservoirs would be adequate to allow restoration of the middle and lower river to proceed. See the Native Anadromous and Resident Fisheries sections in the draft EIS for a discussion about the importance of gravel size to spawning fish.

**Recovery of the fisheries would not take as long as projected, but fish would return within two to five years. (Washington Wilderness Coalition, 178C; John Livingston, 205A)**

Fish would be returning to the river even during the dam removal period. The time schedules summarized in table 2 of the draft EIS estimate the time required to reach full production. Some limited harvest on Elwha stocks may begin within the first decade after dam removal.

**What if the gravel recruitment rate to the lower river and the rate at which the channel stabilizes to allow spawning are slower than the rate at which the fish species expand? Won't this limit the populations? (Clallam County Commissioners, 192 AA, BB)**

Whereas fine material would be suspended and carried out almost immediately by the river, most of the coarse material in the reservoirs would erode out more slowly in the months and years following dam removal. In the channel, sand-sized material would quickly be flushed from the system, in months to a few years. Gravel would take longer, appearing in measurable quantity throughout the lower river within two to six years. This would restore habitat and stabilize the channel well before full restoration for any stock is expected, and would therefore not limit restoration.

**Is it possible to fully restore the Elwha fisheries to pre-dam conditions given other adverse factors that won't change? (Clallam County Commissioners, 192II)**

See response in the programmatic EIS, pp. 164-166—Issue: Definition of full restoration and how long would it take to achieve it. In summary, Interior is restoring habitat and passage, i.e., the natural physical

and biological ecosystem processes that existed before the dams were built. This, in combination with harvest management and measures described in both the programmatic EIS and the draft EIS, would result in the full restoration of Elwha's anadromous fisheries (see pp. 248-254 of the draft EIS).

**Address sockeye restoration. Would the Washington Department of Fish and Wildlife (WDFW) discontinue stocking the lake to encourage the sockeye populations? Would fishing regulations be changed? Does taking no active role with the kokanee of the lake meet the requirements for full ecosystem restoration? (Pacific Fishery Management Council, 150A; Clallam County Commissioners, 192FF; workshop)**

WDFW has agreed to readdress Lake Sutherland fish management following dam removal in order to maximize production of all stocks, not just sockeye salmon. Fish stocking and harvest regulations could be discontinued or modified to achieve this goal.

As the commenter says, "Taking no active role with the kokanee of the lake" is considered the best option for restoring a sockeye salmon run. As stated above and in the EIS, Interior is restoring habitat and passage, i.e., the natural physical and biological ecosystem processes that existed before the dams were built. This would lead to full restoration of the anadromous fisheries, including sockeye. Smolts produced by Lake Sutherland kokanee would be better adapted to the Elwha River system than a sockeye stock imported from another lake (see appendix 2).

## *Analogies*

**Other undammed peninsula streams have low runs, why would the Elwha be any different after dams are removed? Compare salmon streams in trouble to healthy ones and identify the reasons for each. (Rusty Hilt, 156B, C; workshop)**

This question was asked and answered in Interior's programmatic EIS (see pp. 159-160). To summarize, the quality and quantity of freshwater habitat in each stream varies. If all other variables are equal, this will be the dominant reason stock strengths vary. For instance, those streams with the majority of their upper watersheds protected by their location within Olympic National Park (such as those along the Washington north coast) have the stronger runs (McHenry, et al. 1996). The shorter Strait of Juan de Fuca streams, having fish habitat largely outside the park, have severe habitat problems (McHenry 1996) and consequently weaker runs.

**Is the comparison of the Toutle River to the Elwha appropriate? Discuss why. Would a comparison to the Fraser River, where a rockfall blocked the canyon, be appropriate? Commentor suggested that the geology of the watershed is the problem. (Clallam County Commissioners, 192HH)**

The purpose of comparing the Toutle River and Elwha River was to illustrate an extreme example of the resiliency of salmonid populations following exposure to high suspended sediment concentrations. Immediately following the eruption of Mount St. Helens, tremendous amounts of fine sediment were washed down the Toutle in magnitudes far greater than would occur in the Elwha during dam removal. In addition to suspended sediments, water temperatures were significantly elevated and riparian zones denuded (Martin, et al. 1984; Lucas 1985; Jones and Salo 1986). Yet, natural fish recovery in the Toutle River system began almost immediately (Rawding 1995). Impacts in the Elwha would be far less during dam removal, and the EIS team fisheries biologists believe that anadromous fisheries restoration would occur comparatively quickly, in part because of the Toutle River experience. See the programmatic EIS, pp. 157-158, for more information.

The rockfall on the Fraser River is an excellent example of how blocking river access, like the Elwha River Dams, can have a severe impact on salmon populations. Sockeye salmon populations in the Fraser River underwent a major crash in 1913-1914, when rockslides caused by railroad construction in the canyon at Hell's Gate blocked much of the upper river, including most of the spawning grounds. Sockeye and other salmon that used the Fraser River remained at critically low densities until construction of "fishways"

around the blockage in the 1930s. Damage to or loss of habitat was so great that natural recovery was precluded until upstream fishways were completed. (National Academy of Sciences, 1996). Because the Fraser River example was a rockfall that did not result in juvenile fish passage through two large reservoirs or past two hydroelectric dams, it does not offer a comparison to the Elwha River from the standpoint of fish passage.

**Discuss other examples (if any) of fisheries restoration as a result of dam removal. Compare impacts on fisheries of dam removal on the Mad River in California to dam removal on the Elwha River. (Melanie Caltrider, 181BB; Friends of the Earth, 185C; American Rivers, 236B; workshop)**

Other examples of dam removal and fishery restoration projects were described in response to comments made on Interior's programmatic EIS (see pp. 157-158).

A review of the removal of Sweasey Dam on the Mad River was investigated by a consultant for James River during the Elwha FERC licensing process. The Joint Fish and Wildlife Agencies (JFWA; consisting of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, National Park Service, Bureau of Indian Affairs, Washington Department of Wildlife, Point No Point Treaty Council, and the Elwha Tribe) analyzed the review in a March 27, 1992 letter to FERC. The JFWA analysis is summarized below.

> The Mad River basin is more than twice as large as the Elwha, yet the Mad River has significantly less discharge. The basin is intensively managed for timber and agricultural uses, with their concomitant sediment and water quality impacts. The two basins are not comparable, especially in their ability to transport sediments downstream.
>
> The uncontrolled release of sediments was allowed during removal of Sweasey Dam, a method never proposed by FERC or Interior.
>
> The author of the review was unable to provide any evidence (other than reference to anonymous "researchers" at Humboldt State University) to substantiate the claim that fine sediment from behind the dam was still passing downstream 20 years after dam removal. The review also did not provide any supporting evidence for other supposed impacts (i.e., elevated water temperatures, migration of Mad River mouth) caused by the removal of Sweasey Dam. The review could not be substantiated.

In short, the JFWA found no supporting evidence for the claims made in the review, found the two basins are not comparable, and determined that there is no credible reason to reference the removal of Sweasey Dam (see responses to sediment comments for additional information on the Mad River comparison).

## *Data and Assumptions*

**The statement "near elimination of spawning gravel" (p. 12) is incorrect and not supported by scientific evidence. (Rescue Elwha Area Lakes, 148H)**

Some small amounts of gravel and other sediment remain in the lowest 2.5 miles of the river from erosions of the bluffs on the west side and from reworking of existing sediment in this wide flood plain. However, the loss of all but this minor source due to the construction of the dams has been well documented (FERC 1993, BOR 1996 PN-95-5). The lack of gravel has depleted spawning areas, reduced mainstem and off-channel rearing habitat, and decreased the size of the estuary.

**What are the combined effects of the levees and sediment input on side channel rearing habitat? Were impacts on all life stages considered? (Clallam County Commissioners, 192H, II)**

Side channel habitat is naturally formed by channel migration as it is influenced by discharge, substrate, sediment loads, and large, woody debris (i.e., logs and rootwads). Existing levees in the Elwha River do

not significantly limit side channel formation. The trapping of sediment and woody debris limit side channel formation by reducing channel meander.

The impacts on all life stages were considered in the draft EIS. See Impacts sections, Fisheries (pp. 239-265) and Living Marine Resources (pp. 285-291).

**How do you know fish can go above Goblins Gate? (workshop)**

A consulting firm for James River surveyed the entire length of the Elwha River looking for migration barriers, determined using the criteria defined in Powers and Orsborn (1985). The lowest mainstem barrier was documented at RM 33.7, referred to as Carlson Canyon Falls. This site is well above Goblins Gate and is a barrier at low flows; chinook, coho, and steelhead can pass at higher flows.

## *Phased Dam Removal*

**What are the disadvantages (or advantages), if any, to Elwha fisheries restoration of phasing dam removal over a 13 year period? (Elwha Citizens Advisory Committee, 182K)**

Under a phased approach, aquatic resources would be affected by two separate dam removal periods rather than just one. Any gains in restoration in the river following removal of Elwha Dam would be mostly negated by the subsequent removal of Glines Canyon Dam. Fish spawning in Indian Creek and Little River would be able to access these tributaries, and would be safe once in them, but would need to pass through highly turbid mainstem habitat to reach them during the removal of Glines. Corresponding fish restoration costs would increase as restored fish populations in the middle river would be adversely affected by the removal of Glines and the release of sediments in Lake Mills. Consequently, much of this restoration would have to be repeated. Chinook and chum salmon runs would be at risk until Glines was removed and habitat restored.

## *Immediate Restoration Efforts*

**As an interim measure, would creating pools and adding spawning gravel below the dams be a benefit to the Elwha fisheries? Would this be feasible? How much would it cost? (Elwha Citizens Advisory Committee, 182Q)**

Chinook pre-spawning mortalities, resulting from disease, are exacerbated by the lack of adequate holding pools in the lower river. When fish are crowded together in the few good pools that remain, disease transfer from one fish to another increases. Construction of additional holding pools in the lower river could spread out the chinook and decrease disease transfer. This action is being assessed by federal, state, and tribal biologists for possible implementation in 1997. Since high water temperatures are considered a greater threat to chinook than limited holding areas, emergency actions undertaken in 1996 focused on providing cool-water holding areas (i.e., rearing channel, Bosco and Boston creeks).

Loss of gravel has had an adverse impact on spawning and has reduced rearing habitat in the river and estuary. FERC (1993) calculated that the cost of artificially replacing the natural gravel supply would be $500,000 to $700,000 per year (p. F-110). Gravel supplementation on a reduced scale could provide some benefits, but high flows would likely spread the material throughout the river, limiting effectiveness. Accelerating dam removal and the release of accumulated sediments would have a much greater beneficial impact.

**Would operating Lake Mills now for an interim period to reduce water temperature in the middle and lower river help diseased chinook? (Elwha Citizens Advisory Committee, 182K)**

This has been tried in the past. A consulting firm hired by James River during the licensing process found that Lake Mills caused increased water temperatures to a greater degree than Lake Aldwell due to its

relatively high volume (FERC 1993, p. 3-24). In addition, flow augmentation (an additional 100 cubic feet per second) released at depth from Lake Mills was monitored during a summer low flow season. Unfortunately, the greater flow and deeper release resulted in only a one degree temperature drop downstream, and this may have been due to a significant drop in air temperatures during the monitoring period. Although James River and Daishowa must be given credit for operating Glines for this purpose when requested, little effect has been observed downstream and no measurable changes were observed in the pre-spawning death rates of chinook salmon when this action has been taken.

**Can fish be passed past the dams during an interim period to initiate restoration? What about shutting down the turbines or removing them and passing fish over the spillways, using the existing Eicher screen, and drawing down the reservoirs to make them more river-like? (Elwha Citizens Advisory Committee, 182K)**

Outplanting juvenile fish above the dams can occur, but juvenile passage through the reservoirs and past the dams would result in significant additional mortalities compared to those fish below Elwha Dam. Given the declining chinook run and the high losses these fish incur during reservoir and dam passage, it is unlikely that state or tribal fisheries managers would agree to this action for chinook. Since the natural steelhead run is in very low numbers, these fish should not be passed above the dams. Coho salmon could be passed above the projects, but this is the stock in least need of immediate action.

Shutting down the turbines to maximize passage over the spillways would help at Glines Canyon Dam, but only for those fish that managed to migrate through the reservoir. A 1990 study of outplanted juvenile chinook in the Elwha River (Dilley and Wunderlich 1990) found that less than one-half made it through Lake Mills. These fish would then need to navigate a second reservoir in Lake Aldwell and pass over the Elwha Dam spillway, which would not have received the costly modifications it needs to provide satisfactory survival (FERC 1993, p. 2-11). In addition to high fish mortalities and expense, power production would be significantly curtailed.

Removal of the turbines is consistent with the interim operation plan approved by Interior (programmatic EIS, p. 12, draft EIS, pp. 54 and 57). However, removal of the turbines and the associated modifications necessary to dissipate water velocities are considered to be part of decommissioning actions, which would render the projects unable to produce power.

The Eicher screen could be used, although it would need repair and maintenance work to bring it to original design standards. It also lacks the bypass facilities necessary to pass fish to the river, and so a bypass facility would have to be designed and installed at additional cost. Without such a facility, the fish would have to be manually collected and transported below the dam, increasing handling injuries and mortalities. The installation of a guide net to direct fish into the penstock containing the Eicher screen would be ineffective, because the net would quickly collect debris, resulting in the need for frequent cleaning to prevent failure; currents in the area of the Eicher penstock would cause water to flow through the net, resulting in fish passing through the net and into other penstocks without the Eicher screen; and the majority of fish would continue to pass over the spillway.

In concert with removing the turbines and installing a velocity dissipator, Lake Mills could be drawn down about 80 feet. Although this would produce a more riverine environment, it would completely access the sediment delta and some fine sediments on the reservoir bottom. Consistent with the Elwha Act, water mitigation measures would have to be in place before this occurred. Without these measures, Lake Mills could only be drawn down a maximum of 18 feet, which would not produce riverine-like benefits: because it is a surface withdrawal, Lake Aldwell can only be drawn down about 8 feet.

**Gill nets should be eliminated from the river. (Elwha Citizens Advisory Committee, 182)**

Appropriate harvest management actions are a necessary part of Interior's restoration plan. However, the specific elimination of gill nets is inappropriate. Although gill nets are essentially non-selective, the tribal harvest is managed such that weak stocks are avoided. For example, the chinook salmon run returns prior to the coho run. Tribal fishery biologists document the movement of chinook to upstream areas via visual

counts (from boats or snorkeling) before opening the coho fishery at the mouth of the river. The coho fishery moves upstream as the chinook vacate downstream areas. Sufficient harvest restrictions would be in place without the need to eliminate gill nets.

**Why begin fish restoration efforts now when you have said all along the dams would be removed before restoration starts? (Rescue Elwha Area Lakes, 148M)**

Fish restoration efforts would begin before dam removal (see appendix 2).

## *Fish Passage/Retain the Dams*

**Would retaining the dam and using fish passage technology achieve full restoration of Elwha stocks? Why wasn't this considered as an alternative? Is this a less costly alternative? (Rescue Elwha Area Lakes, 148B; Howard Briggs, 149C; Melanie Caltrider, 181A; William Jensen, 197C; workshop)**

No. Retention of the dams with the provision of fish passage measures and other actions was fully analyzed in Interior's programmatic EIS on restoration of the Elwha River ecosystem. (For additional information, see the programmatic EIS, pp. 171-172.)

**The reservoirs filter out most sediments and create unusually clear water that improves the lower river as spawning habitat. (Rescue Elwha Area Lakes, 148D)**

All bed-load sediments (i.e., sands, gravels, cobbles) are trapped within the reservoirs. Some fine sediments (e.g., silts and clays) are also trapped in the reservoirs, but much of this material continues through the reservoirs, even with the dams in place. Highly turbid conditions occur in the river now, primarily during high flow periods such as fall and winter rains and spring snowmelt. However, water is clear both above and below the dams during lower flow periods. These conditions would continue after the dams are removed and the reservoir materials have washed out. In general, spawning would be no more affected by fine sediments in the long term than it is now.

**Interior should include an alternative to remove the dam to its 50 foot level and restore remaining sediment to a meadow. Use dam debris to build fish passage system. (workshop)**

Partial dam removal was not considered a feasible alternative because the dams would lose their structural integrity. This would likely result in dam failure and catastrophic flooding.

**Why did fish continue to return to the lower river after it had been dammed for so many years? (workshop)**

The process of gravel depletion below Elwha Dam to RM 3.0 has been gradual. Erodible sources have provided spawning-size gravel below RM 3.0, although not enough to completely mask the effects of Elwha Dam. Consequently, fish spawning has continued in the lower river. In addition, artificial supplementation programs were begun by the Washington Department of Fisheries as early as the 1930s, contributing to salmon returns. Hatchery programs became the dominant production source in the 1970s.

## *Other Factors Affecting Salmonid Populations*

**How did the removal of Elwha chinook by the Washington Department of Fisheries in the 1950s and 1960s "to spawn elsewhere" damage today's Elwha fisheries? (Rusty Hilt, 156A)**

As early as the 1930s, the Washington Department of Fisheries spawned Elwha River chinook, took their eggs to the Dungeness Hatchery to incubate and rear, and later released these fish back into the Elwha. These efforts helped maintain the existing Elwha River chinook stock, and we have no evidence that efforts in the 1950s and 1960s did otherwise.

**Has there been an increase in oil (from spills, etc.) in the Strait of Juan de Fuca? If so, how does this affect the smolts? (workshop)**

The increase or decrease in the amount of oil that has been released in the strait is outside the scope of this EIS.

**What is the importance of the Elwha estuary on the fisheries? How do the levees impact the estuary and fish production? (Washington Department of Natural Resources, 180E, F)**

Estuaries are very important to salmon because they provide food and protective cover to young fish, and they allow fish to acclimate to brackish water before entering full sea water. The two dams have substantially reduced the size of this critical rearing habitat at the Elwha River mouth by blocking sediments that are needed to maintain the estuary. The "Living Marine Resources" sections address the importance of the estuary to fish and the impacts of the alternatives in the draft EIS.

The federal levee on the east side of the river is "set back" at the natural meander limit of the Elwha River, thereby minimizing impacts to the estuary. The levee on the west side of the river cuts off a relatively small portion of the estuary, although the river has migrated away from this area in recent years. The impacts to fish production from the loss of this habitat are considered to be relatively minor and the restoration of the sediment supply would mitigate this loss.

**How does water temperature change now over the course of a year vs. with the dams out. Compare this to fish tolerances. (workshop)**

The draft EIS (table 17) includes information on existing temperatures and on expected changes (tables 37 and 38). High water temperature below the Elwha Dam is a limiting factor for salmonids. Tolerances to high temperature vary between species and life stages. The EIS includes some information on this in the Impacts to Fisheries section. Interior's programmatic EIS (p. 170) also responds to a similar question.

**What is the potential of Atlantic Salmon escaping from nearby fish farms? What would the impact be on the Elwha fisheries, if they did escape? Are these fish farms regulated and could they be closed or mitigated to ensure protection of Elwha stock? (Arthur Whiteley, 243B, Olympic Park Associates, 280B)**

Escapes of Atlantic salmon from net pens in Puget Sound have been documented. Safeguards against future net pen escapes are undertaken as a part of existing federal and state regulations.

**Is there a reference for "rogue driftnet fishing no longer takes place beyond the 200 mile territorial waters of the U.S. and Canada?" (Eric Hartmann, 245H)**

See response to this same question in Interior's programmatic EIS comment, p. 162. References include Office of Enforcement for the National Marine Fisheries Service communications and results of an intensive U.S. Coast Guard monitoring effort.

## *Miscellaneous*

**The EIS should include Pacific Fishery Management Council (PFMC) endorsement (Save Our Wild Salmon Coalition, 184B; Friends of the Earth, 185L; Pacific Fishery Management Council, 186A)**

The PFMC commented that ". . . the Elwha River represents the best restoration opportunity in the region."

**How is it that Dr. Winter's view of the safe backup population of native fish has gone from 75% (as expressed in *A Review of Methods to Re-Introduce Anadromous Fish in the Elwha River*) to zero? (Rescue Elwha Area Lakes, 148G)**

The subject reference incorrectly cites a meeting report written by Dr. Conrad Mahnken of the National Marine Fisheries Service. Dr. Winter was merely one of several meeting attendees and did not state that ". . . 75% of the native population should remain in the [Dungeness] river to guard against failure of the supplementation effort."

**Interior should consider a sustainable design for the hatchery egress channel as an alternative to dredging the channel. (Washington Department of Natural Resources, 180G)**

Dredging the hatchery egress channel is only a short-term mitigation measure to maintain hatchery operations during and immediately following dam removal. The tribe is considering alternative designs for long-term operation.

**If outplanting is necessary, can't it be accomplished with methods ("milk cans") less disruptive than helicopters? (Eric Hartmann, 245C)**

Transporting fish to the upper river using "milk cans" is infeasible given the number of fish proposed for outplanting. If eggs are used in remote site incubators, land transport would be a reasonable option, depending on the time of year.

**Have you considered blocking access to the river during high sediment loading (via a boom or net)? (workshop)**

The means to ensure survival of fish stocks during removal are discussed in the Fisheries section of the draft EIS (see pp. 258-261) , the fish restoration plan (appendix 2), and in response to comments on Interior's programmatic EIS (see pp. 168-169). To summarize, a combination of electro-shocking and small-mesh gill-netting as well as other equally less damaging techniques are anticipated to capture fish entering the Elwha during dam removal. The fish would be transferred to clean water areas or used to build stocks.

**Fish have survived for tens of thousands of years without logjam removal. Such measures are not needed now. (Eric Hartmann, 245D)**

Over the years, a large amount of woody debris has accumulated behind the two dams. Some of this material would be removed during the dam removal process or incorporated in revegetation actions. However, a large amount of this material is expected to be released downstream. This material could potentially form an unnaturally large logjam, creating a flood hazard or fish barrier. Measures would be taken to prevent this.

**Are there any exotic fish in the reservoirs that would get washed into the river? (workshop)**

Small populations of non-native brook trout occupy the upper Elwha River. There are no exotic fish that occur exclusively in the reservoirs.

**Address methods employed to assure upstream utilization of the river. (Melanie Caltrider, 181AA)**

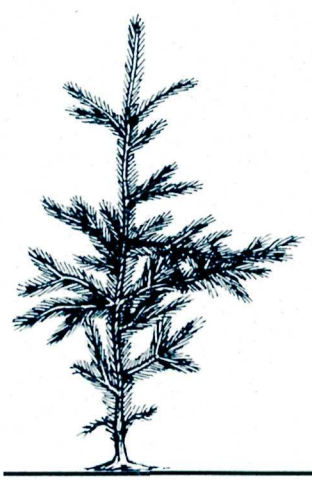
Numerous studies have shown that salmon and steelhead outplanted into a stream reach as juveniles return to that area as adults. Even without outplants, adult fish would stray to the upper river over time. The fish restoration plan includes outplanting to accelerate the return of fish to the upper river. Fish passage to the river reaches upstream from Lake Mills is not expected to be a problem, following dam removal, for species that historically occupied this reach before the dams were built.

**What are the short-term and long-term losses or gains in aquatic biodiversity from the project? (workshop)**

See sections on impacts on fisheries, vegetation, wildlife, species of special concern, and living marine resources in the draft EIS. A general discussion of biodiversity is located in Interior's programmatic final EIS, pp. 109-114. To summarize, biodiversity is expected to increase both in the aquatic and upland ecosystems in the Elwha River valley as a result of the restoration of sediment transport, natural flow regime, and the nutrients and biomass formerly supplied by anadromous fish.

**Would fish recovery be improved if Glines Canyon Dam was removed before Elwha Dam? (Randall Payne, 171D)**

Fish recovery would not improve if Glines Canyon Dam was removed before Elwha Dam, because the same amount of sediment would be washed downstream as for the proposed action. Therefore, the impacts on fish would be similar to those of the proposed action (see pp. 248-26).



# Vegetation

## Wetlands
## Vegetation Management
## Miscellaneous

## Wetlands

**The EIS should consider creating wetlands for use as wildlife habitat. (Washington Department of Fish and Wildlife, 163C)**

The creation of wetlands within the former lakebeds would be considered and implemented where appropriate.

**Won't expansion of the tribal hatchery have an impact on wetlands? (Workshop)**

The expansion of the hatchery would not have a significant impact on wetlands. Most of the proposed work would be within the existing hatchery or rearing ponds. Improvements to the water supply system would involve placing additional perforated pipes in the substrate below the active river channel. Additional piping would be located in or along the access road.

**Would moving the levee affect wetland or estuarine habitat? (Washington Department of Natural Resources, 180F)**

There are no plans to move existing levees as part of the proposed action. However, in order to provide the same level of flood protection following the removal of the dams, the height of the levees would need to be raised between one and four feet. Although raising and armoring the levees would result in localized impacts to wetland and estuarine habitat, the restoration of the fluvial processes would result in improvements to wetlands and to the estuarine zone that far exceed the impacts. Nonetheless, opportunities to improve wetlands and restore habitat would be explored.

**Interior should move Elwha Valley Road to upland rather than elevating and armoring it in its existing location. (Washington Department of Natural Resources, 180I)**

Wildlife in the floodplain might benefit from such a relocation, because disturbance to wildlife and their habitat from human activity and protection of public and private property would be reduced. However, if the Elwha Valley Road and structures within the floodplain were removed, there would also be significant short-term adverse impacts to wildlife and their habitat associated with the relocation. There may also be impacts on recreation users, traffic, air quality, and economics from relocating the road.

Interior has defined the goal of the Elwha Act as restoring the natural physical and ecological processes and anadromous fisheries in the Elwha River. Although smaller scale actions such as relocating the road might add incremental benefits to the ecosystem, the focus of the project has been on restoring the larger scale missing links in the natural Elwha River ecosystem, such as sediment transport and natural flow regimes. Nonetheless, options for road protection that do not entail armoring with riprap will be examined during final design.

**What are the revegetation plans during the drawdown process? (workshop)**

Subsequent to dam removal, plant material production and collection activities would occur. During the drawdown process there would be no active planting activities until complete dewatering and debris removal of the reservoirs is complete (see appendix 3, p. 441).

## Vegetation Management

**How would you keep exotic vegetation from recolonizing the site? (workshop)**

Exotic plants with the potential to cause difficulties during revegetation would be physically removed. Removal would occur as needed throughout the basin. The side slopes inundated by the reservoirs now would be planted with indigenous trees from local seed sources, which would create an area that is generally inhospitable to exotic species. Serious difficulties with exotic plants are not expected.

**Once the dams are removed, are there plans to manage riparian vegetation downstream of the dams? (workshop)**

Riparian vegetation within Olympic National Park would be managed consistent with National Park Service policies for protection of native biodiversity. The future Aldwell lands manager would be required to ensure that ongoing efforts to maintain the anadromous fish populations are not endangered, and so may be required to preserve riparian vegetation. No additional federal regulatory requirements (e.g., for managing vegetation) would be implemented on private land holdings outside the park.

## Miscellaneous

**Please include a list of the plant species to be collected in the final EIS. (Inside Passage, 168A)**

Plant species that are proposed for collection for use in revegetating the reservoirs are listed below. The categories reflect the quantity that would be collected, primary being the greatest effort and tertiary the least effort. A list of plant species occurring in the Elwha basin is included in table H-1 in appendix H of the Elwha Report.

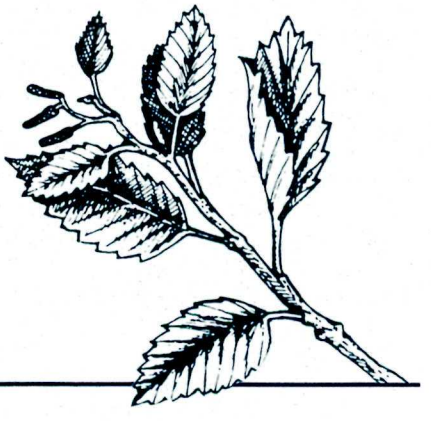
### Primary

| | |
|---|---|
| *Pseudotsuga menzeisii var. menzeisii* | Douglas fir |
| *Alnus rubra* | Red alder |
| *Tsuga heterophylla* | Western hemlock |
| *Acer macrophyllum* | Bigleaf maple |
| *Salix spp.* | Willow |
| *Mahonia nervosa* | Oregon grape |
| *Gaultheria shallon* | Salal |
| *Rubus spectabilis var. spectabilis* | Salmonberry |
| *Polystichum munitum* | Sword-fern |

### Secondary

| | |
|---|---|
| *Populus balsamifera var. trichocarpa* | Black cottonwood |
| *Thuja plicata* | Western red cedar |
| *Abies grandis* | Grand fir |
| *Holodiscus discolor var. discolor* | Ocean-spray |
| *Rubus parviflorus var. parviflorus* | Thimbleberry |
| *Rosa gymnocarpa var. gymnocarpa* | Baldhip rose |
| *Vaccinium parvifolium* | Red huckleberry |
| *Achlys triphylla* | Vanilla leaf |

Miscellaneous native grasses and sedges, 10-20 additional species



**Tertiary**

| | |
|---|---|
| *Cornus stolonifera var. stolonifera* | Red-osier dogwood |
| *Sedum spathulifolium var. spathulifolium* | Stone crop |

**Twinberry should be added to the list of plants in the area. (Inside Passage, 168B)**

Thank you for your information. Twinberry (*Lonicera involucrata*) has been added to our list of lowland vascular plants of the Elwha River Valley.

**Are the stumps still in the reservoir? (workshop)**

A large amount of woody debris (stumps and logs) is still present along the reservoir bottom. The stumps that are exposed following dam removal would not be easily visible to persons looking at the reservoir areas. Additionally, the stumps and logs would provide organic material helpful to the restoration effort.

**The EIS should include a description of successional pathways expected in different soils in the areas after dam removal. (workshop)**

The soils in the project area are developed either directly from glacial deposits, or on alluvium or colluvium derived primarily from glacial deposits. On the steep side slopes, the soils are well-drained colluvial units, and on floodplain areas, the soils are well-drained gravelly loams or gravelly sandy loams which become increasingly gravelly and cobbly with increasing depth (FERC 1993).

The western hemlock/Oregon grape/swordfern, the western hemlock/salal, the western hemlock/vanilla leaf, and the Douglas fir/salal are the primary plant associations expected to establish on the side slopes and terraces of the former reservoirs after the dams are removed. The floristic composition of these associations was described by Henderson, et al. (1989). In earlier stages, red alder is expected to dominate or codominate. There are two probable successional pathways. One is dominated by Douglas fir, and the other, less likely, pathway is dominated by western hemlock. Western hemlock and western red cedar are expected to dominate the climax stand (Henderson, et al. 1989)

# Wildlife

## Insects
## Waterfowl
## Other Wildlife

## Insects

**Would the drained reservoirs produce mosquitoes and other insects? What are the plans to control these insects? (Joel Sisson, 15B; workshop)**

There are no plans to have an insect management program after dam removal. Mosquitoes and other biting insects require muddy flats or stagnant water to live and reproduce. The removal of the reservoirs and the restoration of the river is not expected to result in a significant amount of this kind of habitat.

Fine-grained sediment is needed to create the muddy, still water conditions these insects need. Either dam removal alternative would result in the vast majority of this sediment either washing out quickly from the reservoir area, or mixing with coarser sediments on remaining "benches." Since it would mix with sand and gravel, the fine-grained sediment would not prevent water from percolating through the soils. Few, if any, shallow pools of stagnant water would form.

In portions of the reservoirs, water circulation is restricted by vegetation (e.g., the south end of Lake Aldwell), creating conditions where insects could and do live and breed. Removing the dams would create fast-flowing riverine conditions over a significant portion of the reservoir areas and create unsuitable conditions for mosquitoes.

## Waterfowl

**What mitigation is planned for destruction of waterfowl habitat, particular for trumpeter swans? Cash payment is not acceptable. (Rescue Elwha Area Lakes, 148O, P; Martha Jordan, 258D)**

There has never been any intent to make a cash payment to any group or individual in lieu of mitigation. More than five miles of additional riverine habitat suitable to many species of waterfowl would be restored when the dams are removed. Also, the productivity of the Elwha River estuary would increase following dam removal. This would offset, or in effect mitigate, impacts to many waterfowl species. Additional mitigation in the form of improving or protecting overwintering habitat outside the Elwha basin through wildlife easements or habitat modification is also proposed. Other slow-moving rivers in the area, estuaries, farm ponds, and agricultural lands are also suitable habitat.

**The EIS does not use the most recent information on trumpeter swans, and also quotes the goal of the North American Waterfowl Management Plan. Some do not agree with this goal. (Martha Jordan, 258A; workshop)**

We agree that the most current estimates should be used. The final EIS reflects the most recent population estimate (i.e., 1995 breeding bird survey) for the Pacific Coast population of trumpeter swans. Also, reference to the year 2001 North American Waterfowl Management Plan goal for trumpeter swans has been deleted.

**Why has growth of trumpeter swans slowed down? (Martha Jordan, 258B)**

Based on data compiled by the U.S. Fish and Wildlife Service's Office of Migratory Bird Management, the Pacific Coast population of trumpeter swans increased by 2,856 birds between 1990 and 1995, representing an increase of about 21% over this period. The growth rate during this period is only slightly less than the 23% that occurred between 1980 and 1985. It is not unusual for the growth rate of a population to decline as the population increases in size. (Reference: "1995 Survey of Trumpeter Swans in North America" compiled by David F. Caithamer, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, 11500 American Holly Drive, Laurel, MD 20708-4016.)

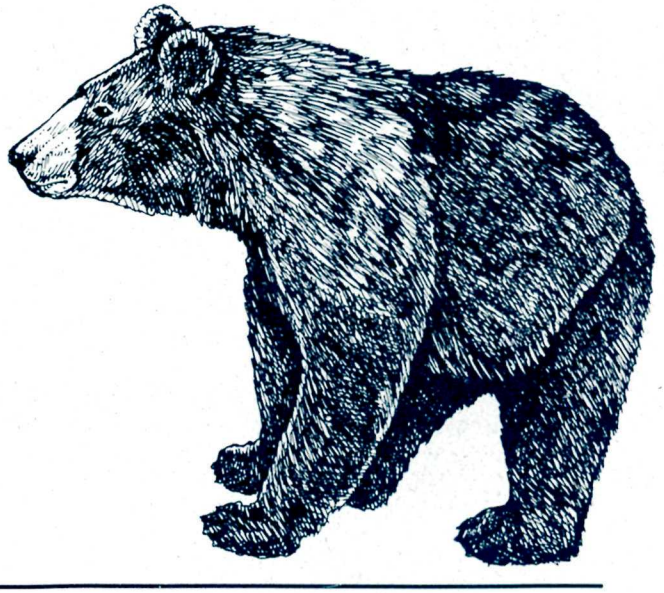
**Canadian geese, mallards, and gadwels use the reservoirs. (Martha Jordan, 258E)**

This is corrected in the final EIS.

## *Other Wildlife*

**Do deer come down the valley for salt? (workshop)**

We are unaware of deer migration to the mouth of the Elwha River specifically to obtain salt, but since it is done elsewhere in the area, it is possible that some individuals migrate locally to obtain salt or food at the shoreline



# Living Marine Resources

## Estuary
## Pipeline Outfall
## General

## Estuary

**The EIS should mention that the current estuary is not as productive as it was before. (Eric Hartmann, 245F)**

The productivity of the estuary has been addressed on pp. 12, 29, 247-248, and 286 of the draft EIS. A sentence has also been added to the Living Marine Resources -- Affected Environment section of the EIS.

**Would the dams have increased the productivity of the estuary for a short time by increasing the clarity of the water? (Clallam County Commissioners, 192Z)**

It is reasonable to expect there may have been a minor beneficial impact from the increased clarity of river water reaching the estuary. The actual impact is unknown. However, the estuary itself may have served the same purpose as the reservoirs in settling out turbidity, as its waters are relatively still. In other words, the reservoirs may just as likely have had no beneficial impact on the estuary. Also, as the draft EIS and commentor note, even if there were minor increases in estuarine productivity resulting from water clarity, they would be overwhelmed by the adverse impacts to productivity from the loss of estuarine area and diversity resulting from the dams.

**How much land (estuary) has been lost at the mouth? If you use the pipeline alternative, would the estuary not rebuild? (workshop)**

Based on information provided by tribal elders and on the comparison of old maps with the conditions that exist today, the estuary has receded between 1/4 to 1/2 mile. If the slurry pipeline alternative is implemented, the estuary would still be restored because it is the larger sized sediments, i.e., sand, gravel, and cobbles, that would be needed to rebuild the estuary, and these would not be transported by the pipeline. Moreover, the pipeline would not transport all of the accumulated fine-grained sediment. Consequently, there would still be almost 2 million cubic yards of fine sediments that would be available to the estuary during dam removal, and the natural supply thereafter.

## Pipeline Outfall

**What are the marine resources at the site of the pipeline outfall? (workshop)**

The marine resources in the vicinity of the pipeline outfall include a few species of red and brown algae, red rock crab, purple sea urchin, sunflower stars, clams, and a variety of fish, including skates and dogfish shark. The substrate consists of a mix of gravel, cobble, shell, and sand, and an occasional boulder.

**Where would the sediments go at the outfall? (workshop)**

The sediments that would be transported through the slurry pipeline would consist of fine sand, silt, and clay. Consequently, they would not be deposited in measurable quantities at the site of the outfall because of the strong water currents. The smallest sized sediments would be dispersed throughout the Strait of Juan de Fuca and into Puget Sound.

## *General*

**Has Interior given any thought to recolonizing or otherwise mitigating impacts to marine communities? (workshop)**

There are no plans to implement specific measures to promote the recolonization of plant and animal communities in the estuary affected by the sediment released by the removal of the dams. Natural recolonization would soon fill the void created by the plants and animals covered or affected by the deposited sediments.

**Would shellfish populations in the Strait of Juan de Fuca and Freshwater Bay improve with dam removal? (workshop)**

It is certain that the shellfish population in the vicinity of the Elwha River mouth would change because of the dramatic change in substrate. Existing populations of clams, including geoduck, butter, littlenecks, and horse clams, are low because of the high percentage of large-sized substrate, e.g., cobbles and boulders. The expected increase in sand and gravel in the substrate following dam removal would provide more suitable habitat for these bivalves and for other shellfish such as dungeness crab and cockles. Shellfish, such as mussels, kelp, and red rock crab, that prefer or depend on rocky substrates would decline in abundance.

# Cultural Resources

## Cultural Sites
## Tribal Lands
## Interpretation
## Miscellaneous

## Cultural Sites

**Have cultural sites inundated by the dams been identified? (workshop)**

It is known that sites sacred to the Lower Elwha Klallam Tribe were inundated following construction of the dams. Other sites could exist. Stipulations of a programmatic agreement among the National Park Service, Lower Elwha Klallam Tribe, Washington State Historic Preservation Office, and the Advisory Council on Historic Preservation Regarding Restoration of the Elwha River Ecosystem (June 8, 1995) provides a process for the identification, evaluation under National Register criteria, and treatment of such sites.

**Were the tribe's sacred sites at the dam or behind it? Would tourists have access to the cultural sites when they are unburied? (workshop)**

Some of the Lower Elwha Klallam's most important sacred sites were rendered inaccessible by dam construction and subsequent creation of Lakes Aldwell and Mills. In general, the public would have access to these sites following dam removal. However, Section 304 (a) of the National Historic Preservation Act (16 U.S.C. 470 et seq.) authorizes agency heads to withhold information regarding location, character, or ownership of resources that are listed in or eligible for listing in the National Register of Historic Places if disclosure may cause a significant invasion of privacy, risk harm to the resource, or impede the use of a traditional religious site by practitioners.

**What if a site considered sacred to the tribe is also considered sacred to another culture? How is it decided who takes "precedence?"(workshop)**

Legislation and executive orders provide for access to sacred sites by Native American tribes. However, these do not restrict access by members of the general public, or establish a "precedence" should different cultures regard the same site as sacred.

## Tribal Lands

**Which tribes now have access to the Aldwell project lands? (workshop)**

Through the courtesy of James River, all citizens currently have access to Lake Aldwell lands. However, by intertribal agreement, only Lower Elwha Klallam tribal members are allowed to harvest treaty reserved natural resources, such as fish and wildlife, within the Elwha River basin unless specifically invited by the Elwha Tribe.

**When was the land acquired for the lower Elwha reservation? (workshop)**

Land was acquired under terms of the Indian Reorganization Act (48 US Statute 984, 1934) in 1936-1937.

**What is the relationship between the cemetery down Place Road and the old traditional Klallam village? (workshop)**

The cemetery at Place Road is a Klallam cemetery.

## *Interpretation*

**Portions of the Glines Canyon Dam should not be left on site for interpretation. (Randall Payne, 171A; National Parks and Conservation Association, 198I; Tim McNulty, 225B; Carsten Lien, 240A; Olympic Park Associates, 280C, D, E)**

Interior's proposal is to remove impediments to a naturally functioning ecosystem that existed prior to construction of the dams. It is not necessary to remove every vestige of the dams to accomplish that end. An interpretive plan, prepared according to Stipulation II (C) of the programmatic agreement between the National Park Service, Lower Elwha Klallam Tribe, the Washington State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding restoration of the river ecosystem would address themes, materials to be used, and site locations. Interpretation on site offers a unique and dramatic opportunity to present to the public the story of the dams, their construction, operation, and controversy around their relicensing.

**Interior should limit interpretation of dam removal to dam sites because removing the dams is a disgrace that should not be advertised. (Melanie Caltrider, 181T, U)**

Clearly, Interior disagrees that dam removal is in any way a disgrace. Rather, it is an effort to restore an unbalanced and unhealthy ecosystem to its natural state, a goal with which the vast majority of EIS commentors wholeheartedly agree. In general, an interpretation plan for dam removal is not part of this proposal, and the cost for it is not included. Olympic National Park and other cooperators would undertake such an effort when funds become available. However, the park intends to leave portions of the Glines Canyon facility on site as partial mitigation for the loss of the historically significant hydropower projects. Interpretation will be at the dam site and will focus on the construction and operation of the dams and the issues (pro and con) that led to their removal.

## *Miscellaneous*

**The EIS notes that the public was notified of the programmatic agreement in appendix 5. When and to whom was notification given? (Olympic Park Associates 280F, G)**

The Washington State Historic Preservation Officer, Advisory Council on Historic Preservation, Lower Elwha Klallam Tribe, and federal agencies negotiated the programmatic agreement. The Advisory Council's regulations implementing Section 106 of the National Historic Preservation Act (36 CFR 800) provides for participation by the public as appropriate to the subject matter. The public was informed of the undertaking and of negotiations regarding the effects in public meetings and in the Elwha Report (January 1994), in Interior's draft programmatic EIS, and in subsequent documents.

**The EIS ignores the larger cultural issues. The dams are beneficial and provide power and clean water. Interior is deliberately destroying industrial civilization. (Melanie Caltrider, 181O, S)**

Interior does not see this as a cultural issue, but a philosophical difference on the appropriate balance of natural resources and human-made ones. It is not appropriate as an EIS topic, although the draft EIS does examine impacts to water quality and power from dam removal. The description of cultural resources in the Affected Environment section of the draft EIS accurately and appropriately describes the social and cultural significance of the dams to the tribe, the larger community on the Olympic Peninsula, as well as those members of the Port Angeles community whose family members worked on construction of the dams.

# Socioeconomics



## *Cost Effectiveness*

**If $111 million was spent on fish passage, Interior could have achieved full restoration of anadromous fisheries without removing the dams. Installing fish passage measures is more cost effective than removing the dams, i.e., more fish return for less money spent. (Rescue Elwha Area Lakes, 148B; Howard Briggs, 149B; Melanie Caltrider, 181E)**

Several rigorous studies, including the *Elwha Report* and Interior's programmatic EIS on the restoration of the Elwha River ecosystem and anadromous fisheries, found that full restoration is not possible without dam removal.

Interior's programmatic EIS did examine state-of-the-art fish passage. Although many commentors on the programmatic EIS suggested other fish passage measures they had heard of on other dams, the EIS team did not find any that would result in more success than those it had proposed and analyzed (please see pp. 141-146 of the programmatic EIS for more information), even if $111 million or more was spent.

Dam removal is by far the most cost effective means of returning fish to the Elwha River. The programmatic EIS estimates capital cost to retain the two dams with fish passage measures is $38 million, or about 34% the cost of removing both dams. Yet, this alternative would only produce 12% of the native anadromous fish, and would result in a negative economic return (see draft EIS, table 11).

**This is not a project about restoration, but a control issue. There are simpler and less expensive restoration methods that would work without a doubt. (William Jensen, 197C).**

We disagree. Interior's programmatic EIS examined less expensive alternatives in both the draft and final documents, yet none were able to fully restore the ecosystem and native anadromous fisheries. In fact, none were nearly as cost effective in returning anadromous fish to the Elwha River as dam removal.

## *Lower Elwha Klallam Tribe*

**What is the support for the statement that the tribe considers fisheries its most important asset? How many Klallam earn their living fishing? What about the casino the tribe is planning? (Melanie Caltrider, 181F; workshop)**

Tribal spokespersons emphasize the extreme importance of the Elwha River fisheries to them. Independent analysis of comparative economic advantage indicates that the Lower Elwha Klallam Tribe is in severe economic distress (see table 23), and its members have no economic resources except fish over which they can exert sufficient control to achieve an improved economic return.

The number of Klallam who make their living fishing varies depending on the return. Very few tribal members own a boat and so cannot fish in the Strait of Juan de Fuca. About 20% of the total tribal fishing revenue comes from the Elwha River, and most of that is from the harvest of returning hatchery-produced coho salmon (FERC 1993, p. 3-100). About 60% of active tribal fishers in 1988 had gross fishing incomes below $1,000.

At the present time, the tribe has no casino. Any choices it wishes to make to pursue its own economic development rest with the tribe, and not with Interior or this document.

**Does the tribe realize and accept that it would suffer economically during restoration? Do its members understand the "marginal value of fish which return to the river would be high when contrasted with the value of those fish as a marketable commodity?" (Clallam County Commissioners, 192DD)**

Tribal leaders and staff are closely involved in the EIS process, and periodically brief tribal membership. They understand the relative nature of cultural and economic benefits associated with returning salmon, and are prepared to sustain short-term economic losses to restore the Elwha River. Their position is summarized by Tribal Chairperson Francis Charles on p. 94 of the final programmatic EIS: "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."

## *Project Costs*

**The following costs should be re-checked, as they seem too high: water quality mitigation at $24.838 million, project management at $8.096 million, building permanent flood control measures which must be maintained. The cost of flood control measures should include long-term maintenance, and impact on the ecosystem. Wouldn't relocating homes and/or property be less expensive? On the other hand, cost of repair and maintenance of the dams under No Action ($8.7 million) is too low. (Friends of the Earth, 185N; Washington Department of Natural Resources, 180D; Elwha Citizen's Advisory Committee, 182I; Eric Hartmann, 245G)**

Extensive planning was involved in identification of the water quality measures that would be necessary to comply with the requirement in the Elwha Act that municipal and industrial users be protected from the impacts of dam removal. Based on comments received on the draft EIS and additional information, the cost estimates have been further refined. In addition, the application of value engineering procedures at the final design stage or other factors may further reduce costs. (As an example, as this final EIS goes to print, Rayonier Mill has announced its impending closure for financial reasons. This may ultimately result in cost reductions in industrial water treatment facilities analyzed in this EIS). It is less probable that costs could increase due to some as-yet unforeseen element.

The project management cost estimates (identified as construction management in the draft EIS) reflect a detailed evaluation of the skilled staffing necessary to oversee construction of the proposed plan elements. Based on information available at this time, more detailed evaluation of these costs is not likely to result in their reduction.

Interior included, but did not specifically evaluate the cost of, non-structural means of flood protection in the draft EIS, including relocation or flood insurance (p. 214). Another option may be temporary flood control (such as sandbagging), or a contingency fund to compensate owners for losses from flooding during dam removal. The flood control mitigation measures recommended in the draft EIS would protect owners under the most conservative assumptions, i.e., that aggradation continues over the long term and has a permanent adverse impact on property. The largest of these structural measures, the federal levee on the east side of the river at its mouth, is located at the far edge of the floodplain and so has little impact on the ecosystem. All other proposed flood control mitigation measures are much smaller and have less impact. The cost of even these conservative measures is less than 4% of the total project costs.

Adjusting the $8.7 million capital expenditures for repair and maintenance of the projects under the No Action alternative from 1990 to 1995 level values increases the $8.7 million to $9.0 million. This change has also been made in the body of the draft EIS.

**Who pays the operation and maintenance cost of the pre-treatment plant for the mills after five years? Who pays for additional treatment if the plant does not work as planned? (workshop)**

Both dam removal alternatives reflect the expectation that the industrial users would assume responsibility for operation, maintenance, power, and replacement costs for the infiltration gallery system at the end of the construction period. A basic assumption is that the active treatment facilities (as opposed to the passive treatment/filtration provided by the infiltration gallery) would be unnecessary and would be removed once the construction period is completed. Study team members are satisfied that the proposed facilities can provide an adequate level of treatment to protect the industrial users.

**Costs are always higher than anticipated for the Denver Service Center or Bureau of Reclamation. Have you considered a private contractor to remove the dams? (John Livingston, 205B; William Jensen, 197A)**

The cost estimates are based on using private contractors to accomplish the work with government employees preparing designs and specifications and inspecting contractor activities. The costs associated with using a private consulting firm in lieu of government forces were not estimated.

**How does delay in removing the dams, like that proposed by Elwha Citizens Advisory Committee (ECAC), affect cost? (The Mountaineers, 141B; Elwha Citizens Advisory Committee, 182B; Friends of the Earth, 185I; National Parks and Conservation Association, 198E)**

Interior conducted a brief analysis of ECAC's recommendations (see Meyer Resources, August 1996), and found the recommendation by the Port Angeles ECAC, wherein Elwha Dam is removed in project year 5 and Glines Canyon Dam in either project year 12 or 13, would cost $116.8 million, more than Interior's preferred alternative. The increase is a result of increased mobilization, construction, and monitoring costs. The costs are expressed "without inflation" for comparison purposes.

However, inflation will also likely increase over this time period. Inflation measures the "value of a dollar getting cheaper." If the project is delayed long enough for inflation to increase by 10%, $1 would only be worth 90c compared to when the estimate was made. Therefore, Congress would need to budget 10% more "post inflation" dollars for dam removal. The degree to which these "nominal" costs increase would be a direct function of the rate of inflation, and this rate is unknown.

Delay would also delay benefits, particularly from the restored fisheries. Interior's analysis showed the longer period needed for restoration as a result of removing Glines Canyon Dam much later in the schedule would reduce total real fishery benefits to business by about $20 million (at a discount rate of 3%).

**Would armored streambeds be blasted? Is the cost included? Do log jams need to be removed? (Eric Hartmann, 245D)**

There are no plans to blast armored layers. Please see fisheries for response to the question on log jams.

**Did the analysis take into account money spent on workers during a prolonged, weather-related work stoppage? Has this been factored into the 2-year construction scenario? (Rescue Elwha Area Lakes, 148N)**

Construction windows are provided in the schedule to allow for the passing of high flows and to provide for fish migrations. These delays were factored into project cost estimates. No other delays have been factored into the estimates.

**Buying and taking down these dams with federal money would set a precedent for public funding of many more dam removal projects. The long-term economic costs to taxpayers would be staggering. (Melanie Caltrider, 181W)**

We respectfully disagree. Removal of the Elwha and Glines Canyon dams is a negotiated settlement. The specifics (i.e., one dam within a national park, the treaty rights of at least four Native American tribes are affected, a relatively small amount of power is produced, replacement power is readily available, the power supplies less than half of the needs of a single industrial user, all species of Pacific salmon are affected) of this project apply to no other. Licensing non-federal hydroelectric dams will continue to fall under the authority of the Federal Energy Regulatory Commission, the costs of which are borne by the project proponent.

**Why was the more expensive road route selected as preferred for costing purposes for the dredge and slurry pipeline? (workshop)**

The road alignment was selected to ensure that repairs could be made to the pipeline regardless of flow conditions in the river. A pipeline following the river alignment (the less expensive alternative) would not be accessible during higher flows.

## *Government Responsibility*

**What are the economic implications to the government for liability if it purchases the dams, i.e., flooding, mishaps during removal, etc. ? (Melanie Caltrider, 181W)**

If the government purchased the dams, responsibility for existing associated liability would also transfer. Dam removal is designed to minimize risk, and the government would take requisite action to protect against adverse impacts during removal, as required in the Elwha Restoration Act.

## *No Action/Dam Retention*

**Can the project stay economically viable and operational if court action related to licensing continues and they must install fish passage and mitigation measures to operate according to licensing requirements? Aren't the loss of fish and deterioration of local ecosystems a cost of No Action, since they are a foregone benefit? (National Parks and Conservation Association, 198A; Eric Hartmann, 245A)**

The present project owners have indicated that if court actions related to licensing continue and they are required to install the passage and mitigation measures required by FERC in its 1993 Draft Staff Report, they would need to reassess the viability of their operation.

Salmon production under No Action was incorporated and appropriately valued in the analysis.

**To what degree could mitigation costs required for licensing the projects be higher than predicted by the programmatic EIS? (Elwha Citizens Advisory Council, 182J)**

Numbers in Interior's programmatic EIS were taken from the FERC Draft Staff Report (1993), and from additional mitigation Interior and other fish and wildlife management agencies would require to ensure a state-of-the-art fish passage system.

**The costs of No Action are understated. For instance, standard project operation and maintenance costs for 40 years would exceed $45 million. Additional mitigation for fisheries, such as gravel augmentation or screens at Elwha and Glines Canyon dams, could add another $40 million if required. (Friends of the Earth, 185O)**

Some of the costs referred to in this summary question and your chart were included in the analysis of dam retention (in Interior's programmatic EIS) and/or of No Action (in both the programmatic EIS and the draft EIS). The costs associated with dam retention include the screens and fish passage you mention. The costs of adding gravel were not included, as this was not part of the dam retention alternative. Operation and maintenance costs were included as energy costs for both the No Action and Dam Retention alternatives. These costs were carried out over the life of the project in the programmatic EIS (see table 12), but were only reported for No Action as annual costs or costs expected in the near future in the draft EIS. This is so they could be compared directly to the capital costs of removing the dams. No costs for dam retention are part of this draft EIS, as the decision has been made based on the programmatic EIS to remove the dams. The No Action alternative is analyzed for comparison purposes only.

## *Alternative Sources of Funding*

**How feasible are the following sources of funding: a restoration fund from power revenues, grant revenues, proceeds from the sale of project lands; a state exemption from state sales taxes (this would reduce costs by 8%); state funding of the rearing channel following dam removal; state funds (from the Department of Natural Resources) for public access planning; or a cooperative effort between local businesses and workers (The Elwha Dams Removal Fund, 188A; Elwha Citizens Advisory Committee, 182C, MM, NN; Washington Department of Natural Resources, 180N).**

All sources of revenue would be explored during the project implementation process. Initial analysis of several of these sources of funds indicates that some have the potential for significant income, although the practicality of each is a factor that needs further exploration. The use of state funds or fostering a cooperative effort locally would likely create greater community stewardship of the restoration project, which Interior agrees would be a benefit. However, the task of the EIS is to examine environmental impacts of alternatives. Since funding options are not expected to affect environmental impact, it is not analyzed as part of this document.

**How much are the Glines and Aldwell lands worth, and could revenues from their private purchase be used to help fund dam removal? (Elwha Citizens Advisory Committee, 182LL)**

The Aldwell and Glines lands are large holdings. Consequently, their market price would be uniquely determined by negotiations between buyers and sellers. Such private sale negotiations were not anticipated by the Elwha Restoration Act, and we have not attempted to forecast their result in this EIS process.

**To what degree would delaying the removal of Glines Canyon Dam to generate income offset project costs? Wouldn't it be less than the Elwha Citizens Advisory Committee (ECAC) says, since the West Coast energy market is competitive and prices low? (Trout Unlimited, 271A)**

Using ECAC's assumptions, about $23 million in revenue might be obtained from operating the dams before they are removed. Interior's initial analysis shows that making more conservative assumptions, such as supposing that Daishowa would continue to pay existing prices for the power received, and dam repairs required by FERC would be made, would reduce total net revenue from operation of the dams to less than $10 million over this same period.

**Sources of revenue which slight other resource restoration efforts (particularly Columbia Dam) should not be used to restore the Elwha River. (Trout Unlimited, 271A)**

No income from other restoration efforts is expected to support the restoration of the Elwha ecosystem.

## *Local Costs and Benefits*

**Would most construction workers be from Clallam County? (Rescue Elwha Area Lakes, 148S)**

The Bureau of Reclamation (BOR) estimates that up to 75% of the work force could be drawn from the local area. This would be dependent upon a number of factors, including the capabilityand availability of the contractor's permanent staffs compared to the skills needed for restoration activities and the availability of local workers with skills needed by contractors.

**What would the local benefits be? (workshop)**

As stated in the draft EIS (p. 314), between $60 and $65 million in business activity in Clallam County over a 10-year pre-construction, construction, and restoration period, and an additional $34 million in personal income (payroll plus returns from savings and investments made) are expected to come from dam removal. In addition, a large percentage of the 1,150 to 1,240 construction jobs are expected to come from Clallam County.

**How long have the hydropower projects been assessed at their current value and contributing $230,000 per year in property taxes? What were they contributing before this? Who would make up the difference and how? Would government in lieu taxes help? (Harry Lydiard, 13C; Melanie Caltrider, 181B; Elwha Citizens Advisory Committee, 182L)**

Taxes have approximated present levels since 1989. Previously, in the period 1980 through 1988, they were at about 15% of current levels.

The $230,000 per year in property taxes to Clallam County would be lost, but revenues to local utilities (another public entity) would increase by $471,000 per year. Other taxes to the city and/or county from increased sales would result from dam removal. For instance, the local share of taxes on construction expenditures would average $52,000 per year for five years. Increased local taxes from project-related tourist growth is estimated to reach $296,000 per year 10 years after project startup. The in lieu tax payments would be about 10% of the $230,000 that Clallam County currently receives in property taxes from the projects. Neither current federal regulations nor the Elwha Restoration Act provide for federal payments that would fully offset the loss in property taxes.

There is no set formula concerning how these beneficial and adverse impacts would be distributed to individual local residents.

**The EIS needs additional support for the claims of local economic benefit, i.e., 446 workers. Are these family wage jobs? Year-round jobs? If they are related to tourism, would they then be seasonal? What methods did you use to calculate benefits? (Rescue Elwha Area Lakes, 148R; workshop)**

To determine local business and job impacts from construction expenditures under the preferred alternative, project engineers examined each construction line item in the EIS cost estimate, and, drawing on their experience in the northwestern part of Washington State, estimated the proportion of purchases and job hires that would be local vs. non-local.

These data were then fed into a regional economic impact model (IMPLAN), which predicted total changes in income and employment in the local economy, given these initial project expenditures. The IMPLAN Model is discussed further in the supporting economic analysis technical report (Meyer, et al., 1995).

Direct local jobs and income would be largely related to construction activities and heavy equipment operation. Indirectly created jobs and income would be spread throughout the local community, wherever residents receiving direct jobs and income spend their money. Incidence of jobs and income for families would be expected to follow existing employment profiles for Clallam County. The number of jobs and income available in any period would vary, and would follow the project schedule for construction expenditure.

Estimates of increased jobs and benefits in the local area from increased recreation and tourism were obtained by multiplying estimates of increased visitorship by average expenditure data per visit, and then

using data from a 1994 study by Dean Runyan Associates for the state of Washington to estimate related local effects on jobs, payroll, and local taxes.

These effects would begin at relatively low levels in project year 7, and their full effects would be felt by about project year 16. These jobs would be year round, but would be shaped to the intensity of tourism on the Olympic Peninsula (e.g., higher in the summer, lower in the winter). They would have a direct impact in services provided to sport fishing, recreation, and tourism.

## *Miscellaneous*

**Has money for the project been appropriated? (workshop)**

A total of $8 million was appropriated by the Congress in fiscal years 1996 and 1997 for the acquisition of the projects. No money has been appropriated for their removal.

**The agencies implementing this project, rather than citizens groups, are best able to sort out the technical and engineering issues involved. (Trout Unlimited, 271D)**

Thank you for your comment. The EIS team is a multiagency group of professional scientists, engineers, economists, and analysts with excellent credentials and experience.

**Please provide a brief explanation of the $3.5 billion/year for 10 years estimate of non-market values associated with the project (U.S. Army Corps of Engineers, 179A)**

The $3.5 billion annual non-market value associated with dam removal is an estimate of the amount of additional taxes Americans would be prepared to pay each year for 10 years to restore the Elwha River.

The estimate was obtained by directly asking a sample of residents of Clallam County, the rest of Washington State, and the United States as a whole how much in taxes they would pay to restore the Elwha River. The survey was conducted by Dr. John Loomis of Colorado State University in November, 1994. The procedure used is described in the technical literature as "contingent valuation."

Contingent valuation is a standardized and widely used method for estimating the willingness of citizens to pay for recreation and for restoring or preserving natural attributes. It is recommended for use by federal agencies performing benefit-cost analysis and for valuing natural resource damages, and has been upheld as valid by federal courts.

**The social impact of dam removal is not whether the dams are a source of pride because Port Angeles citizens built them, but rather that Port Angeles would lose a clean water supply and a clean source of power, and be returned to a hunter-gatherer society. Interior advocates the deliberate destruction of industrial civilization. (Melanie Caltrider, 181S)**

We disagree, but thank you for your comment. The EIS analyzes both the impacts to water quality and from the loss of power the projects produce.

# Public Health and Safety

## Security of Elwha Dam
## Dam Removal
## Hazardous Materials

## Security of Elwha Dam

**What are the safety concerns associated with a blowout and catastrophic flooding at Elwha Dam during removal, similar to the failure in 1912? (Friends of the Earth, 185K, M, P)**

The massive stabilizing fill of rock and earth constructed between 1913 and 1919 upstream of Elwha Dam, together with sheet piles, fir mats, and concrete channel lining, has allowed the project to operate satisfactorily for more than 80 years, and would be expected to continue to do so in the future. Although earthquake shaking and/or age may increase downstream seepage, a catastrophic blowout similar to that of 1912 is not likely with the stabilizing fill in place.

The proposed dam removal plan significantly reduces the reservoir head on the gravity section by providing a deep diversion channel through the left abutment, before excavation of the fill begins, to prevent blowout.

**The EIS should mention dam safety issues at Elwha Dam. (Friends of the Earth, 185P)**

The draft EIS (p. 55) includes information on the technical challenge imposed by the fill on the removal strategy for Elwha Dam. It also includes information on the safety of the dam (pp. 320-321) in an earthquake. This section notes that recent seismic research in the area may result in an updated MCE (maximum credible earthquake), which would then be used to reevaluate the seismic safety of Elwha Dam (which is now considered capable of surviving an MCE intact). A likely result of a large earthquake at Elwha Dam would be increased reservoir seepage through the channel fill materials rather than a catastrophic failure of the gravity section or other feature. However, further analyses using an updated MCE may change this scenario. The EIS also notes that a dam failure would have catastrophic consequences on residents downstream, in particular on residents of the Lower Elwha Klallam Reservation. The tribe has indicated that even the low calculated risk of 0.2% of a very large quake is unacceptable for this reason.

**Do the gunnite cap and other fill at Elwha Dam pose a safety threat if the dams are not removed? (workshop)**

Strong earthquake shaking may cause cracking of the concrete channel lining at Elwha Dam, and increased seepage downstream through the channel fill. A foundation blowout similar to 1912 is not likely with the channel fill in place.

**Would there need to be any modifications to Elwha Dam over time to ensure its safety? (workshop)**

Some maintenance has been deferred at Elwha Dam that would be completed if the dam is to remain, such as replacement of the spillway gate seals and repainting of steel gates and other features. Maintenance would also be required for continued operation of the power plant equipment. As noted above, the dam would be evaluated for seismic stability for an updated maximum credible earthquake, to determine whether any modifications would be required.

**Dam removal should proceed because of the threat of a major earthquake in the region. (Welden and Virginia Clark, 235C)**

We agree that the risk of a large earthquake occurring in the area is possible, and that dam removal would eliminate this threat. The Public Health and Safety - Earthquakes, Impacts of No Action section addresses this on pp. 320-321 of this draft EIS.

## Dam Removal

**Are "fail-safe" mechanisms built into the removal process (based on protecting fish, water quality, etc.)? Are communication and monitoring protocols well established, so that each specialist can say "this isn't working" and the response is quick? (workshop)**

Dam removal designs have incorporated safety measures to prevent uncontrolled releases of water during dam removal, or mitigate their impact should they occur (see p. 324 of the draft EIS). Water quality mitigation and fisheries mitigation measures would be in place prior to dam removal and should not require additional safety measures. Dam removal activities would also shut down from November 15 to December 15 and from May 1 to June 30 to complement fisheries restoration and to protect workers. Communication and monitoring protocols would be written into the dam removal contract should additional work stoppages or other measures be necessary.

**What is the biggest safety concern with removing the dams? With retaining them? (workshop)**

There is always some degree of risk associated with any major construction project, but the dam removal contractor(s) would be held to very stringent federal safety requirements for all operations. The risk of a failure of Elwha Dam during removal is largely eliminated by draining the reservoir through a diversion channel before removal begins. The risks of working on Elwha Dam during large floods is lowered by keeping Glines Canyon Dam in place, and shutting down all dam removal during November and December. There are also only minimal concerns with retaining the dams, as both have been inspected and modified to address dam safety concerns over the past 10 years. As previously noted, there has been some concern expressed over the seismic stability of Elwha Dam, although catastrophic failure during an earthquake is not expected.

## Hazardous Materials

**Hazardous materials must be removed at dam sites even with the No Action alternative. (Friends of the Earth, 185Q)**

The discussion of which hazardous materials would stay or be recycled on site, which would be remediated on site, and which would be removed if the dams remain is on page 327 of the draft EIS. To summarize, most would remain on site, as they are usable or occur in concentrations below those required by the state for removal. Leaking transformers at Glines damsite, some contaminated soil at the Glines switchyard, and underground fuel tanks near the Elwha Resort may need to be removed whether or not the dams stay in place.

**Specifically, how would the materials be removed? How would you prevent them from entering the water during removal? (City of Port Angeles, 241F; workshop)**

The hazardous materials that require removal under state and federal regulations are relatively small in concentration and amount, and consist of asbestos-containing materials, solvents, lubricants, fuels, paint, and pesticides at the dam sites, petroleum-contaminated soils at the Glines Canyon Dam switchyard, and underground storage tanks at the Elwha Resort. Many of the materials would be salvaged and recycled, and others that are stored in properly maintained drums or containers would be trucked to an approved disposal site. Petroleum-contaminated materials would be remediated by removing concrete, transformers, and soils down to the deepest detected contamination. Every hazardous material would be removed or remediated with procedures defined by the Washington Model Toxics Control Act and any applicable

federal regulations. None of the materials would enter the water because they are stored in containers or on the land at the dam sites.

**Responsible parties should bear the cost of removing hazardous materials. (Eric Hartmann, 245E)**

Cleanup costs are expected to be about $500,000, based on the preacquisition surveys conducted to date. While PCBs have been found in the soil at the Glines Canyon Switchyard, the concentrations are below the level requiring removal by state or federal regulations. The transformers have been checked and do not currently contain PCBs. Therefore, it would not normally be the responsibility of the dam owners to clean them up. Also, it is anticipated that much of the hazardous materials, i.e., solvents, lubricants, fuels, paint, pesticide, etc., that are located at the facilities, would be used or reused. Consequently, there could be a salvage value to some of the hazardous material to reduce the cost of removing or remediating the hazardous wastes. Final cleanup costs would be negotiated with the owners.

# Land Use, Recreation, and Esthetics

## Acquired Lands
## Access During Removal
## Private Property Issues
## Miscellaneous

## Acquired Lands

**Would the park boundaries be expanded as part of this project? (workshop)**

The Elwha Restoration Act (PL 102-495) dictates lands associated with the Glines Canyon Project ". . . shall be managed pursuant to authorities otherwise applicable to the [Olympic National] Park." This would not change the exterior boundaries of the park, but would add land to the park's interior. Options for disposal of Elwha Project lands (including Lake Aldwell) are specified in the Elwha Restoration Act. They are: becoming park of the National Park system, being held in trust for the Elwha Klallam Tribe's use, becoming park of the National Wildlife Refuge system, or being managed by and for the use of the state of Washington. The U.S. Fish and Wildlife Service and the state have both indicated that they are not interested in acquiring the lands. The tribe has indicated interest, and has prepared a preliminary land use plan. The lands would qualify to be part of the National Park system, but it would require an act of Congress to add them. If the lands were added, it would change the boundaries of Olympic National Park (see figure 16 in the draft EIS).

**To what extent would land uses for the Aldwell lands be prescribed? Would they remain in a natural or semi-natural state? (Washington Department of Fish and Wildlife, 163B)**

The Elwha Restoration Act specifies that the portion of the river in which the federal government acquires both banks must be managed in accordance with ". . . the declared policy of section 1(b)" of the Wild and Scenic Rivers Act. Essentially, this means that a free-flowing river must be maintained. It does not mean that the portion of the restored river that would run through the Elwha Project lands must be declared a Wild and Scenic River. Additional controls to keep all of the Aldwell lands in a natural or semi-natural state are not anticipated.

**A watershed management plan should be developed and implemented as part of the dam removal project to ensure future protection of the river (Washington Department of Natural Resources, 180J; Clallam County Commissioners, 192BB; Welden and Virginia Clark, 235B)**

Lands within the Elwha basin are managed by a variety of landowners, including the National Park Service, National Forest Service, Washington Department of Natural Resources (DNR), Lower Elwha Klallam Tribe, Clallam County, James River, and private landowners (see draft EIS, figure 16). The Washington DNR has recommended that all interested parties be involved in a long-range planning process for the watershed. The National Park Service is interested in participating in such a process.

**To what degree would timber harvest be allowed on acquired lands, particularly if the Lower Elwha Klallam Tribe manages Aldwell lands? (Carol Volk, 2B)**

Selective timber harvest is an option for some of the Aldwell lands. The state of Washington logs its lands in the general vicinity, and the tribe has indicated that it may do some small-scale harvesting. However, the tribe has indicated that it would develop a forestry management plan that "advocates progressive and alternative practices" as opposed to clear cutting (October 17, 1993, letter from the tribe to Carol Volk).

**Public access to the river corridor should be assured. (Washington Department of Natural Resources, 180A, M; Elwha Citizens Advisory Committee, 182G, GG; Joseph Michalczik, 208A)**

We agree. However, the specific locations and types (e.g., foot, canoe, large boat) of access would be dependent on the ultimate disposition of project lands and coordination with interested parties. A watershed management plan process discussed above or recreation/access plan would help in this effort.

**The protected river corridor should be smaller than 600 acres. (Elwha Citizens Advisory Committee, 182M, HH)**

The land associated with the Glines Canyon Project would be managed in accordance with National Park Service policy consistent with the Elwha Restoration Act (Section 3[c][3]). The amount of Elwha Project lands set aside would depend on the ultimate management authority (see above), with the caveat that the "federal investment in restoration" must be protected (Section 3[c][3]). For example, the vast majority of Elwha Project lands would be protected if Congress chooses to add project lands to Olympic National Park.

**Glines Canyon Project lands should not be managed as wilderness. Vehicular access to the area west of Lake Mills (Olympic Hot Springs Road and Altaire campground) should not be eliminated. (Elwha Citizens Advisory Committee, 182FF)**

The Elwha Restoration Act stipulates that Glines Canyon Project lands ". . . shall be managed pursuant to authorities otherwise applicable to the Park" (Section 3[c][3]). Management of the majority of these lands as wilderness would protect both the "federal investment in restoration" and the opportunity to observe restoration as part of a "living laboratory" (see *The Elwha Report*, pp. 121-122).

As a safety measure, vehicular access within the park's Elwha subdistrict would be controlled during the two year dam deconstruction period. Shuttle service to trailheads, popular sites (e.g., Olympic Hot Springs), and to allow river boating access is recommended. The long-term management of the lands not currently a part of the Glines Canyon Project is outside the scope of this EIS.

**Of the watershed, 83% is within the park and protected. Can the remaining 17% be protected somehow? (workshop)**

No additional federal regulatory requirements would be implemented on private land holdings as part of this project. Land management agreements including provisions for watershed protection could be pursued with all affected parties, including private land owners.

**Is it accurate that project lands must be managed to protect fisheries resources, regardless of the owner? (workshop)**

Yes. The Elwha Restoration Act requires that all acquired lands (project lands) would be managed to "restore, protect, and enhance fish resources."

## *Access During Removal*

**Would access to the park be maintained during demolition and construction for recreation purposes? How much of the subdistrict would be closed? Would a shuttle be provided? (Bob Powne, 200C; workshop)**

Roads (including Whiskey Bend Road) located in the Elwha Valley would be closed to all but construction traffic for a period of about two years. It is anticipated that trails in the Elwha Valley subdistrict of the park would also be closed for this same time period. Possible limited access to park roads located in the Elwha Valley may occur if a shuttle is approved in the final design stage of the project. The shuttle is a recommended mitigation measure for impacts to recreation users, and may be pursued by Olympic National Park. If so, it would provide limited access for the general public to the back-country trailheads from a parking area outside the construction area.

**Would roads be constructed during or after dam removal for recreation access? (workshop)**

There are no plans to construct additional roads for public access in connection with this project. Increased levels of maintenance and modifications of existing roads would occur to allow heavy construction vehicle use as the project is implemented. (BOR 1995 c)

**How would changes to accommodate construction traffic change the character of Olympic Hot Springs Road? (Randall Payne, 171B)**

Large flatbed trucks, including an oversized one to transport a crane for removing cut blocks from Glines Canyon Dam, would use Olympic Hot Springs Road. To accommodate these vehicles, the road would be widened in some areas, and a few of the sharper turns would be straightened.

## *Private Property Issues*

**How would private property be protected during this project? (workshop)**

Mitigation measures protecting water quality from degradation and private property from flooding are listed in the draft EIS on pp. 214, 215, and pp. 222-226.

**At what point does Interior begin talks with property owners? (workshop)**

Interior would begin meeting with private property owners during the final engineering design phase.

**Would Interior be willing to trade for land affected by the project? (Joel Sisson, 15A)**

Structural and non-structural measures, including buyouts and land exchanges, are possible mitigation options for affected private lands.

**How would Olympic Raft and Guide Service be affected? (Olympic Raft and Guide Service, 112A)**

Access to Altaire campground, where the guide service launches, would be closed to unrestricted public access during dam removal. Shuttle service may be provided and commercial access negotiated. Dam removal would restore about five miles of riverine habitat likely to be suitable for whitewater rafting, although take out sites must be identified. Elwha Project lands, including Elwha Resort lease lands, would be acquired. The ultimate disposition of these lands has not yet been defined.

**Property shown as owned by the city of Port Angeles on the right side inset of figure 16 is not owned by the city. (City of Port Angeles, 241T)**

The property should be labeled as 30 (Clallam County), not 40 (city of Port Angeles).

**The dam removal project should make certain that there is no net loss of private property or tax revenues. Property exchange issues with the county should be explored. (Melanie Caltrider, 181B; Elwha Citizens Advisory Committee, 182F, 182LL)**

Although some tax revenue would be lost from removal of the hydroelectric projects, additional tax revenue would result from the sale of replacement power to the Daishowa America Mill, and from sales taxes in conjunction with deconstruction and restoration actions, commercial and recreational fishing and support industries, and increased tourism (see Socioeconomics section of the draft EIS, and Interior's programmatic final EIS). Nevertheless, methods to further replace tax revenue and private property, including the option of land exchanges, are being investigated.

**Agreements delineating land ownership in case of changes in the river's course should be in place before the dams are removed. These should include nearshore and delta areas as well. (Washington Department of Natural Resources 180P, Q, R)**

Interior is willing to meet with the Department of Natural Resources (DNR) to develop an agreement for the project lands the federal government acquires. Agreements covering private lands must be negotiated with the owners of those lands.

**The DNR has a trustee responsibility to ensure public access to aquatic lands, so Interior should take no actions that foreclose DNR options for developing public access to corridor and for property acquisitions to secure such access until the planning process is complete. (Washington DNR, 180M, N, O)**

Interior would continue to coordinate with the DNR to ensure adequate public access.

## *Miscellaneous*

**Two lakes used for recreation for several generations would be destroyed. Won't this have an adverse impact on local citizens and on the tourism industry? Where is the mitigation for this loss? (Rescue Elwha Area Lakes, 148Q)**

The loss of reservoir recreation is well documented in the draft EIS (see section on impacts to recreation, pp. 343-348). Although this would have a moderate adverse impact for local users, removing the dams and restoring the anadromous fisheries would result in a significant, permanent increase in fish and river-related activities, and a concomitant beneficial impact to recreationists, including those local users. Mitigation for the loss of reservoir recreation would include directing park visitors to other nearby flatwater opportunities (see p. 346 of the draft EIS).

**Won't debris be a safety problem for river recreationists during dam removal? (Carol Volk, 2A)**

The dam removal plan includes a number of measures to guard against the release of debris, sudden releases of water, and other safety concerns. In addition, emergency notification procedures would be required, as they are now.

**The final EIS should show consultation with Clallam County. (Melanie Caltrider, 181C)**

Interior has consulted with Clallam County on numerous occasions (see Preparers and Contributors section, pp. 377 and 379).

**The northern boundary of Olympic National Park was moved south in 1929. This should be noted in the EIS, as the action was likely taken to negate the conflict of having a hydroelectric operation within an existing national monument. (Olympic Park Associates, 280H)**

Comment noted.

**The reservation should be moved to allow for full restoration of the lower river ecosystem (Clallam County Commissioners, 192T)**

It is not necessary to move the reservation to allow for full restoration. The Lower Elwha Klallam Tribe manages lands west of the federal levee in a natural state.

**How much of a drop would the falls be at the upper dam? (Rescue Elwha Area Lakes, 148-I; workshop)**

There were no falls located at the Glines Canyon Dam area prior to its construction. After dam removal and restoration there would be no falls, although a narrowing of the river passage through the old Glines dam location may result in the creation of rapids as existed before the dam was built.

**Can the project move forward without acquisition of the dams? (workshop)**

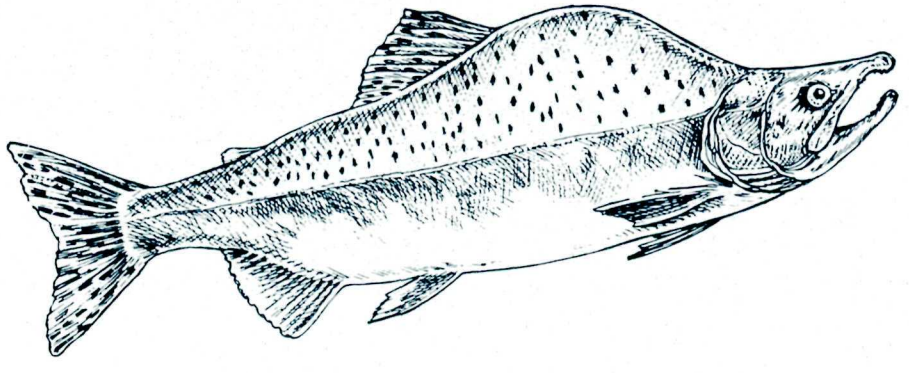
Technically, yes. Final design, construction of water protection measures, and fish hatchery improvements could begin. However, except for the hatchery improvements, these actions would be unnecessary if the projects are not acquired. The Elwha Restoration Act stipulates $29.5 million as the purchase price of the projects, which the federal government must own before it can remove. Some immediate efforts are underway now to save declining fish stocks in the Elwha (see responses to fisheries comments, Immediate Restoration section), but these are separate from the full restoration effort described in the act.

**How would solid waste disposal areas be selected? (workshop)**

Interior anticipates using a contractor to remove the dams. It would be up to the contractor to select which of the site(s) evaluated on pp. 163-165 in the draft EIS they would prefer using.

**Could Olympic Hot Springs be re-created? (workshop)**

The creation of a new Olympic Hot Springs resort/spa is not within the scope of this project.



# National Environmental Policy Act Issues

## Alternatives
## Final Programmatic EIS (EIS #1)
## Level of Detail/Supplemental EIS
## Miscellaneous

## Alternatives

**The Elwha Citizens Advisory Committee's phased alternative for dam removal should be in the EIS. (Harry Lydiard, 13E; Friends of the Earth, 185I)**

Several features of this alternative have merit, and Interior has engaged in independent analysis of them. However, phasing the removal of the two dams was discussed early by the EIS interagency team and was dropped because of its unacceptable impacts on existing anadromous fish stocks. Specifically, sediment releases resulting from the removal of Elwha Dam would have a significant impact on aquatic life in the lower river for a period of 12-18 months. By removing Glines Canyon Dam 6-7 years later, fish would be subjected to another 12-18 months of high sediment loads. This phasing of removal would seriously threaten the long-term health of the fish stocks remaining in the lower river, particularly chinook and chum salmon. The fisheries restoration team found this to be unacceptable.

**If the provisions of the Elwha Restoration Act are not implemented, i.e., the No Action alternative is either selected or comes to pass, litigation, suspended licensing, and resulting costs and impacts are likely and should be included in the EIS. (Friends of the Earth, 185E)**

This question was addressed in Interior's final programmatic EIS (p. 187). To summarize, litigation is likely if the dams remain without fish passage. Should licensing revert back to FERC, the costs of fish passage and mitigation measures acceptable to fish and wildlife agencies and the tribe are at least $38 million. Assuming that these costs are passed on to the mill in increased power costs, this, plus annual maintenance and operation costs, may result in local socioeconomic impacts, such as downsizing of the mill's work force.

## Final Programmatic EIS

**Not many people read the entire final programmatic EIS. No letters against dam removal were printed, but half the final EIS was devoted to letters in favor of it. (Jim Ruff, 147A)**

The federal NEPA regulations published by the Council on Environmental Quality (40 CFR 1500 et seq.) do not require the reprinting of any comment letters received on a draft EIS. However, Interior chose to reprint all letters received in response to the Elwha River Ecosystem Restoration draft EIS, in favor of or in opposition to the proposal. There were many more letters received in favor of the proposed action than against it, and this is why it appears that "half the FEIS" was "devoted to letters in favor of it."

**This draft EIS has not yet properly addressed legal concerns for James Martin Johnson, attorney for the building industry. (Rescue Elwha Area Lakes, 148A)**

Interior's final programmatic EIS responded to all substantive comments made on the draft programmatic EIS, including those referenced as having been made by James Martin Johnson. The final programmatic EIS was released in June 1995. Interior believes all substantive comments on the draft programmatic EIS, including Mr. Johnson's, were adequately addressed in the final document, either as a direct response to a question or comment, or as a text change in the body of the document.

## Level of Detail/Supplemental EIS

**The EIS is lacking in detail. For instance, there is no information on the "falls" that would be left behind when Elwha Dam is removed. (Rescue Elwha Area Lakes, 148U)**

The draft EIS provides detailed information on the alternatives considered, including methods, mitigation, and impacts. Additional information can be found in the appendixes or in reference material cited in the EIS and available by request from the National Park Service or cooperating agencies. No "falls" would be created by removing Elwha Dam (please see Elwha Dam Removal on pp. 54-56 and responses to Recreation, Land Use, and Esthetics comments).

**The EIS is lacking in detail regarding the economic benefits from dam removal. It needs information on the document "Meyer 1995," including methodology, qualifications of the preparer, etc. Where are water quality treatment details? Where is more information on flooding, emergency power loss, interpretive facilities, or property tax revenues? A supplemental draft EIS should be issued with this information. (Melanie Caltrider, 181D, M, V, Z)**

A supplement to an EIS is only issued when an agency decides to make substantial changes to the proposal or "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts must be included" (CEQ regulations, 1502.9 [c][I and ii]). Meyer, 1995, and Meyer, et al., 1995 are references cited in the bibliography (p. 394 draft EIS), available by request from the National Park Service. Phil Meyer's qualifications and those of the entire EIS team are on pp. 372-374 of the draft EIS. Interior is charged with ensuring that information important to the decisions at hand is included in the EIS. To help reduce the size of the body of the EIS, detail that few might find interesting or informative is considered support, and is located in appendixes or the EIS administrative file. Therefore, the information exists, is part of the record, and does not require the issuance of a supplement to the draft EIS.

For example, water quality treatment details are available by requesting the U.S. Bureau of Reclamation technical report on water quality facilities (there are a limited number of copies available). Information on flooding is contained in the draft EIS in specific detail in both the impacts from flooding section (pp. 206-217) and appendix 4. The impact of lost property tax revenues (and increased public revenues from other sources) is found in the socioeconomics section of the draft EIS (pp. 311-319). The decisions on how to interpret dam removal would be made at a future date by the Olympic National Park and other cooperating agencies when funds become available. It is not considered part of this project, and costs for interpretation are not included in the cost of dam removal. Emergency power loss is addressed in the responses to comments on "power."

**The proposed tribal cultural facility on Ediz Hook and dam removal are connected actions, and the impacts of the cultural facility should be included in this EIS. (Melanie Caltrider, 181K)**

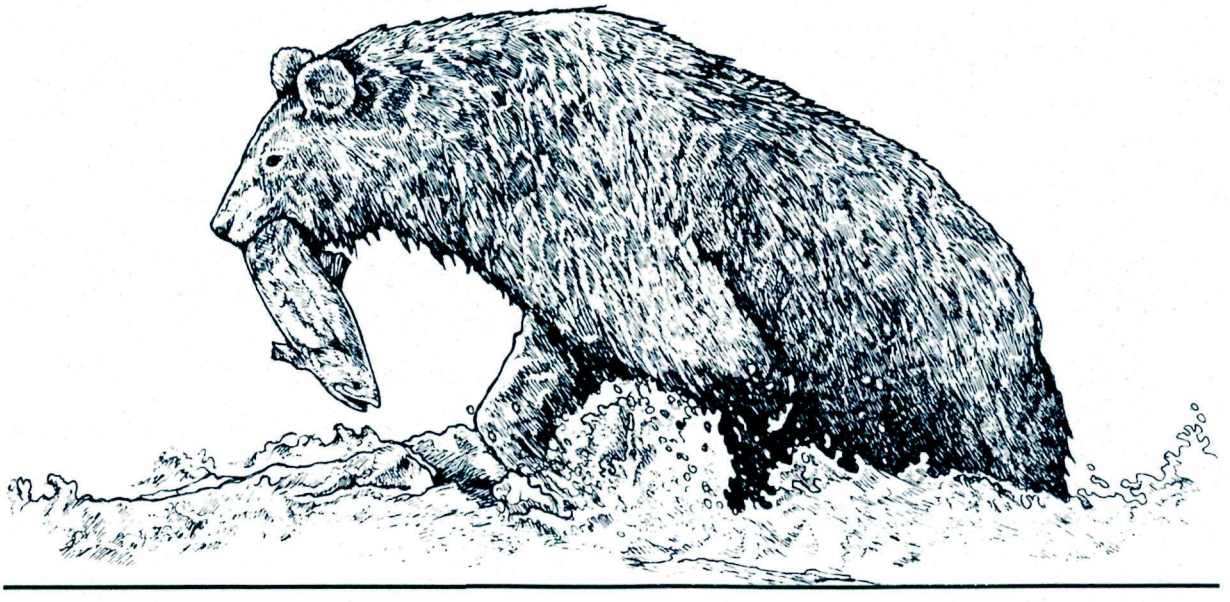
The Elwha Restoration Act authorizes, but does not require, leases of federal land to the tribe and the city of Port Angeles, and acquisition of lands "in Clallam County" for the tribe. The proposed action removes a precondition to those authorizations, but does not commit the federal government to leasing or acquiring land without further decision making. It and dam removal are therefore not connected, or interdependent, actions.

Generally, impacts of leasing land to the tribe include the following: it would prevent its use for other purposes and involve impacts associated with development. These may include grading, removing vegetation, noise and its impacts to wildlife or human populations, construction traffic, dust, etc. Use of the facility would require utilities and may generate some small amount of traffic. Transfer of fee land to the United States in trust for the tribe may result in a reduction in the county's property tax base. At this time, there is no specific proposal for lease or use of the federal land, and no specific proposal for acquisition or use of other lands in Clallam County. Because the specifics are not known, a detailed environmental assessment of the proposal or alternatives to it is impossible. A site-specific environmental review process can be initiated when, and if, specific proposals are made.

## *Miscellaneous*

**The ecosystem would not be fully restored if the dams are removed. Therefore the EIS is flawed. (Clallam County Commissioners, 192A)**

We disagree. Although human uses that did not exist before the dams were built would continue, the natural physical and biological processes essential to a healthy and functional ecosystem would be restored through dam removal. The return of these natural processes would result in restoration of the Elwha River aquatic and terrestrial ecosystem (please see responses to ecosystem comments).



# Permitting

**Why are 33 months needed for permitting? Why wait for two years after acquisition before beginning dam removal? (Save Our Wild Salmon, 184D; Friends of the Earth, 185B, F, H; National Parks and Conservation Association, 198D; Tim McNulty, 225A; American Rivers, 236A; Northwest Ecosystem Alliance, 237A; Eric Broman, 242A).**

The permitting process is iterative and interactive with the design process. Changes to the design may be required based on permit requirements. Some aspects of the permitting would need to be accomplished after the final design is complete. The design process would require approximately two years to complete. Permit applications would be filed as early in the process as possible so that regulators are fully aware of the designer's intentions and approaches. Aspects of the permitting that may require ongoing monitoring of water quality would continue after permits are issued. Hence the period of time required for permitting extends through the design and construction process.

Permitting may require less time than indicated in appendix 6. The schedule for permitting was developed based on requirements for design and construction. The bar graph shown in this appendix is intended to show the range of activities. For permitting, these activities would be intermittent in this period, not continuous. The length of the design and construction period would dictate the period of time required for permitting.

**If direct discharge of filtration backwash is proposed, the action would require a state of Washington Department of Ecology (DOE) National Pollution Discharge Elimination System (NPDES) permit. This should be added to the appendix. (City of Port Angeles, 241L).**

The Department of the Interior and the cooperating agencies have met with the Washington DOE several times to discuss permitting requirements. At the time the EIS was written, no decision on whether a NPDES permit is required had been made. Also, note that the appendix already lists NPDES permits as required for the proposed action (p. 480).

**Has the discharge of settled solids for the industrial pre-treatment facility been approved by the DOE? Is it allowed only in the short term, or also in the long term? (City of Port Angeles, 241V; Daishowa America, 244D)**

A final decision by the Washington DOE has not been made on whether the discharge of settled solids might be allowed in either the short term or long term. A permit application has not been filed at this time; however, the intent would be to discharge solids into the river during the dam removal process, or for a period of approximately two years. After that time, calculations indicate that water quality would, on average, be similar to current water diverted from the surface of the river. Based on these calculations, only a small volume of material would be settled in the flocculation basins each year. This material could be hauled to a land fill for disposal. The final design would be required to determine the extent of suspended solids concentration present in the water taken from the infiltration gallery.

**Many elements of the proposed project would require permits or modifications from the Department of Ecology. These include a determination of federal consistency and/or local shoreline permits, permits for new wells, and a permit to discharge flocculent used in the settling basins for the proposed pre-treatment plant. The flocculent used in the basins should be discharged to the river only during high flows and high turbidity. (Washington Department of Ecology, 259A, B, C, D, E)**

The permit appendix (appendix 6) has been updated to reflect this information.

Water quality facilities would be further refined before applying for a water quality modification. However, at this time it appears that high flows and high turbidity during removal would not necessarily be coincident. High turbidity would occur when notches are formed in the dam. These would be in the months of January through March and June through October. The period of January to March would

experience high flows. However, highest flows generally occur in November to December, when no notching would occur, primarily because of fisheries concerns. The period of June through October, when notching would occur, is a time of lower flows. Larger pumping facilities could be used to remove sludge more quickly, near the time of peak turbidity events.

**Why is the National Park Service (NPS) being given favorable treatment with respect to the permitting process? (James Sewell, 84A; Melanie Caltrider, 181L)**

The NPS is not receiving favorable treatment. Discharge of sediments resulting from dam removal activities is subject to the same regulations required of anyone discharging sediments into waters of the U.S. Obtaining all applicable permits (such as the National Pollutant Discharge Elimination System and Section 404 permit) for discharging dredge and fill materials into waters of the U.S. would be necessary prior to beginning dam removal activities. All other activities governed by environmental laws and regulations are also required for this project and would be obtained prior to beginning that particular activity. Appendix 6 of the draft EIS outlines all of the permits that may be required for this project.

# Power Generation

## Port Angeles Power Supply
## Replacement Power for Daishowa

## Port Angeles Power Supply

**How would power be supplied to Daishowa and other users of Elwha River-generated power if the dams are removed? (Washington Wilderness Coalition, 178B)**

This question was addressed in Interior's programmatic EIS (see pp. 189-190). To summarize, only the Daishowa America Mill uses power generated by the Elwha and Glines Canyon projects, which amounts to about 38% of the mill's power needs. Replacement power would be supplied by the Bonneville Power Administration through Port Angeles City Light, as is the rest of the power the mill currently consumes.

**By removing the dams, would Port Angeles become completely dependent on power generated by the Columbia River dams? What happens when both the Columbia dams and Elwha dams are removed? (Melanie Caltrider, 181N, P)**

Port Angeles City Light operates a small hydropower plant on Morse Creek, but most of the power supplied to Clallam County comes from the Bonneville Power Administration (BPA). BPA supplies power to the region from a mix of resources, including hydropower, gas turbine generators, and a coal-fired power plant near Centralia. There are no plans to remove any of the Columbia River dams.

**Are the projects a potential source of emergency power for Port Angeles? What would the cost be to restore this ability to use the dams for emergency power? How difficult would it be to connect to the BPA grid? (Elwha Citizens Advisory Committee, 182J; Melanie Caltrider, 181P, Q)**

Many local emergency services (e.g., the hospital, telephone communications, fire stations, and county emergency [911]) are equipped with diesel-electric generating systems, and so do not need output from the Elwha projects during power outages. Regardless, Port Angeles City Light's average summer, non-industrial load is 25 megawatts, and the winter load averages 40 megawatts. The Elwha projects provide 18.7 average megawatts, ranging from 6 megawatts in the late summer and early fall to 29 megawatts during winter floods and spring runoff (Campbell 1996). Because the projects do not provide enough power to meet community needs, essential (emergency) loads would have to be segregated from non-critical loads within the city distribution system. This could not be accomplished without extraordinary measures, such as physically disconnecting powerlines to non-critical power users.

The Elwha projects also provide relatively poor quality and uniformity of energy delivery when operating in a "stand-alone mode," such as would occur with a loss of BPA power. When connected to BPA (through Port Angeles City Light), the electrical inertia of the BPA system stabilizes the power quality and output of the Elwha projects. When separated from BPA, power operators must rely on generator governors that date back to the turn of the century and lack the rapid response time and sensitivity of modern hydro-power equipment. Manual adjustment is required at Elwha to regulate output voltage, although Glines Canyon uses a 1920s vintage automatic voltage regulator. When power from the dams was used in the community in the past, residential and commercial loads were primarily for space heating and lighting, and so were less sensitive to variations in power supply voltage, frequency, and output. Modern computer-operated machinery and sensitive process control systems are intolerant of the relatively poor Elwha power quality (Campbell 1996).

It would be relatively inexpensive to equip the Elwha turbine generators with modern, automatic control apparatus. However, the programmable logic controllers with the necessary algorithms to process the sensor output and provide corrective signals to the final control mechanism are very expensive (Campbell

1996). Because parallel operation with BPA provides very acceptable energy to the Daishowa America Mill, there is little justification for such an investment. It would be more cost effective to acquire diesel-electric generating equipment for those emergency services that do not already have them, but it is not the responsibility of the Elwha Restoration Project to fund them.

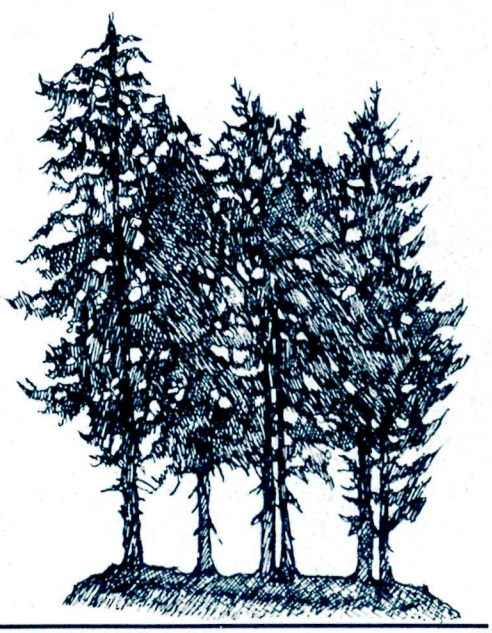
## *Replacement Power for Daishowa*

**In the "Energy Consumption" section of the EIS, Interior should note that there is currently a large energy surplus in the Pacific Northwest, and Daishowa's additional need can be readily met. (Friends of the Earth, 185R)**

The Bonneville Power Administration (BPA) has a power surplus and has projected the surplus would continue through their five-year planning period. BPA can easily meet the additional power needs of the Daishowa America Mill, and this has been reflected in this EIS.

**Is power from the dams being used by someone other than Daishowa America Mill? If so, who? (Howard Briggs, 149A)**

No. Only the Daishowa America Mill consumes the power produced by the dams.



# Dam Removal

## Sequence of Events
## Alternatives
## Analogies
## Miscellaneous

## Sequence of Events

**Won't removal of Elwha Dam first destroy any ecosystem restoration when Glines is removed second? (Randall Payne, 171C, D)**

It is true that removal of one dam followed by removal of the other would affect ecosystem restoration to a greater degree than removing both at the same time. Ecosystem restoration benefits arising from the removal of Elwha Dam would be largely erased during removal of Glines Canyon Dam. This would result in a greater degree of risk for the fish stocks remaining in the lower river. The proposed action (and Dredge and Slurry alternative) would remove both at the same time for this reason.

**Why are you removing the dams during low flow season? (workshop)**

Dam removal would be done year-round, starting in November of the first construction year. The only times planned for shut down of dam removal activities are during November 15 to December 15 and from May 1 to June 30. These shutdowns are necessary to protect workers and to complement fisheries restoration. For a more complete description of dam removal activities please refer to pp. 54-58 of the draft EIS.

**Can Interior accelerate the dam removal (and permitting) process so that salmon stocks do not die out before removal? (Friends of the Earth, 185F; American Rivers, 236A; Northwest Ecosystem Alliance, 237A)**

(Please see responses to fisheries and permitting comments for additional information.) The proposed schedule for dam removal is based on decommissioning the dams, implementing water quality and flooding mitigation, initiating fish restoration activities, and acquiring the necessary permits prior to dam removal. Although preliminary permitting discussions have begun, most of these activities cannot begin until the dams have been purchased.

When Interior owns the dams, several concurrent activities critical to the project's success must be completed before dam removal can proceed. For instance, decommissioning of the dams includes shutting down the power plants and activities such as de-energizing the electrical equipment, preparing equipment for long-term storage, removing hazardous materials, rerouting transmission lines, and decommissioning the grounding grid. Water quality treatments are required by the Elwha Act to be in place prior to dam removal. Flooding mitigation includes raising the federal and non-federal levees near the mouth of the river and other measures necessary to maintain the present level of flood protection. Fish restoration activities such as hatchery support, the development of broodstock, and outplanting would begin two years before dam removal.

**Would notching be minimized during storm events or maximized to take out as much sediment as possible? (workshop)**

During high flow periods, notches would be adjusted (made wider) to accommodate larger flows. This would allow dam removal operations to continue and would provide the opportunity for sediment to be

accessed and eroded by the river. Work stoppages have been figured into dam removal activities for high flow periods (such as November and December) and may also be necessary during other times of the year.

**What would contractor's crew be doing when they're not working? (Rescue Elwha Area Lakes, 148N)**

The project schedule includes two work stoppage periods, one in May and June, and the other from November 15 to December 15. These are scheduled for safety and fish restoration reasons. If higher than normal flows occurs during dam removal, this may cause additional work stoppages for safety reasons, extending the contract duration. Construction activities above the reservoir level, outside the channel limits, or otherwise unaffected by river flows would likely continue during these periods. However, the contractor is ultimately the judge of how it would best meet the schedule required by Interior.

**How long would the reservoirs erode without being vegetated? (workshop)**

The revegetation plan calls for reseeding and replanting native riparian vegetation on high gradient areas and along restored powerline corridors. Within one year, natural vegetation would begin to appear on the drained reservoirs. Within three years, vegetation would begin to appear natural, and would be stabilized enough to approximate pre-dam levels of erosion within 6 to 10 years.

## *Alternatives*

**Discuss "phased" approach to dam removal and reason for rejection. (Friends of the Earth, 185I)**

(Please see responses to fisheries and socioeconomics comments for more information on phased dam removal.) Separate dam removal contracts would cost more to prepare, administer, and implement, and inflation would have an effect on the overall project costs. Phased dam removal was also rejected because it would lengthen the time period that fish would be impacted by increased sediment loads in the river, and would not provide access to suitable spawning habitat upstream of Lake Mills for a considerable amount of time, increasing the risk of extinction of additional species of salmon before Glines Canyon Dam were removed. Phasing also delays the return of natural sediment transport processes, flow regime, pre-dam water temperatures, and fish habit, as well as the anadromous fish themselves. Some of these impacts are described in Interior's programmatic EIS for the alternative "Remove Elwha Dam" only.

**What would you be able to learn from the removal of one dam that could be applied to the other? (workshop)**

The dams are quite different. Interior does not believe that much would be learned that is applicable to removal of the other from waiting and studying the removal of the first. See Fisheries, "Phased Dam Removal" for more information.

**The EIS should examine an alternative which removes a large-enough portion of the lower part of the dams to allow free flow of the river and fish passage. (Robert Ramsey, 126A)**

Since Elwha Dam was constructed on loose fill material and the foundation failed in 1912, there is an ongoing concern about the continued safety of the foundation. Because of these safety concerns, removal of the entire dam structure would be necessary to ensure that the foundation would not fail at a later date.

The EIS team looked at removing a piece of the lower portion of Glines Canyon Dam, but found it to be infeasible for a number of reasons. A portion of the lower part of the dam could theoretically be removed, but would present many overwhelming technical problems, including the underwater excavation of existing upstream sediments at the dam, the underwater installation of a temporary bulkhead, and the construction of additional structural support for the remaining upper portion of the dam (for stability under potential loading conditions). Controlled downstream releases necessary for gradual reservoir drawdown in stages (for sediment management) would require a temporary regulating gate or valve.

## Analogies

**Cite cases where dam removal has been done successfully. Include a description of the impact and recovery of Mount St. Helens and the Toutle River. (Friends of the Earth, 185C; National Parks and Conservation Association, 198F)**

The Toutle River is a tributary of the Cowlitz River in Washington; the Cowlitz drains into the Columbia River. Prior to the eruption of Mount St. Helens, anadromous fish had access to about 175 miles of Toutle mainstem and tributary habitat, and 77% of this was impacted by the eruption (Martin, et al. 1984). Ash fall, mud flows, water temperatures that exceeded fish lethal limits, loss of instream cover, and riparian vegetation all contributed to a catastrophic loss of aquatic life. Additional information on the recovery of anadromous fish after the eruption is available in the responses to fisheries and sediment comment sections of this EIS, and in Interior's programmatic EIS, pp. 157-158.

Some of the larger dams that have been successfully removed in the United States include: Sweasey Dam, Mad River, California; Harpster Dam, South Fork Clearwater River, Idaho; Lewiston Dam, Clearwater River, Idaho; Mussers Dam, Middle Creek, Pennsylvania; Fulton Dam, Yahara River, Wisconsin; Hayman Falls Dam, Embarrass River, Wisconsin; Prairie Dells Dam, Prairie River, Wisconsin; and Woolen Mills Dam, Milwaukee River, Wisconsin. Many smaller timber crib dams have been successfully removed by the National Marine Fisheries Service to restore anadromous fish passage (DeLarm, et al. 1989). See Interior's programmatic EIS, pp. 157-158 for more information.

## Miscellaneous

**What is the lead agency for dam removal? (workshop)**

At this time, it is anticipated that the Bureau of Reclamation would prepare the designs and specifications for dam removal, although the U.S. Army Corps of Engineers is an option.

**Can dam materials be recycled? (workshop)**

Recycling of dam waste materials has been investigated to some degree, but would appear to increase overall project costs. Further evaluation of potential recycling opportunities would be performed during final design. The contractor may also identify additional recycling opportunities subject to Interior's approval.

**Interior should review whether it is necessary to remove the rock check dam to ensure fish passage. (Harry Lydiard, 13A)**

The water quality mitigation plan provides for an infiltration gallery and other measures to meet the water quality needs of the mills and rearing channel (see table 5 of the draft EIS). These measures would eliminate the need for the rock dam.

# Miscellaneous or General Comments

**Fish could have been returned to the Elwha River long ago if not for Interior's opposition to fish passage and restocking. (Rescue Elwha Area Lakes, 148V)**

As the draft EIS (pp. 30-31) indicates, the pace and details of this restoration effort have been dictated to a large extent by legal requirements and actions taken by the U.S. Congress (see also appendix B of *The Elwha Report*). The goals of Congress and Interior are full restoration of the anadromous fisheries and Elwha River ecosystem, neither of which can be accomplished through fish passage or restocking. Passing fish upstream during this process would have contributed to the decline of remaining stocks by subjecting fish to needless mortalities associated with upstream and downstream reservoir and dam passage.

**The proposed action requires permits which require exceptions to the rules and violate environmental laws (Rescue Elwha Area Lakes, 148C)**

The proposed action does not violate environmental laws, and in general does not require exceptions to permits. In fact, Interior anticipates applying for more than 30 federal, state, and local permits required to implement dam removal (see appendix 6). The Washington Department of Ecology (DOE) has indicated that a water quality modification would be required for the project. However, according to DOE, the point of the modification is to ensure that water quality would be protected to the maximum possible extent, i.e., to impose appropriate conditions on the project. Water quality modifications have been approved by the Washington DOE for various non-federal projects.

**Interior should use this project as a learning lab, and should collect all data on fish, macroinvertebrates, vegetation, and wildlife. Although some data collection is occurring now, it is not as thorough as it should be. (Nick Gayeski, 162A)**

Interior and cooperating agencies are attempting to collect adequate information on current biological communities to allow comparisons to the restored ecosystem. Additional cooperative efforts are being pursued.

**Could a citizens committee be formed for resolving property and flooding impact and mitigation issues? (workshop)**

Interior anticipates meeting individually with property owners at the final design stage to determine which mitigation would best suit their needs.

**The dams should be relicensed for their remaining life. James River Corporation should set aside money to eventually remove them, and until then, should install fish ladders or elements of the REAL (Rescue Elwha Area Lakes) proposal. (Melanie Caltrider, 181Y)**

The environmental impacts of keeping the dams in place and installing fish passage compatible with FERC licensing requirements were examined in detail in Interior's programmatic EIS (the "Dam Retention" alternative).

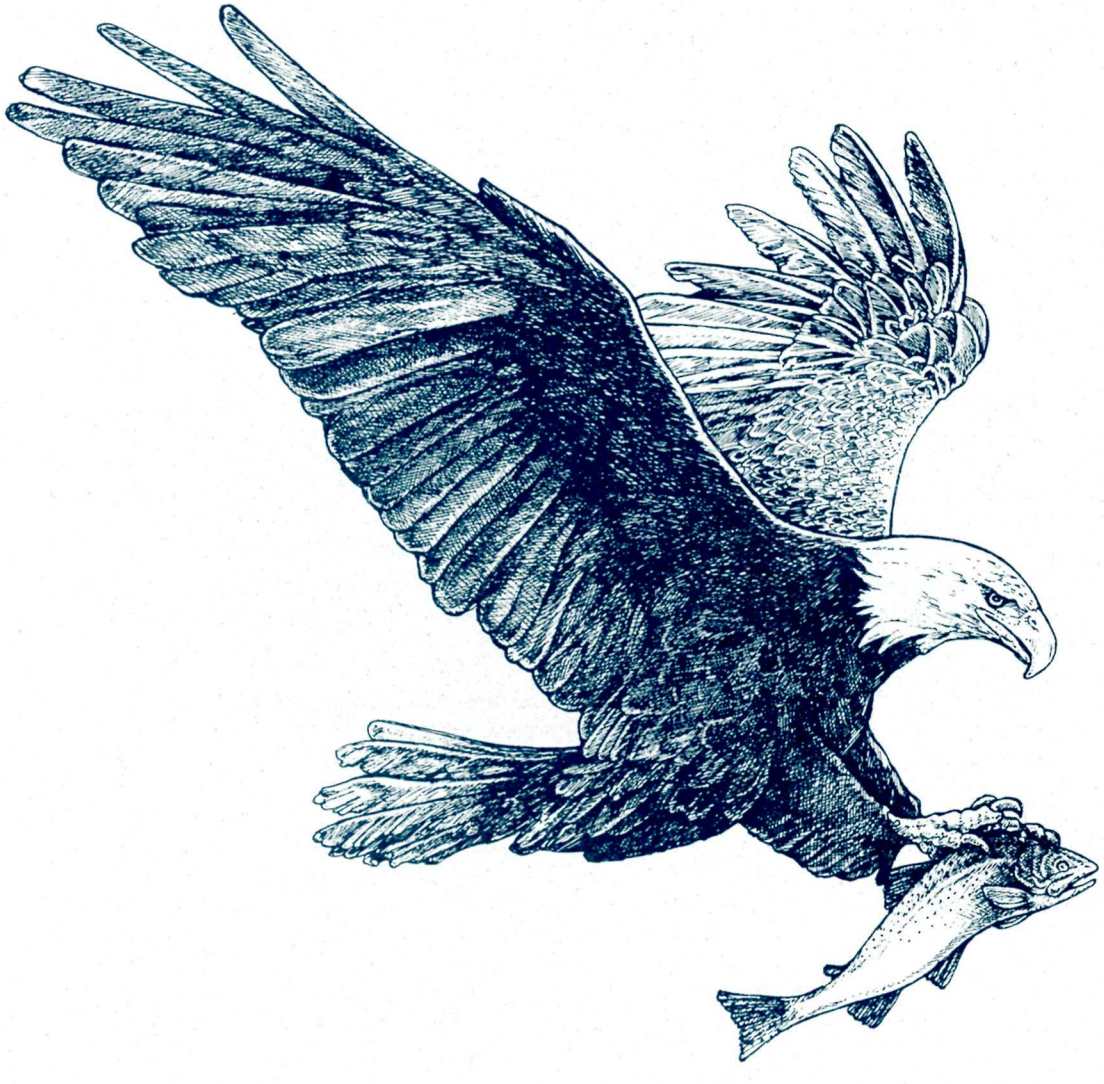
**Can the projects continue to operate without licenses? Isn't this an unlawful status quo that violates trust agreements with area tribes? (National Parks and Conservation Association, 198A)**

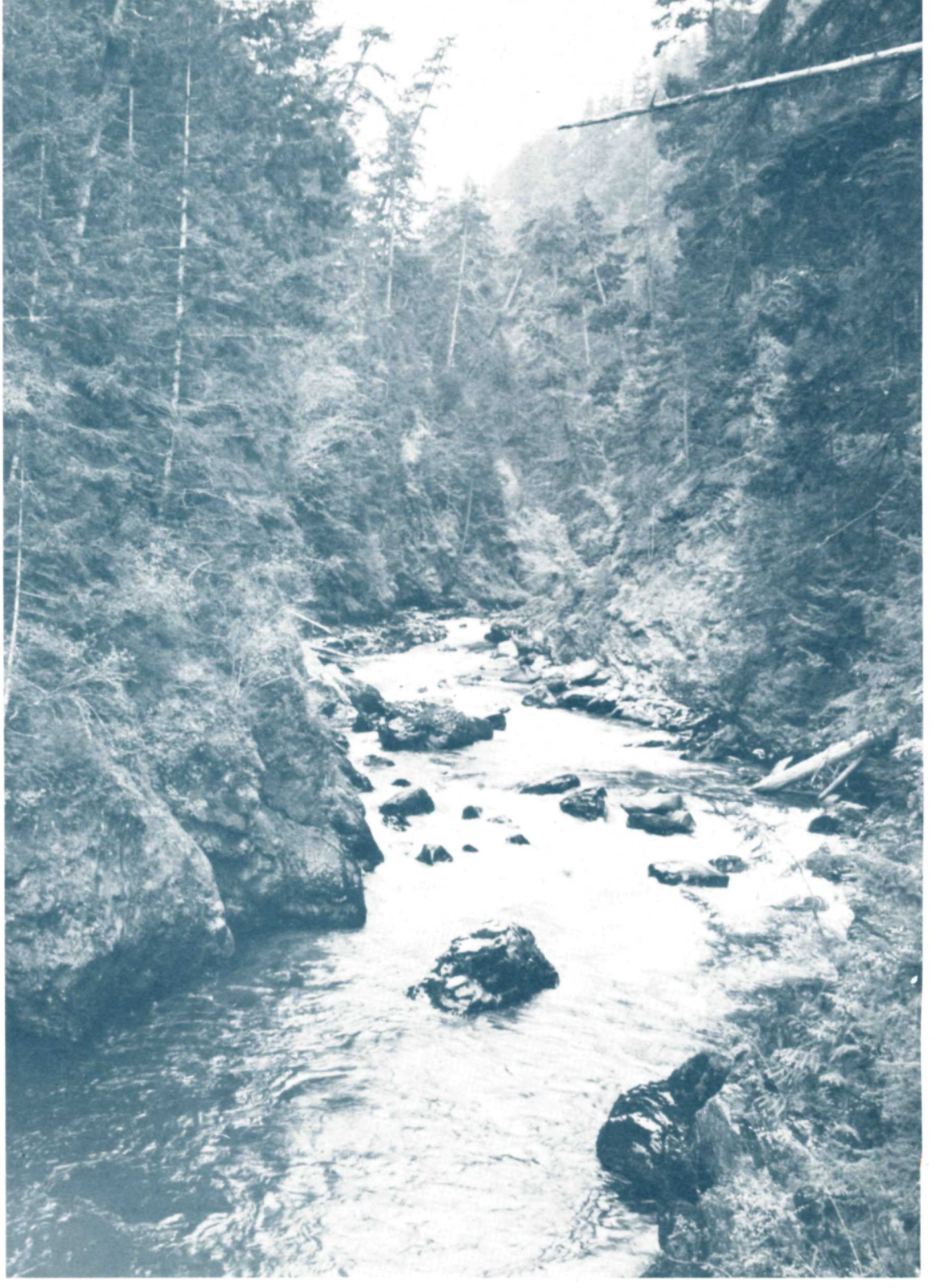
Section 5(a) of the Elwha Restoration Act authorizes the continued operation of both projects until (1) the Secretary of the Interior has acquired them or (2) five years after expiration of the current annual license in effect if "the Secretary's report required in section 3(c) does not provide for dam removal," at which time FERC licensing authority would be reinstated. The secretary has not yet acquired the projects, but *The Elwha Report* did provide for dam removal. This EIS does not speculate on possible legal challenges to this condition.

**What specific mitigation measures would be used to ensure traffic safety at the intersection of Olympic Hot Springs Road and U.S. Highway 101? Would a temporary traffic light work? (Randall Payne, 171B)**

The draft EIS notes that there could be safety concerns where trucks enter U.S. 101 from Olympic Hot Springs Road, and suggests that flaggers be used to help facilitate these movements. Traffic specialists on the EIS team do not feel that there are sight distance problems at this intersection, as there are unobstructed lines of sight for drivers on U.S. 101. Should there be backups on U.S. 101 due to trucks making left turns onto Olympic Hot Springs Road, westbound traffic may have less time as they come around the curve to slow. However, proper warning signs would be adequate for this problem.

There are several reasons not to install a temporary signal. For instance, traffic on Olympic Hot Springs Road other than construction traffic would decline during dam removal, since this part of the park would be closed. Also, temporary signals would be unexpected and would require warning signs just as the proposed use of flaggers. Temporary signals often do not function well, and must be monitored closely for problems. The EIS team felt that flaggers could more easily and safely facilitate the operation of the intersection, since they would be able to react to either the presence of trucks or lack of truck traffic to keep U.S. 101 traffic flowing smoothly.





# *Comment Letters*

# *Comment Letters*

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Morrison, Kingsley - 261; flood, cultural resources, general
Payne, Randall - 171; cultural resources, transportation, dam removal, fisheries, sedimentation
Powne, Bob - 200; sedimentation, recreation
Ramsey, Robert - 126; dam removal
Ruff, Jim - 147; NEPA, fisheries
Sewell, James - 84A; sedimentation
Sisson, Joel - 15; wild life, land use
Whiteley, Arthur H. - 243; fisheries

**PACIFIC FISHERY MANAGEMENT COUNCIL**
2130 SW Fifth Avenue, Suite 224
Portland, Oregon 97201
Telephone: (503) 326-6352

*CHAIRMAN*
*Robert C. Fletcher*

*EXECUTIVE DIRECTOR*
*Lawrence D. Six*

OLYM-404-06-155

June 21, 1996

Received
JUN 25 1996
DSC-RP

Ms. Sarah Bransom
National Park Service
Denver Service Center
Resource Management - RP
12795 West Alameda Parkway
PO Box 25287
Denver, CO 80225-0287

*RE: Elwha River Implementation EIS*

Dear Ms. Bransom:

The Pacific Fishery Management Council was created by the Magnuson Fishery Conservation and Management Act (MFCMA) in 1976 with the primary role of developing, monitoring, and revising management plans for fisheries conducted within federal waters off Washington, Oregon and California. Subsequent congressional amendments in 1986 and 1990 added emphasis to the Council's role in fishery habitat protection, restoration and enhancement.

In view of the fishery habitat concerns specified in the MFCMA, the Council's Habitat Steering Group has been closely monitoring the status of the restoration of the Elwha River ecosystem. In a letter of December 15, 1994, the Council provided its support for the preferred alternative (removal of both dams) outlined in the Draft Environmental Impact Statement. More recently, the Council voiced its support in a resolution of March 14, 1996 urging the acquisition and removal of the Elwha and Glines Canyon Projects by the federal government at the earliest opportunity. Given these facts, we offer the following comments on the Elwha Implementation Environmental Impact Statement.

Once again, the Council is impressed by the level of detail and thoroughness for the environmental documents prepared by the Department of Interior. The Council strongly agrees with the preferred alternative (and proposed action), which includes demolition of both mainstem dams and removal of accumulated sediments through natural river erosion processes. This alternative will result in the most rapid rehabilitation of the Elwha River ecosystem. The alterative proposal (sediment management through dredging) adds considerable cost to the total project with no appreciable long-term benefits.

The Council continues to be very concerned about the status of salmon throughout their range along the West Coast. It is apparent that the decline in abundance is partially related to the failure of society to protect freshwater spawning and rearing habitats. The current situation in the Strait of Juan de Fuca (to which the Elwha River drains) is an excellent case in point. Recent research has shown that coho production in the Strait has been well below viable target levels established by fishery managers. Degradation of freshwater habitat as a result of various land



use practices has been identified as a major cause for the decline of Strait coho. The Council notes that in terms of coho production alone, a fully restored Elwha River will produce some 248,000 smolts annually. This number represents fully 65 percent of the current total smolt yield in the Strait of Juan de Fuca. This confirms our belief that the Elwha River represents the best restoration opportunity in the region.

Sincerely,

Robert C Fletcher

Robert C. Fletcher
Chairman

JCC:hmm

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: 600 Capitol Way N • Olympia, WA 98501-1091 • (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building • 1111 Washington Street SE • Olympia, WA



June 20, 1996

Ms. Sarah Bransom
National Park Service
Denver Service Center, Resource Planning
DSC-RP, 12795 West Alameda Parkway
Post Office Box 25287
Denver, Colorado 80225-0287

Dear Ms. Bransom:

Subject: The Elwha River Ecosystem Restoration Implementation Draft Environmental Impact Statement, Submitted Pursuant to Public Law 102-495, April 1996.

The Washington Department of Fish and Wildlife has reviewed the Draft Environmental Impact Statement for Restoration Implementation of the Elwha River Ecosystem and Native Anadromous Fisheries. The Department submits the following comments.

The Department agrees with the conclusions reached by the Department of the Interior in this report for full restoration of anadromous fish and wildlife in the Elwha River basin. We feel very strongly that complete restoration of the ecosystem and related fish and wildlife resources cannot be accomplished without removal of both the Elwha and Glines dams and implementing fisheries and ecosystem restoration planning.

Regarding the proposed action, the river erosion alternative, we concur that this is the best and most efficient method of managing the large quantities of sediment that must be removed from the system. We understand the complexities of developing mitigation measures to offset impacts from this high sediment load and are confident that every effort will be made, as outlined in the document, to minimize impacts to fish resources as well as other river uses for the short term. We believe the long-term benefits to fish, wildlife, and marine resources far outweigh the short-term unmitigatable impacts. We also concur with the two-year removal scenario in lieu of a longer period. Allowing the initial plume of sediment to flush out of the system in the shortest time possible allows restoration efforts to begin almost immediately. The river erosion alternative also provides the best means of replenishing sediments to the marine environment, which have been lacking since the dams were constructed.



The discussion on Disposition of Project Lands describes several land use options: Natural Resource, Economic Development, Mixed Use, Residential and Conservation (Refuge). We would hope that the majority of the project lands will remain in a natural or semi-natural state to preserve the biological integrity of the entire river corridor, and to compensate for wildlife resources lost for the 60-80 years since the dams were constructed. We recommend that any economic, residential, or mixed use be minimized and confined to already disturbed areas. The criteria used to determine which lands are preserved in a natural state should not be restricted to steep slopes, but also include the low gradient areas.

Discussions on restoration and revegetation of the lake beds mention creation of small wetlands by placement of woody debris. Considering the importance of wetland complexes for trapping sediments, retaining nutrients, providing fish and wildlife habitat and possibly providing overwintering habitat for waterfowl such as trumpeter swans, we would encourage development of wetlands and shallow open water areas whenever possible.

We appreciate the opportunity to comment on this report. We hope our comments will be helpful in developing the final Environmental Impact Statement.

Sincerely,

Martin Baker
Assistant Director
Habitat Management Program

MB:DG:slt

cc: John Conklin, Regional Ecosystem Director
Cyreis Schmitt, Division Manager
Dave Gufler, Habitat Biologist
Brian Winter, Olympic National Park
Department of Ecology
Elwha Tribe
USFWS

OLYM-404-E i
180

WASHINGTON STATE DEPARTMENT OF
**Natural Resources**

JENNIFER M. BELCHER
*Commissioner of Public Lands*
KALEEN COTTINGHAM
*Supervisor*

June 26, 1996

**Received**
JUL 02 1996
DSC-RO

Ms. Sarah Bransom
National Park Service
Western Team
PO Box 25287
Denver, CO 80225-0287

Dear Ms. Bransom:

The Department of Natural Resources (DNR) fully supports the Elwha River Restoration project and the preferred alternative for the physical removal of the Elwha and Glines Canyon Dams. However, we have significant remaining concerns with the approach the proponents have taken on proposed flood control mitigation methods. We also are continuing to strongly recommend the implementation including provisions for the proponents to facilitate and participate in post-demolition watershed management planning to protect such a significant investment in a unique restoration opportunity. We wish to restate our appreciation to the National Park Service (NPS) and the other proponents for their cooperation and interest in working with us on our concerns. We look forward to continued cooperative efforts on implementation planning with the proponent, the local community, and the interested parties..

Public Access

The DNR has proposed that a public access plan be developed in a public forum as part of the implementation process. A copy of the letter to the park Superintendent containing that proposal is enclosed for inclusion, in it's entirety, as part of our comments to the DEIS. To summarize our statements on access planning; we wish to participate in exploring a range of options for boat, foot and vehicle access and facilities along the river corridor from the present head of Lake Mills to the ocean beaches. We are also interested in possible connections to regional trail systems.

We are supportive of the park service proposals for interpretive facilities at the Glines Canyon Dam site and for trail access to the lake head site via trail across the restored river bottom lands.

Also refer to the enclosed letter to the Superintendent regarding the need to address our trust interests in public access to aquatic lands in the disposition and/or management of the lands acquired. The scoping comment remains our primary statement of our interests. We envision a mix of land use authorizations, agreements and/or acquisitions by interested parties as the potential mechanisms for securing our interests in public access to the aquatic lands of the river and nearshore corridor.

1111 WASHINGTON ST SE ▮ PO BOX 47000 ▮ OLYMPIA, WA 98504-7000




Floodplain Management.

In our comments on scoping and in decisions on mitigation requirements, we have repeatedly stated that we are supportive of restoring the river, estuary and nearshore to the pre-dam free flowing state where natural meandering and sediment transport will be allowed to occur. The DNR has also not requested mitigation for impacts of the project but requested watershed planning to provide more long-term certainty for all parties concerned. We have previously stated that the Elwha restoration provides a unique opportunity for reestablishing a healthy complete natural river ecosystem from source to nearshore marine area in a near pristine condition. It is our opinion that the restoration proponents should be taking this opportunity to work with other agencies and local authorities to define what it would take to live with a fully functioning river for the long-term. We have found no substantive provisions in the proposal to assure us that a healthy, natural floodplain will be allowed to develop in the lower river and estuarine areas. We do not believe the proponents have made adequate provisions to ensure the investment in restoration will be preserved for the long-term. Our concerns for the impact of the structurally based flood mitigation measures on ecosystem productivity have not been adequately addressed to this point.

We believe there are alternative solutions that need to be developed. Without these measures, we will need to open discussions on mitigation for the flood control measure impacts on the productive potential of the river/estuarine/marine ecosystems. We view this as a separate issue from the construction and long-term impacts of restoring the natural free flow regime of the riverine ecosystem that we stated we would not seek mitigation for.

We also do not believe that the proposed flood mitigation measures are the most cost-effective long-term solution. In reviewing the costs of mitigation options both maintenance costs and impacts on ecosystem functions should be considered (ie. The project should internalize all costs). The proposed structural mitigation projects should factor in years of maintenance costs. Acquisition and removal or relocation of existing improvements are the only options without long-term maintenance costs.

The DNR is especially concerned with the implementation plan's continuing lack of focus on assuring the full development and maintenance of a healthy estuarine ecosystem. Intertidal floodplain habitats are increasingly being recognized as critical production areas and refuge, feeding, and acclimation habitats for juvenile salmonid migrants, particularly chinook. There is a wealth of recent literature demonstrating the critical role of estuarine habitats in determining the size and productivity of salmonid populations. The health of the restored Elwha River salmonid stocks will depend as much or more on the productivity of the estuary as the river. The chinook salmon population, in particular, has the capability to utilize the estuary for an extended rearing period and would benefit greatly from any increases in estuarine functions.

It is our opinion that the success of the restoration will be closely related to the size and productivity of the estuarine ecosystem that develops. The implementation plan, therefore, should provide for maximizing estuarine habitats. The proposed property flood protection mitigation measures listed for the river delta are contrary to the proponent's stated goal of assuring that the investment in restoration be protected.

Specifically, the private levee on the west side of the river has isolated the wetland area behind it from the delta. The proposed configuration will not allow the area to serve as productive estuarine habitat for juvenile salmonids and will entrap them during high water events. Moving the levee to the west of the existing wetland area will allow that area to become a fully connected and functioning part of the river delta system once again. If relocation of the levee is not an option, then we will want to explore other options for achieving the same level of estuarine habitats and productive capacity.

The proposed extension of the northern end of the federal levee will isolate a significant area within the flood plain from the estuary; impacting estuarine size and function. Relocation of the structures is a mitigation alternative that would provide for both the long-term interests of the property owners and a healthy estuarine system. The estuarine flood plain off-channel refuge habitat that would be created by the alternative is the very type of habitat biologists are struggling to recreate to restore other systems in the region (Skagit, Puyallup, Duwammish, Snohomish, Nisqually, and Chehalis, to name a few). If relocation of the residences and other nonstructural solutions are not an option, then we will want to explore other options for achieving the same level of estuarine habitats and productive capacity.

There has been some discussion of periodic dredging in the same general area to maintain the rerouted tribal hatchery egress channel. We would prefer to see a more self sustaining design solution to the hatchery egress channel problem that will not cause ongoing disturbances to the estuarine sediments.

We are also disappointed that the proposed flood protection mitigation measures throughout the remainder of the river did not substantively explore nonstructural measures for mitigation that would be much more consistent with the projects stated goal of river ecosystem restoration. We had proposed in scoping comments that nonstructural alternatives (such as moving roads, homes, and other facilities) be considered. We strongly recommend that nonstructural alternatives that will provide a healthier river channel/flood plain system and more sustainable development be given preference to the proposed mitigation measures.

Specifically, move the sections of the Elwha Valley Road instead of the proposed elevation and armoring. The restoration is creating over 562 acres of upland habitats. The most sustainable solution for a heathy river ecosystem is to be willing to give up some upland, and move the road



instead of constraining the river. For the mitigation proposed at RM 9.5, moving the home appears to be a more sustainable outcome for the long-term and is more in keeping with managing the river as a fully functioning river system. We also recommend moving the other nonwater supply related structures and facilities along the river to sites out of the flood plain as the most sustainable long-term solution.

Watershed Planning

In our scoping comments, we advocated a three phase approach to restoration concluding with the development and implementation of a comprehensive watershed management plan to protect the investment in restoration for the long-term. The project proponents should begin to work with residents and owners in the lower river as well as the local authorities, other agencies and interested parties to facilitate the watershed landscape planning that will be required to protect the investment in restoration for the long-term. Provisions for participation in and funding the watershed planning process should be identified in the implementation plan. Locally based watershed planning has been demonstrated to be an effective tool, both locally and throughout the nation for resolving water management issues. It is a central component of the Draft Model Wild Salmonid Policy of the State and Tribes of Washington State. We encourage the project proponents as the major land managers in the watershed to take the initiative to launch a comprehensive watershed management planning process. In spite of the fact that the proponents manage the greatest share of the watershed, and have substantial influence over ocean management, they still do not control even all the anthropogenic effects on salmonid survival rates. Implementation cannot be considered complete without a commitment to a comprehensive watershed management plan that addresses all sources of mortality for each stock.

All parties with an interest in river management need to formally recognize that river channel and flood plain structure and function are an important part of the local and state infrastructure. This concept was implied in the DEIS discussions on the value of the resource to the tribal and local communities. It now needs to be explicitly stated and the implications for both protecting and developing it or losing it need to be fully detailed. Healthy river floodplain that maximize both resource production and development at the lowest level of operation and maintenance expenditures are the most sustainable long-term solution.

Sediment Disposal Costs for the Dredge and Slurry Alternative

As we have previously stated, the outfall for the dredge and slurry alternative will require a use authorization. Be advised that existing law requires a fee for disposal. Costs of the alternative should include disposal costs of $0.45/cubic yard. Please contact Phil Hertzog at (360) 902-1066 for additional information. Exceptions have been granted in the past for public works projects and may be considered for this project to achieve the benefits of watershed and nearshore

restoration. Exemption process options including administrative rule revision or legislative action will need to be considered in construction scheduling. Some options may require significant lead time.

Elwha Fish Restoration Plan

We are interested in further analysis into the restoration strategies for the various salmonid stocks during implementation. The literature contains a number of reports indicating rapid colonization of high quality habitats by salmonids. We would like to participate in exploring the feasibility of restoration via natural recolonization options in lieu of, or prior to hatchery supplementation methods. It may be that the benefits of some supplementation do not warrant the expenses and management implications of additional hatchery facilities and programs. Also, we once again note, that the Elwha provides a unique opportunity for observing the recovery of a large riverine ecosystem. One aspect of that opportunity is the chance to monitor rates of recolonization. Please contact Jeff Cederholm at (360) 902-1609.

If you have questions, please don't hesitate to call me at (360) 902-1146.

Sincerely,

Bill Graeber
Aquatic Resources Division
PO Box 47027
Olympia, WA 98504-7027

Enclosure

c: Brian Winter, NPS, Coordinator
Rebecca Inman, Environmental Review Section, WDOE
Craig Partridge, Manager
Rich Hsu, Olympic Region, NR Asst. Manager



WASHINGTON STATE DEPARTMENT OF
**Natural Resources**

JENNIFER M. BELCHER
Commissioner of Public Lands
KALEEN COTTINGHAM
Supervisor

October 19, 1995

Mr. David Morris, Superintendent
Olympic National Park
600 E Park Ave
Port Angeles, WA 98362

Dear Mr. Morris:

The Department of Natural Resources (DNR) understands that the Elwha River Restoration Implementation Draft Environmental Impact Statement (DEIS2) is now very close to being finalized and released for public review. Our Department has been happy to work with the project proponents on various aspects of the DEIS2 and we wish to express our appreciation to the National Park Service (NPS) as lead agency for their cooperation and great interest in addressing our concerns. We look forward to continued cooperative efforts on implementation planning.

In this letter, I am conveying more detail on three (3) DNR issues that warrant further comment prior to the DEIS2 release. The letter serves to memorialize the discussions Brian Winter and I have had over the last several weeks. These three (3) issues for comment are: access to the river and corridor, contingency for potential DNR acquisition of any project property, and the need for *a priori* agreements on property ownership interests. The remaining issues identified in the DNR comments to DEIS1 and the scoping for DEIS2 either already have been addressed or appear to be on track for further work during the finalization of the implementation EIS. The DNR reserves the right to comment further during the implementation EIS process.

**Issues that need to be addressed further in the DEIS2:**

1. Public Access Planning DNR Scoping Comment: "The DNR would like to participate in developing provisions for public access as part of the implementation DEIS. The implementation plan should provide for securing and developing boat ramp access sites from near the present head of Lake Mills downstream to the mouth. Foot trails to and along the river and beach corridor and other access options also need to be addressed in some detail."

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Equal Opportunity/Affirmative Action Employer

I have briefly discussed the feasibility of providing various types of boat launch facilities at general areas including the head of Lake Mills and the Glines Canyon area, as well as both the upstream and downstream ends of Lake Aldwell with NPS, Washington Department of Fish and Wildlife (WDFW), and Lower Elwha S'Klallam Tribal representatives. My initial discussions on the subject have indicated that significant work remains to be done in designing an access plan before specific decisions can be made.

It has become evident to me that not enough information is currently available to provide guidance for making decisions on the specific river corridor public access alternatives and facilities within the DEIS2. Access that is consistent with the overall project goals will substantially contribute to achievement of the potential benefits from the project. As a result of our preliminary findings, the DNR recommends that a comprehensive public access plan be developed during the EIS process and implementation.

We propose a process for developing a public access plan for the river corridor in a public forum during the implementation. We recommend the plan be developed by working down from general concepts defining a vision for access and uses; to a determination of the types of access and uses for general areas; to the selection of specific access sites and facilities. It is our expectation that the completed plan would define the preferred types of watercraft, pedestrian, and vehicle access by stream reach. We suggest a range of alternatives, from the more strictly preservation oriented to relatively intense use of the river corridor, be considered as a means to facilitate the decision process on specific access facilities' options.

DNR's Aquatic Resources Division is actively working to protect and develop various forms of public access to the aquatic lands of our state. We are satisfied with the cooperation we have had on this issue and with the progress made to this point. We would welcome the opportunity to continue to work with the project proponents, the other natural resource management agencies, and other interested parties on river corridor public access planning. The DNR can offer the potential for funding portions of the planning and implementation. For example, the Aquatic Lands Enhancement Account (ALEA) is an ongoing DNR program that funds many access projects throughout the state. Furthermore, we are open to considering options that involve access across DNR managed uplands. We are specifically asking that no actions be taken that foreclose DNR options for developing public access to the river corridor and for property acquisitions to secure such access until an access planning process is completed.



2. Consideration of DNR Trust Interest. DNR Scoping Comment: "The DNR's trustee obligations to protect public access to aquatic lands will need to be addressed in any plan for disposition or management of the lands acquired. The DNR may reconsider acquisition of some portions of the exposed lands if provisions for access and navigation are not otherwise made."

   The DNR interest is in securing the continuance of public access to aquatic lands; not in acquiring uplands. We remain committed to working with the project proponents to assure that state access interests are met consistent with the other aspects of the proposal. We anticipate an open dialog with the Lower Elwha S'Klallam Tribe on public access planning as it relates to disposition of the Lake Aldwell parcel of the project lands.

3. Proprietary Interest Agreements. DNR Scoping Comment (paraphrased): The DNR has proposed *a priori* agreements between the affected parties regarding anticipated impacts of the project on property ownerships interests.

   The DNR intent in providing the comment was to sustain our trust interest in the subject state-owned aquatic lands, sustain other parties' interests in affected lands, and prevent future disputes between interested parties. I view agreements between agencies as assurances that each party's interests will be addressed and maintained for anticipated potential outcomes of the project. We do not view agreements between agencies as a mitigation issue. We are not asking the proponents to bear the costs of preventing or correcting any potential impacts. Instead, we ask that the proponents work with us to reach agreement on management actions that will address future uncertainties; thereby avoiding ownership disputes.

   Let me further illustrate our concerns for two situations that the proposal poses:

   1. For the lands acquired and disposed of as part of the restoration project, prior agreements can prevent numerous potential disputes over proprietary interests as implementation proceeds. The rules governing aquatic and riparian lands ownership that have been established in case law may not serve the interests of the parties involved in the subject restoration proposal. When reservoirs are created, the aquatic and riparian lands ownership is fixed as it existed at inundation. The flooded uplands remain distinct from the historic aquatic lands (bedlands and shorelands). As has been well documented in the Elwha River Restoration Final Environmental Impact Statement, both reservoirs contain massive quantities of sediments. It is reasonable to project that, at any given time

after restoration, significant portions of the Elwha River channel within the two (2) formerly inundated areas will not be in the same location as the configuration that existed at inundation. Therefore, at any given future time and within both former reservoirs, the state will not own portions of the existing river bed, but will own the original river bed which may have the character of uplands. We are recommending up-front agreements to reset ownership for both the Lake Aldwell and Lake Mills project lands as a means of meeting all parties' best interests.

2. The river delta and nearshore zone is the other area where we recommend *a priori* agreements on ownership to significantly reduce the uncertainties and expenses associated with the normal processes for resolving conflicts. An up-front agreement can clarify and memorialize ownership, access, and resource use expectations of the interested parties relative to anticipated potential changes in the delta and nearshore areas. We feel it is imperative that the DNR and the proponents, particularly the Lower Elwha S'Klallam Tribe, have a clear understanding of each others' interests and expectations for the river delta and nearshore zone area before implementation begins.

   The river delta is the only area outside of the reservoirs where changes in the location and character of the channels and shorelines will be so profound as to make it difficult to anticipate potential ownership interest impacts. A contingency agreement between agencies for avulsive (ie. instantaneous or overnight) changes is one specific potential means for defining a mutually desired outcome. Otherwise, the parties' interests *may be adversely affected by aquatic land and upland ownership being* fixed at the time of avulsion. The project proponents may also choose to enter into contingency agreements as a nonstructural mitigation strategy for protecting riparian property owners interests. We encourage such agreements as our preferred means of providing protection without impairing river ecosystem process functions. The DNR has expressed concern that levees may constrain the restoration of the braided channel delta habitat, a key component to the system's productivity. Recent conversations with Brian Winter have provided me with a greater understanding of the flood control issues involved. Up-front agreements are a mechanism that may provide a creative alternative to traditional flood control measures. The historic approach to flood control has been demonstrated to provide only limited benefits while often seriously





degrading in-stream resources and habitats. I am asking that the proponents approach flood control with the conviction that restoration of the river ecosystem functions be maximized.

Again, I wish to thank the National Park Service (NPS) as lead agency for their cooperation and great interest in addressing our concerns. We look forward to continued cooperative efforts on implementation planning with the project proponents. If you have questions, please don't hesitate to call me at at (360) 902-1146.

Sincerely,

Bill Graeber, NR Scientist
Aquatic Resources Division
PO Box 47027
Olympia, WA 98504-7027

c: Craig E. Partridge, Manager
Brian Winter, NPS, Project Coordinator
Rich Hsu, DNR, Olympic Region, NR Asst. Manager

Reference Code: David Morris
ww/graeber/morris.ltr

OLYM-404-06-192

CLALLAM COUNTY
COMMISSIONERS' OFFICE

COURTHOUSE
223 EAST FOURTH STREET
PORT ANGELES, WA 98362-3098

(360) 417-2233
FAX: (360) 417-2493
Internet: Clallam@coopext.cahe.wsu.edu
JIM RUMPELTES, ADMINISTRATOR

BOARD OF COUNTY COMMISSIONERS

MARTHA IRELAND, DISTRICT I
DOROTHY DUNCAN, DISTRICT II
PHILLIP KITCHEL, DISTRICT III

June 26, 1996

Received
JUN 2 8 1996
DSC-RP

National Park Service
Attn: Sarah Bransom
Resource Management - RP
P.O. Box 25287
Denver, CO 80225-0287

Dear Sirs:

We have reviewed the Elwha River Ecosystem Restoration Implementation DEIS and have the following general comments:

The purpose of this document as described in the Elwha River Ecosystem and Fisheries Restoration Act is to achieve "full restoration of the Elwha River ecosystem and native anadromous fisheries". We find the DEIS in its present form does not achieve these desired goals, and further feel that any decision by the Secretary of the Interior based on the information contained in the DEIS would be substantively flawed.

Our technical staff has reviewed the document. Their comments are attached to this letter and form the basis of our concerns with the DEIS and any actions taken pursuant to it. Also enclosed is an audio tape of the Public Forum on this matter of June 25, 1996, which was sponsored by the Port Angeles City Council and the Board of Clallam County Commissioners. We believe this forum brought out many valuable comments and concerns of Clallam County citizens which should be considered.

The Board of Clallam County Commissioners appreciates the opportunity to comment on this action, and looks forward to continued involvement in the decision-making process regarding the Elwha River and its valuable resources.

Sincerely,

BOARD OF CLALLAM COUNTY COMMISSIONERS

Phillip Kitchel, Chair

Martha M. Ireland

Dorothy Duncan



*The Clallam County Department of Community Development's Habitat Specialist and other technical staff have reviewed the Elwha River Ecosystem Restoration Implementation DEIS. In light of the directives of the Elwha River Ecosystem and Fisheries Restoration Act we raise the following concerns;*

**Table 28 Page 195**

We do not understand how the sediment levels during those periods when dam removal stops in the first two years are essentially background levels. During the winter high flows both the former deltas (now alluvial fans) that the river flows through will extensively regrade, and the river will have more capacity to transport sediment. This table appears to contradict itself in that at the bottom it says that flood-induced erosion will result in elevated suspended sediments and concentration over the next four years following dam removal. The way we read the table, it appears that the effects of increased flow through the former reservoirs during the first two years of removal result in "background" levels of sediment, and increased flows after the dams are removed will cause an increase in the transport of sediment. The same cause (increased flow and sediment transport capacity) having different effects (less sediment transported and more sediment transported) does not make logical sense.

The shape of the channel is primarily a function of physics - the relationship between flows, sediment types and amounts, gradient, and valley confinement. Alteration of several of these parameters must result in channel changes. Does your sediment routing model take into account the change in sediment transport capacity of the channel as the channel form changes from a relatively incised channel to one with increased meander amplitude (less effective gradient) and an overall increased roughness of the channel due to an increase in the wetted perimeter (i.e. changes in the width/depth ratio) over time? We were unable to determine this from the main text or appendices.

The flushing of sediment to the Strait is also doubtful. First of all the sediment is not likely to be moved all at one time in one event. The amount of sediment moved will only be as great as the rivers ability to move the sediment. So sediment will be entrained by the river. Not all the sediment entrained will make it to the strait - lessening of the flow, changes in channel shape or roughness, or the effective gradient, will greatly effect the sediment transport capacity. Once a given flood event is, a portion of this material will remain in the channel, and due to its fine structure, will rapidly be colonized by riparian plant communities such as willows, cottonwoods, and red-osier dogwoods. This trapping of sediment within the active channel and on the floodway is a common occurrence on other streams (i.e. the Dungeness River, Morse Creek, Clallam River) which drain to the strait and are constricted at the mouth, such as the post-dam Elwha will be.

In our experience on these river types, flooding is usually accompanied by a "storm tide". These storm tides are the result of low air pressure, strong winds at the mouth of the Strait (from the SW) and contributions of flow to the Strait from the rivers of Puget Sound and the Strait of Georgia. The nearest tidal gauge is at the Coast Guard Port Angeles Station, and may be useful in your modeling. The effect of the storm tide is to greatly alter the energy dynamics of the lower rivers, especially when the river is confined by artificial flood protection structures. Given the relatively shallow gradient of the lower Elwha, we would expect these tides to greatly lower the energy for sediment transport for more than a mile upstream of the present "sea level". If the other rivers mentioned above are an indication, much of the sand sized fraction will be retained between the levee and the bluff, and will be rapidly bound up by the existing riparian community. Again, the Dungeness River, even though it is much more confined than the Elwha, and the amount of sediment released into the Elwha will be much more massive, shows what can happen to the lower reaches of a river which is confined and has an increased sediment load. The raising of the floodplain within the levees has resulted in a raised water table, which effects many land uses over a broad area - residential development, agriculture, infrastructure development, etc. Essentially, river deltas build up and extend seaward over time. The levees stop the rise in elevation for that area which is protected by the levee, but accelerate the rising in the area confined by the levee - the area adjacent to the river and at the delta.

In sum, did the sediment routing models incorporate the trapping of sediment by vegetation, colonization of sand and gravel bars by riparian vegetation, or the change in energy dynamics which result from changes in channel configuration or the storm tides?

**Page 203 third paragraph-**

As the lobe of the delta extends into the Strait, one would expect the dynamics of the littoral movement to the west of the river mouth to change dramatically. This will probably result in the accumulation of finer material on this beach, and extension of the beach waterward. This would be a project benefit as it would lessen flood hazard (from storm tides, winds and tsunamis) to the residents along the lower end of Place Road.

The paragraph ends with the statement "Sands and gravels would deposit on the main bars and overbank areas, and fine-grained sediment would deposit in the quieter backwater areas creating wetlands." We do not think this statement withstands scrutiny. The Clallam County Soil Survey shows the entire lower floodplain as "Typic Xerofluvents" or dry soil recently deposited by riverine processes. These soils will have a xeric moisture regime within the leveed areas and a ponded moisture regime outside the levee. The reason we say this is that the accumulation of sediment in the lower river will raise the water table, the water table will "fall away" from the river between the levee and the bluff, another way of saying this is that the river, instead of being the low point in the water table as it is now and was in pre dam times, will be the high point of the local water table. The area between the river and the levee will actually be the driest area in the lower river, due to the depth to water table and the relative coarseness of the sand material of which the soil is presently and will continue to be composed. This will be a xeric soil, and the formation of wetlands between the river and the levee will not occur. This has profound implications for ecological restoration, especially as it relates to rearing areas for salmonids such as coho, chinook, and habitat for searun cutthroat. The levee and the sediment input combined should effectively prevent rearing habitat and side channels (with water in them for significant periods of time) from forming, other than in the relatively small area of the new river delta. The goal of fully restoring the ecosystem and the anadromous fisheries may be incompatible with structural flood protection measures in the lower river due to lack of rearing areas for salmonids to complete their life history. Have all the life history requirements for the various species of salmon met by the proposed restoration implementation?

**Next Paragraph**

When you say long term, you should define what you mean. In the lower river, a statement that the rise in the 100 year flood stage will be up to 4 feet in some locations is only supportable when long term is defined. Over the long term, once the natural sediment supply and the accelerated sediment supply from the dam are added to the lower river, flood height will keep increasing over time. Over time, the Lower Elwha Reservation will have an increased flood hazard, due to sediment accumulation in the confined floodplain and delta, absent removal of sediment from the diked reach. Is this removal of sediment, or the increase in flood hazard over time, compatible with the goals of the act to fully restore the ecosystem?

**Page 201, second Paragraph**

Lateral migration of the channel will occur, and it should be possible to predict generally the locations where this movement will be most severe. In our experience with western rivers such as the Elwha which alternate from a confined bedrock channel to an alluvial channel, the greatest effect from addition of sediment to the system is at the upstream end of the alluvial channels. These upstream ends of the alluvial channels behave similar to an alluvial fan in that they are a transition area between the high sediment transport capacity bedrock channels, and the low sediment transport capacity of the alluvial channels. Based on that, the areas most in danger from repeated channel changes will be Altaire Campground, the upper end of Sweets Bottom, the vicinity of the 101 bridge, the area of the Dry Creek wells, and the present water diversion/spawning channel etc., and the upper end of the present levee. At



a minimum, the document should discuss either extending the levee to "tie in" to the cliffs, or removing the levee, or the advisability of the levee itself over the long term.

On the same page at Table 33, the Flood elevations at the 101 bridge are of concern. Later in the document it states that the bridge will not show an increase in flood hazard due to increased flood stage. Did you model the bridge as a constriction at these high flows which will result in an accumulation of sediments (even under a natural sediment regime) upstream of the bridge? Again, there are numerous examples of bridges on the peninsula which have plenty of capacity for the 100 year flood, but act as a constriction to sediment transport or truncation of the natural meanders. In the mitigation section you mention debris deflectors will be added to the bridge, which may reduce some of the conflict with river meandering. Is this facility (the 101 bridge) properly designed for the new sediment and river dynamic regimes which will result from dam removal? Can you model sediment accumulation in this reach, or has your model already taken the constriction into account?

**Page 211 - Lower Elwha Levee and Locally constructed levee**

The Lower Elwha Levee was originally constructed to provide protection to the reservation and adjacent lands. The levee itself was designed with the assumption that the river would continue to be starved for sediment, and the meander length would lengthen over time. The EIS should examine this facility in the new light of a increasing sediment load, increasing meander, and in the context of fully restoring the ecosystem (i.e. not just above the dams) of the Elwha River.

If the locally constructed levee will be adversely effected by the dam removal, this will increase flood hazard to those residences. An increase in flood damage will likely result in an increase in flood insurance rates across the County since those rates are set on a County-wide basis. This would be an adverse effect of dam removal. The document should discuss ways of reducing flood hazard, preferably in ways which are compatible with existing land uses and the goals of the project. For this levee, is raising the levee and armoring with riprap compatible with the goals of the project?

**Page 216- Impacts of the Dredge and Slurry Alternative**

The conclusions reached in this paragraph are insupportable. If you look at the materials that deposited on the floodplain prior to dam construction, finer grained materials have deposited in the floodplain. A flood plain which accumulates sediments will lessen the capacity of the overall channel and floodplain cross-section, and result in increased flood hazard. Modeling of the channel elevations themselves without relating those elevations to the elevations within the floodplain and the resultant changes in channel form and energy cannot alone be cited as the basis for the conclusion that there is no difference in flood hazard between the two alternatives.

There should be significant differences in the flood hazard and channel form (hence fish habitat) effects of the River Erosion vs. the Dredge and Slurry alternative. The finer materials collected in the lower delta and floodplain prior to construction of the dams, and will do so again after the dams are removed. Greatly lessening the quantity of material transported by the river will greatly lessen changes in channel configuration over time, and somewhat mitigate the increased flood hazard over the long term that aggradation of the channel and floodplain within the levee presents.

The theoretical relationships between sediment, flow, and gradient would lead one to believe that the channel will undergo massive reshaping over a period of several decades to adjust to the increased sediment load from dam removal, and then regrade again after this material has moved through the system, adjusting to the "natural" sediment regime. Lessening this period of time between the regrading of the channel from it's present configuration to the channel with a configuration of the channel under a "natural" sediment regime (it will not be a natural channel due to the levees near the mouth) has a tremendous bearing on flood hazard and the length of time to restore the ecosystem itself.

**Page 221 Water Quality Impacts**

The Rayonier Mill needs extremely high quality water for it's photographic paper manufacturing. The needs of the Mill may significantly exceed water quality standards, what levels of degradation of water quality will effect the Mills' process?

**Page 225, top of page-**

There will be some effect from pumping flocculated sediment back into the stream, especially at lower flow levels. The flocculated sediments will behave as though they are heavier that the natural sediment, which is after all the point in flocculation. Water withdrawal has to lessen the sediment transport capacity downstream of the withdrawal. Adding heavier sediment into a channel with less energy will result in less overall sediment transport out of the system, and more accumulation.

**Page 226 Bosco Creek and the Hatchery -**
Increased surface elevations could also result in the elimination of Bosco Creek itself. This new outfall will also result in lessened sediment transport downstream, but may be offset by an increase in water quality in the river itself due to lessened concentrations of nutrients, biocides, and relatively low dissolved oxygen concentrations that hatchery wastewaters typically contain.

**Page 235 Increased Water Table level -**

We believe the document understates the effect of a raised water table. It is our understanding that there will soon be an additional 41 houses for tribal members in the area which will be effected by the raised water table. Perhaps a better way of stating the effect of the raised water table is to forecast how much of the Reservation and lower delta areas will become unsuitable for septic system installation over time. The effect of dam removal could (over the long term must) reduce the overall land area suitable for development in the lower Elwha valley. Given the relatively small area the Tribe presently has to expand, this project could negatively effect the Tribe in the not-too-distant future. The location of the reservation in relationship to the river is similar to the townsite of Dungeness on the Dungeness River. While the town of Dungeness is relatively well protected from flood damage by the levees on that river, the water table is at or near the surface for a significant time of the year, with the peak water table height (in those areas beyond the tidal influence) occurring during the maximum sustained discharge of the Dungeness River - in early late May thru mid-June. This same phenomenon could occur to the reservation, especially under the River Erosion Alternative. We would suggest that the EIS consider removal of the levees and moving the Lower Elwha Reservation away from the river mouth as a way of meeting the goal of full restoration of the Elwha River Ecosystem, and lessening the impact of dam removal on future land uses in the lower valley.

Beyond that, elevated water tables can be expected to have other consequences besides having an effect on septic system performance. Roads, building foundations, agricultural uses and other activities and facilities will be effected by the water table rise. These effects and how to mitigate them should be included in the EIS.

**Page 258 Mitigation and Restoration Actions - Anadromous Fisheries**

In general, we find the actions described in this section to be limited in scope, much as the sediment management section above was limited in addressing impacts in the lower river, and restoration activities are limited to sites upstream of the dams. The objective of this project is to "fully restore the ecosystem". At some point, "full restoration" needs to be discussed. The way we read the Act, the project will create a river system with a management paradigm different than any other river of it's size in the world - a management paradigm based not on sustainable harvest, or management of one species or another, but management toward "a fully restored ecosystem". This is, as far as we know, a new field of human endeavor, and the EIS would benefit from a discussion of what is really possible in a physical, biological and sociological sense, for river restoration. The Act itself specifies activities which conflict with the restoration goal, it only allows restoration activities which maintain the existing quality and quantity of water for municipal and industrial uses. Diversion of this water will have an ongoing negative effect on the ecosystem from a low flow/instream habitat perspective, and from ongoing maintenance of



diversion facilities. Beyond that, the Act leaves the options for restoration open as long as they are consistent with the Act itself.

This raises some interesting questions which should underlie the restoration activities and guide management of the river and its fisheries in perpetuity. These questions have not been discussed in the EIS. Primary among these questions is "How do we manage the fishery resource to fully restore the ecosystem?" or in harvest management terms, "Will fisheries management under the present management paradigm of managing populations of fish for sustainable harvest fully restore the ecosystem?" or "How many fish need to recruit to the ecosystem before it is fully restored?". Typically, harvest management is geared to prevent "overspawning" or "overseeding of rearing habitat". The Act requires full restoration of the ecosystem, and the nutrients and energy recruited to the ecosystem by overspawning or over seeding may support crucial ecosystem functions, as well as a more stable ecosystem able to withstand stochastic events such as fire, El nino, global warming and floods. This EIS must discuss the fundamentals of restoring the ecosystem, not merely restoring runs of fish to the upper watershed.

On the ecosystem level, there are a number of processes that did not stop with the construction of the dams and will not restart with the removal of the dams. For instance, in the upper reaches of the river, you could assume that the fish populations are at or near carrying capacity. Granted this carrying capacity has been reduced due to the loss of anadromy of some species, and elimination of other species such as chinook and coho. In the initial stages of the outplanting, simply adding additional biomass in the form of fry to a stream at carrying capacity will not ensure increased productivity. In order to have a chance of good survival of the planted fry (even discounting predation of the existing fish crop on the introduced fry) is to either remove (partially) the existing fish populations, or increase the carrying capacity of the environment. Removal of the existing fish populations would be difficult, increasing the carrying capacity could be accomplished by the addition of nutrients and energy to the system. We would suggest that the addition of salmon carcasses in the upper watershed several years prior to outplanting, this would allow the stream ecosystem to begin to adjust to the new nutrient and energy regime which the return of anadromy should bring. This is the crucial difference between the example on the Skykomish which is cited in the EIS - opening an area to colonization by anadromous fish is very different than adding fry to a stream. In the Skykomish example, the fish carcasses which accompany the colonizing fish are raising the carrying capacity of the stream, in your case, you do not propose any measures to raise the carrying capacity. If it could be established that productivity was nutrient limited in the streams, you could probably simply add fertilizers to boost productivity. The point being, you cannot assume that the addition of fry will increase productivity, or that the present-day disturbances such as the levees and their effects, the water withdrawals and their effects, or other factors such as population levels of pescivorous fish will not limit the population levels of the anadromous fish species well into the future.

Another difference between the Skykomish example and the proposed project is simply the scope of changes in habitat conditions which will occur under dam removal. On the Skykomish, allowing additional area to be colonized by anadromous fish directly addressed a limiting factor for a portion of the life history needs of the salmon in the river - it actually increased the available spawning and rearing habitat to those fish. All the other life history needs - migration, incubation flow, channel stability, estuarine rearing/ feeding, protection from predators - of those fish were maintained at their previous levels. This allowed the fish to take advantage of the newly available habitat, and probably had a competitive advantage for early rearing in that environment, allowing the population to expand.

One tremendous difference between the Skykomish and the Elwha is the vast (3000 acre plus) Snohomish River estuary. Even though this habitat has been severely degraded over time, it is still underutilized by juvenile salmonids, and thus has excess capacity to produce large smolts which emerge upriver. The Elwha estuary has been essentially eliminated. If the dams are removed, the morphology of the delta will change, these changes will roughly parallel the channel changes in the river. An initial sediment pulse and regrading followed by a return to a "natural" sediment regime and resultant regrading of the channel and estuary. Ecological succession of the plant and animal communities will "trail" these morphological changes, and will also be effected by changed nutrient and water opacity over time. Indeed, it would not surprise us to discover that the productivity of the estuary actually increased for a

short time following dam construction, due to increases in clarity of the water ( and hence primary productivity) and decreases in disturbance associated with deposition of sediment and the natural process of delta extension. Estuarine survival of those fish which still entered the estuary from upriver may have temporarily mitigated population declines of some fish species following dam construction.

In any event, it is clear that elimination of certain fish species did not immediately coincide with the installation of the dams. Examination of the theoretical relationship between populations and habitat conditions for pink and chum salmon during the period before dam construction, while the dams have been in place, and potentially after they are removed would be instructive. Before dam construction, the life history needs for spawning and estuarine rearing were fully met by the ecosystem. After dam construction, habitat quality for spawning (loss of correct substrate size) and rearing (erosion of the delta/estuary) gradually declined. After several decades, this habitat finally became so poor that these fish were extirpated from the system. After dam removal, habitat should gradually improve over time. Forecasting the rate of population expansion is difficult from this perspective. If the rate at which spawning gravels recruit to the lower river and the rate at which the channel stabilizes to allow spawning of these species is slower than the rate at which these species are able to expand, the population of these species will be habitat limited. If the rates at which morphological change and consequent ecological succession of the plant and animal communities (we are assuming that bare sediment has low habitat value for rearing salmonids due to low primary productivity and predation) is less than the populations ability to expand given the spawning habitat conditions upriver, these populations will be limited by rearing habitat.

The point being that population projections which are based on models of population expansion such as the Skykomish example, where a single variable was manipulated, are not appropriate for this project. The forecasting of population levels based on model of a species supposed population dynamics, such as the spawner-recruit curve, and not on broader ecologic principles and processes seems to directly contradict the objective in the Act of restoring the ecosystem. In the estuarine example above, the rates of succession and the productivity of those estuarine communities would need to be known prior to forecasting the ecosystems ability to produce pink or chums. This is important since it should determine the timing and amount of salmon release, and hopefully prevent wasting of limited funds and hatchery space. Can the projected population levels of the various fish species in the FEIS be based on the rates of ecosystem recovery rather than (or in addition to) the potential population dynamics of the individual fish species? This would seem to us to more closely align with the goals of the Act.

As discussed above, the objective of the Act is to restore the ecosystem, not simply to remove the dams and plant fish in the upper reaches. Some of the species you will introduce, such as the pink and chum salmon, will be dependent on the habitat in the lower river. As mentioned above, the dam removal will result in stream instability for several decades at least, as the channels in the former reservoir develop, and the sediment pulse from the input of coarse sediment travels downstream. Just as fish continued to return to the Elwha for several decades after dam construction, even though the dams altered the habitat dynamics, it took several decades for the habitat to degrade to the point it could no longer support those fish. Removal of the dams will not restore the habitat, but it may allow the habitat to begin restoring itself. While it is true that the watershed upstream of Lake Mills provides excellent spawning and rearing habitat, neither the watershed, nor the river are pristine. This EIS needs to discuss management and restoration of the river outside the boundaries of the park.

Full restoration implies ongoing monitoring and management, and according to the restoration literature we have read, the eventual goal is a self-regulating system which doesn't need outside inputs to function. Another question that needs to be answered in the EIS is the policy for stocking fish outside the park, since that stocking will definitely effect the ecosystem. Will the Elwha Hatchery continue to exist over the long term, and will the stocking of fish continue, and will certain runs of fish be managed as hatchery stocks, and will any of these actions conflict with full restoration of the Elwha River ecosystem?

**Page 261 second paragraph -**



Since the goals of the project as defined in the Act are to fully restore the ecosystem and native anadromous fisheries, it seems important to manage the harvest portion of the equation. In this document it seems as though the tribal fishers of the Lower Elwha Tribe will be the group most impacted by potential harvest closures. This makes sense from the standpoint that they are for the most part a terminal fishery, and have the greatest ability to modify harvest which will directly benefit the Elwha Stocks. The problem with that is the tribe will be put in the position of having to choose between the overall time required for recovery of fish populations and generation of income. The marginal value of fish which return to the river (in terms of recovering the ecosystem and fish populations) will be extremely high when contrasted with the value of those fish as a marketable commodity. Does the Lower Elwha tribe understand the risk they are being subjected to by this project? The EIS should discuss the possibility of lessening commercial/sport fishing pressure in the ocean. Can the ecosystem of the Elwha (which includes salmon native to the Elwha drainage while they are in the ocean) be fully restored given the rate of ocean commercial/sport harvest?

**Page 260 Table 47 -**

Under sockeye restoration, no outplanting will take place, and the hope is that the native kokanee will eventually re-establish the run. Again, this lake is a portion of the Elwha River ecosystem and should be addressed in the document. Will WDFW discontinue stocking the lake to encourage the sockeye population? Will fishing regulations change? Does taking no active role with the kokanee or the lake meet the requirements for a plan that fully restores the ecosystem?

**Page 365 - Unavoidable adverse impacts -**

Raising of the water table on the Reservation in and of itself is an unavoidable adverse impact, and should be mentioned here.

**Page 366 - Short term Uses vs. Long Term Productivity**

See tribal harvest discussion above.
Comparison of this project with Mt. St. Helens and the Toutle River is only warranted in general terms. The difference between the behavior of organic debris and volcanic ash or andesitic derived sediments delivered across a broad area in the case of the Toutle, and glacio lacustrine clays, and granitic, basaltic and metamorphic coarse fractions with organic debris deposited directly into the river channel in specific locations in the Elwha is tremendous. Perhaps a better analogy is the rockfall in the canyon of the Frazer River (which in total is much less than the sediment described here) which acts as a partial blockage to the Sockeye migration, putting the upper Frazer stocks at risk. The point being the Toutle and Elwha are totally different systems under totally different disturbance regimes, and quick recovery in one does not even logically mean the other will recover quickly. If the mention of the Toutle is retained in this report, such a disclaimer should be inserted, or the Frazer River example also inserted.

The statement that "in the long term, the Elwha River native anadromous fisheries would be restored to pre-dam conditions" is insupportable and should be removed from the EIS. Numerous activities have taken place since the dams were erected - water diversions, levee construction, increases in efficiency in ocean harvest, development of Lake Sutherland, even global warming, preclude restoration to pre-dam conditions. Since this report does not address those problems, the document cannot contain a statement which cannot logically be achieved. You may be able to say that upstream of Lake Mills anadromous fisheries would be restored to pre-dam conditions, but only if all the other life history requirements of the fish which spend the fresh-water portion of their life history above Lake Mills are met without hatchery supplementation. As the document states, destruction of the species freshwater habitat is primarily responsible for the declines of specific runs, this project defined in this document does not restore all that freshwater habitat. The document also states that harvest has an effect on fish escapement to the river, the document cannot claim restoration to pre-dam population levels unless those pre-dam harvest levels are re-instituted. But once again, will the harvest management regime even allow fish in pre-dam levels to occupy the upper reaches of the river, and secondly but more importantly, will fish be allocated to the ecosystem itself in numbers sufficient to meet the goal of fully restoring the ecosystem?

**Page 423 Enhance Late Run, lower river stock, Option 2 -**

We get the impression that the tribal releases of winter steelhead will continue, is this consistent with full restoration of the ecosystem? These fish may prey on chum and pink fry when they are introduced.

**Page 451 - Flooding Impacts -**

We disagree with the BOR analysis that removal of the dams will not alter the existing hydrology downstream because of the dams' "run of the river" mode of operation and small storage availability. As the channel and floodplain aggrade, the water table will rise, and the river become "perched". When this occurs, a relatively larger proportion of the rivers' flow will be "lost" to groundwater. Even though the reservation and adjacent lands are protected by the levee, and not within the rivers floodplain, this rising water table, especially during long duration high flow events, will increase flood damage to the reservation.

**Page 453, HEC-6 model -**

Does this model account for changes in channel shape (and hence changes in gradient, roughness and conveyance capacity) over time, due to inputs of sediment.

**Page 462, Paragraph C -**

This entire paragraph seems in conflict with the goal of a fully restored ecosystem. If channels are armored to protect critical areas (we assume such areas are everything listed in appendix 4) the channel and floodplain cross sections will be effectively much narrower than in the pre-dam condition, and with a greater amount of stream energy, this will either result in coarser substrate in the river adjacent to these armored sections, or a decrease in channel stability. Either of these conditions will limit the recovery of the anadromous fisheries (primarily impacting chum and pink salmon) to population levels below those which existed prior to dam construction.

*In conclusion, we thank you for the opportunity to comment and recommend that the Final EIS be amended to address the issues raised above.*

Sincerely

Bob Martin, Director
Clallam County Department
of Community Development

Joel Freudenthal, Habitat Specialist
Clallam County Department
of Community Development

*Post Script - We attended the Public Forum on June 25,1996, and several comments made by Dr. Brian Winters in describing the proposed action bear commenting on to ensure that the Park Service understands the intent of the above comments.*

Two words which were mentioned by Dr. Winters last night were not used in the DEIS, and they should be. These two words are "harvestable surplus". We got the impression that "harvestable surplus" entered into the restoration planning, if this is not true, the Park Service should state so in the FEIS. Since the Park Service felt free to use analogies in the DEIS - we ask permission to use one of our own. In simple terms, the concept of harvestable surplus is the core of the restoration plan. The decision-maker for this action may be in a similar situation to a forest manager determining how a landscape will be managed. There are many recent lessons in contemporary forestry which can be applied to fisheries harvest management and the maintenance of self-regulating (fully restored) ecosystems.

For example, a traditional forest management approach would examine a forest within a given watershed. The manager would determine the growth rate of the various tree species, and determines the "harvestable surplus" or that schedule of timber harvest which maximizes the amount of wood fiber or structural lumber based solely on the potential population dynamics of the given tree species. This is a standard practice across much of the western US, and in fact was pioneered by the Forest Service as an example of good conservation practice. It is also substantially analogous to the way harvest management for fish populations has been designed - to maximize the harvestable surplus. The forest manager then makes the statement that even though the landscape is actively managed, the forest is considers his tree farm a fully functional ecosystem, and that after timber harvest, if he just plants seedlings, the ecosystem is fully restored. And indeed for serveral generations of trees, and the proportion of the watershed which is actively managed remains small, it does function as an ecosystem. Once again, we get the impression that the management strategy the NPS is proposing for the Elwha River restoration is substantially in the same vein. It is the standard operating procedure for determining "harvestable surplus", and suffers from the same flaws which plague "traditional" forest management.

Of course, soon the wildlife biologist, the fisheries biologist, the botanist or mycologist, or even the silviculturalist, tell the forest manager that the tradional view of the ecosystem was incomplete. They say that the trees he thought of as harvestable surplus, and the processes which were interrupted by timber harvest and suppression of fires diseases and pests, were crucial to ecosystem function. The evidence of ecosystem breakdown is obvious to these other specialists but not to the traditional forest manager. The wildlife (the spotted owl and marbled murrelet) was dependent on that surplus which no longer exists. The fish were directly dependent on the riparian timber and the complexity of the undisturbed forest protected them from flooding and sedimentation. Most disturbing to the forester was that the continued existence of the trees themselves was in danger due to his own actions. The silviculturalist told him the trees were themselves dependent upon trees and the "legacy" of woody debris left behind by previous trees.

The ultimate result of management according to "harvestable surplus" was, eventually, the disruption of that economy which was dependent on the resource, not to mention a whole lot of buresaucratic wheel spinning that further aggravated the already stalled economy, and also a landscape across vast areas of the west which is no longer as productive as it once was. The most disturbing part of this analogy is that it is all true, and stands as a testament to the fallacy of managing for a "harvestable surplus" base solely on the potential population dynamics of an individual species or group of species. That is why we feel so strongly about how the fish populations are managed. Will you manage all the resources of the ecosystem with the knowledge that those resources are interdependent? Like the trees, the fish populations are dependent upon both the genetic material and the nutrients and energy of the previous generation to survive. Salmon are a geomorphic force in and of themselves, and modify their own environment to enhance their progeny's survival and the stability and function of the ecology of the stream and watershed in which they spawn.

Nothing in any state law or treaty or court decision binds the NPS or the State Department of Fish and Wildlife to manage fish populations for maximum harvest at the expense of ecosystem or long-term population stability for the resource (the ecosystem) itself. The tribes have the right to fish "in common" with the citizens of the state. The state and tribe as co-managers of the resource (and the NPS on NPS lands) have the latitude to determine whether the traditional methods of harvest management are applicable to these fish populations which the Act requires be managed to fully restore the ecosystem. Sooner or later, the ecosystem's health and dependence upon the nutrients, energy, and

geomorphic functions the salmon provide must be weighed against the concept of "harvestable surplus". The DEIS's main failing is the lack of examination of this conflict.

Again, thank you for the opportunity to comment.



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

JUN 2 . 1996

Reply To
Attn Of: ECO-088

Sarah Bransom
National Park Service, DSC-RP
P.O. Box 25287
Denver, CO 80225-0287

Dear Ms. Bransom:

In accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, we have reviewed the **Elwha River Ecosystem Restoration Implementation,** Draft Environmental Impact Statement (draft EIS). The draft EIS analyzes three alternatives to meeting the need to return the Elwha River to its natural, self-regulating state. The action alternatives would remove the Elwha and Glines Canyon dams which presently block fish passage up the Elwha River located on the north tip of the Olympic Peninsula in Washington.

The Environmental Protection Agency strongly supports the removal of both dams. Historically, 10 anadromous fish runs were present in the Elwha. These fish sustained more than 22 different species of wildlife that fed on them including the threatened bald eagle, marbled murrelet and Stellar sea lion. The recovery of this potentially pristine ecosystem is very valuable in our eyes. This is an important opportunity that cannot be ignored for its potential benefits to fish, wildlife, and those people who live, work, study, and recreate along the river.

For the Lower Elwha S'Klallam Indian Tribe this project offers the potential for a tremendous increase in the amount of salmon for tribal consumption. The United States has a unique relationship with Native American tribal governments which requires that activities that will affect tribes should be implemented in a knowledgeable, sensitive manner respectful of tribal sovereignty. Tribal government rights and concerns must be considered during the development of such activities. This project would have a very favorable impact on tribal interests.

It is extremely rare that we, as a nation, have the opportunity to put something back that we have taken from the land. Since the Elwha River flows from the Olympic National Park, which is virtually untouched by development, the amount of money spent on this project will go a long way toward improving the functions and values of the aquatic system associated with the river. In contrast, we've spent billions of dollars attempting to restore the Columbia

River aquatic ecosystem and although we consistently make progress toward this end, we see results in much smaller increments than we would see in the Elwha.

Based on our review, we have rated the draft EIS LO (Lack of Objections). This rating and a summary of our comments will be published in the *Federal Register*. An explanation of our ratings system is attached.

*If you have any questions, or would like to follow up on any information in this letter,* please contact John Bregar in our Environmental Review Section at (206) 553-1984.

Sincerely,

for Richard G. Parkin, Manager
Geographic Implementation Unit



D44.404-06-241

Received
JUN 2 0 1996


# CITY OF PORT ANGELES

321 E. FIFTH • P.O. BOX 1150
PHONE (360) 457-0411
PORT ANGELES, WASHINGTON 98362-3206
FAX (360) 452-0353

June 25, 1996

Ms. Sarah Bransom
*National Park Service*
Denver Service Center, Resource Planning
P.O. Box 25287
Denver, CO 80225-0287

RE: Elwha River Ecosystem Restoration Implementation, Draft Environmental Impact Statement, April 1996

Dear Ms. Bransom:

The following will serve as written comments on the above titled DEIS from the City of Port Angeles. Our comments are directed specifically at the materials contained in the DEIS, but we understand from Mr. Robert Hamilton that detailed technical reports are forthcoming in the next 1-3 months on such issues as water quality and sedimentation. We request that we be provided time to review and comments on those documents prior to their official publication and use.

Based upon our review of the DEIS, we are requesting that the water treatment facility proposed for the domestic water supply be changed from a temporary to a permanent facility. This request is based on the greater expected frequency of higher NTU levels that must be dealt with at the Ranney collector, increased public access and use within the Elwha Watershed, and the expectation of lower pH levels in the river. Also, the cost of a permanent facility should not be that much more than a temporary facility. Specific comments on pages will be made first with our general comments following.

| Page | Comments |
|---|---|
| 7 | No details are provided as to when and how the decision is made to install treatment for iron and *manganese.* |
| 7, 11 | It is mentioned that Dry Creek Water Association could either connect to the City of Port Angeles system or to a separate system. How will this decision be made? What will the time line be? |
| 10 | The statement is made that "Changes in pH and dissolved oxygen would have negligible or minor impacts to water quality." A drop in pH may be beneficial for the river biota, but for the City of Port Angeles water supply there would be a minor adverse impact. A lower pH results in leaching in the distribution system causing an impact on the lead and copper compliance. *[page 86 states pH now 6.7-10.0 would go to 5-9 (river erosion) or 6-9.5 (dredge & slurry)* |
| 19 | We must assume that measures will be taken to ensure that, during the removal of the asbestos, PCB and chemicals, will not be discharged into the water. |
| 50 | Nothing is indicated on this page that the City Ranney Well be flood proofed. In Table 34 on page 215 there is an indication that the well will be protected. |
| 63 | Under Water Quality Protection it is noted that the proposed alternative would result in periods of very high suspended sediment levels. We assume that this is true both in the short-term during dam removal and long-term after both dams are gone. As we have stated previously, the Ranney System does experience periods of high turbidity (>1 NTU) on occasion when the river is at flood |

stage. This requires us to shut off the well to maintain water quality within acceptable national standards.

Without the dams the likelihood of fines passing down the river to the Ranney collector is higher and the elevation of the river bottom by the Ranney collector is expected to rise. This equates to a greater expected frequency of higher NTU levels that we must deal with at the Ranney collector.

The proposal to construct a temporary iron/manganese treatment facility, should be changed to a permanent treatment facility to deal with the water quality issues directly on a permanent basis. There would be very little cost difference to change the 10 mgd temporary water treatment facility to a permanent one.

64 Table 7: Again, the temporary treatment facility should be changed to a permanent facility.

66 Permitting: If direct discharge of filtration backwash is proposed, a Department of Ecology NPDES discharge permit would be required. This should also be added to Appendix.

68 Our consultant cannot assist us in commenting on the costs contained on Table 9 until more detailed information is available from the technical reports that are currently being prepared by the Bureau of Reclamation. One area of concern is the costs related to the disposal of backwash from the filters. Both the short-term and long-term proposals for disposal and the cost should be reviewed after the technical reports are available.

71 A comment is made that there is a possibility of a filtering system for the Port Angeles Ranney collector. How is this decision made? When? Please note our comment related to page 63 here as well.

87 In Table 12: Under City of Port Angeles, No Action, the water is not currently filtered.

114 The first sentence under Groundwater indicates that the industrial water is supplied by this source. This is not true. The industrial water is from a surface source. Yes, the domestic supply provides water to commercial and some light industrial, but we have always referred to the industrial supply for the mills as the industrial source from surface water.

118 "There is little indication that river water quality affects the Ranney collector water supply." The Ranney does experience higher turbidity during high river flows. During high flows, water moves in the less compacted gravels near the surface to and then down the Ranney caisson. During these periods, we shut the system down.

119, 231 While mean turbidity levels are interesting to note (0.08 NTU), they have less significance from a regulatory standpoint, which are governed by the maximum NTU levels. The State allows a maximum of 5 NTU. At a level of 1 NTU the City shuts off its Elwha supply because of stricter State reporting requirements and in order to better protect is water quality delivered to its customers. Of more importance is the number of days where 1 NTU is exceeded. It is likely that the number of days where turbidity of 1 NTU will be exceeded will increase after dam removal and this is a major reason for requesting the permanent treatment facility.

153 The correct storage available in the City of Port Angeles Water System is 17 million gallons in five reservoirs.

175 Property shown in the inset on the right side of Figure 16 shown as owned by the City of Port Angeles is not owned by the City of Port Angeles

196 What is the ability of the sediment monitoring system to stop the removal if water quality becomes





a problem? How long will it take to alter the process and improve water quality?

225 The statement is made that the settled solids will be pumped back into the river for discharge. Has this method been approved by DOE? If it is allowed in the short term, will it be permitted in the long term for the future operator beyond the dam removal?

225 Who will operate the water treatment facility during dam removal? After dam removal? How will it be paid for?

227 "Surface water users would, for the most part, not be affected in either the short or long term by dam removal, as mitigation to protect them against adverse impacts of dam removal is required." This is an awkwardly written sentence which requires very careful reading. A specific reference to the fact that the mills and others are impacted and will be mitigated would be better.

230 Groundwater. The issue of slightly higher pH is not discussed in this section as it relates to corrosion control requirements for the water supplies.

231 Note that iron and manganese are secondary standards that are advisory.

233 1st paragraph. It seems likely that not only will there be additional fines in the water during dam removal, but also after dam removal since the river will now carry the fines that have settled behind the dams in the past. This is one key reason for requesting the change from temporary treatment to permanent treatment.

234 Table 43. Under City of Port Angeles add "possible increase in number of days turbidity in water from Ranney collector greater than 1 NTU." Under proposed mitigation add "water treatment filtration facility."

236 Revise temporary water treatment system for iron and manganese impact to permanent water filtration system for water quality impacts.

Very truly yours,

Jack N. Pittis,
Director of Public Works

JNP:jnp
Attachments: None
Copies: City Council and City Manager
Dean Reed, Daishowa
Bill Jensen, Rayonier
Disk: C:\DATA\WP60DATA\DAMS\DEISCOMM.WPD
File: Elwha Dam Removal

OL94404-06-259

Received
JUL 02 1996
DSC-PP

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(206) 407-6000 • TDD Only (Hearing Impaired) (206) 407-6006

June 26, 1996

Ms. Sarah Bransom
National Park Service
Denver Service Center
Resource Management - RP
PO Box 25287
Denver CO 80225-0287

Dear Ms. Bransom:

Thank you for the opportunity to comment on the draft environmental impact statement (DEIS) for the removal of the Elwha and Glines Canyon dams, located near Port Angeles in Clallam County. After reviewing the document, Ecology Program staff have the following comments.

Water Quality

Many elements of the proposed project will require issuance of a water quality modification from Department of Ecology. Application should be made as the final design is developed and the timing of the water quality exceedances is better known.

The flocculent used in the settling basins should be discharged to the river only during high flows and high turbidity.

Shorelands

The proposal is not yet of sufficient detail to warrant comment regarding the Shoreline Management Act. Many of the proposed actions will require a local shoreline permit or determination of federal consistency at a later date.

Water Resources

Wells which will be inundated or otherwise made unusable as a result of this proposal shall be abandoned in accordance with WAC 173-160-415 through -465, and abandonment reports submitted to the Department of Ecology.

Replacement wells shall be constructed in accordance with the provisions of Chapter 173-160 WAC by a driller licensed in the State of Washington. Well reports must be submitted to the Department of Ecology within 30 days of completion.



The City of Port Angeles will need to file an application for change of the point of diversion under Surface Water Certificate #1328 prior to withdrawing water from the proposed infiltration gallery for industrial and fish-rearing purposes.

Water Right Permit #G2-21950 for the City of Port Angeles authorizes construction of additional Ranney collectors for supplemental flow. The city will need to notify the Department of Ecology when construction is completed or apply for an extension of their permit if construction will not be completed by July 1, 2000.

If you have any question on the comments from our Water Quality Program, please contact Mr. Eric Schlorff at (360) 407-6478. For questions on the comments made by our Shorelands Program, please call Mr. Jeffree Stewart at (360) 407-6521. For information regarding our Water Resources Program comments, please call Ms. Marie Peter at (360) 407-0279.

Sincerely,

Marvin L. Vialle
Environmental Review Section

MLV:ri
96-2857

Attachment

OLYM-404-06-141

June 17, 1996

Received
JUN 21 1996
DSC-PP

THE MOUNTAINEERS

*Founded in 1906 to Explore, Study, Preserve, and Enjoy the Natural Beauty of the Outdoors*

Sarah Bransom
National Park Service, Resources Planning
P.O. Box 25287
Denver, CO 80225-0287

Re: Elwha River Restoration DEIS

Dear Ms. Bransom:

The Mountaineers is the oldest and one of the largest conservation and recreation organizations in the Northwest, with more than 15,000 members. We have a long history of involvement in the Olympic Peninsula starting with the first Mountaineer outing in 1907. The Mountaineers schedules many outdoor activities in the Park and other areas of the Peninsula. The Mountaineers has been actively involved in the Elwha Dam situation for many years.

The Mountaineers strongly supports the Park Service Preferred Alternative, which would require dam removal and allow the sediment to erode away naturally through "run of the river" processes. We believe that this proposal has significant advantages over the other alternative, which would suction dredge sediments and pipe them into the Straits. We believe that there are serious technical problems with the suction dredging proposal. In addition it would delay dam removal and river restoration for a period of several years, and cost substantially more money. The Preferred Alternative is the most fiscally sound and environmentally desirable Alternative.

The Mountaineers urges the Park Service to proceed with dam removal on an expedited schedule. The Park Service and various other agencies and consultants have already done detailed studies on dam removal and the environmental effects of dam removal. We hope that the actual process of dam removal could begin in 1997 and proceed in an expedited fashion thereafter. Each year of delay increases the risk to the various species that use the river and delays the restoration of the natural ecosystem. In addition, each year of delay increases the cost of the total

(206) 284-6310
300 THIRD AVE. WEST
SEATTLE, WA 98119
FAX (206) 284-4977



project. We do not see any reason why the Preferred Alternative cannot move ahead promptly on an expedited schedule.

Thank you for the opportunity to make these comments.

Very truly yours,

THE MOUNTAINEERS

Marcia Hanson

Marcia Hanson,
President

MH:bjh

c:\mountaineers\bransom.061796

(206) 284-6310
300 THIRD AVE. WEST
SEATTLE, WA 98119
FAX (206) 284-4977

OLYm-404-06-148

*Rescue Elwha Area Lakes*



Sarah Bransom, National Park Service
Denver Service Center, Resource Planning - DSC-RP
12795 West Alameda Parkway, PO Box 25287
Denver Co 80225-0287

## RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR ELWHA DAM REMOVAL

LEGAL PROBLEMS

The DEIS describing how the dams will be removed is premature, since you have not yet properly addressed the legal concerns for the first EIS that were enumerated in the 11 page letter of James Martin Johnson, acting for the Building Industry Association of Washington. Is it your position that the department of Interior is exempt from environmenal laws?

The Elwha Act specifically calls for investigation of fish passages as an alternative to dam removal and we have seen nothing to indicate you have actually done any such investigation beyond citing some of the fish passage ideas from the dam owner's relicense application and dismissing them. The dam relicense application never contemplated "full restoration" and never contemplated spending an amount of money anywhere in the range of that you will require for dam removal. For much less than $111 million, you could construct the world's most sophisticated fish passage system which would actually surpass natural passage in it's ability to get fish up and down the river.

The DEIS will probably suffice to get approval from federal agencies because they are presently controlled by the interior secretary who's personal views are well known. However, destruction of the lower Elwha will also require permits from state and county agencies and these permit applications will, in many cases be calling for substantial exceptions to the rules. Clallam County residents will object to these exceptions. You will have to come up with a plan which is much more detailed and which does not violate our environmental laws.

TURBIDITY - Page 10 - Surface water

The first paragraph is deceptive. It gives the reader an impression that the lakes only extend the time of river turbidly. In truth they filter out all but the very finest of suspended materials (17 million cubic yards filtered out to date still remains in the lake, per your estimate) This creates unusually clear water in the lower river most of the year and in the opinion of Dr. Robert Crittenden, (Phd from U of W school of fisheries) this fact has materially improved the lower river as spawning habitat, since silt is suffocating to salmon eggs. Suspended materials which are so light that they pass through the lakes, mostly also pass through the lower river and on into the strait and do not effect spawning.





RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR ELWHA DAM REMOVAL

TURBIDITY - *Cont.*

> "The Elwha river will <u>never</u> return to it's present clarity after removal of the dams" - *Robert Hamilton, US Bureau of Reclamation.*

This portion of the DEIS needs to be rewritten to give the public a more accurate picture of the past, present and proposed state of river water.

GROUNDWATER - page 11

It appears that the plan for protection of water users consists of an additional Raney well. You admit that the present Raney well may be overcome and blocked by material moving down the river. What guarantee do you offer that a second well won't suffer the same fate. Printed assurances are fine, but the day the water fails, they won't be much help.

> "WDF&W fish rearing facility would be closed during dam removal and chinook salmon production moved to another river"

This statement fails to inform the reader that these fish spawned and reared in another river would no longer be Elwha salmon, as they would be imprinted to return to their natal river. To leave out this information is deceptive. This passage should also include a 1990 opinion expressed by Dr. Brian Winter found in the US Fish & Wildlife Service publication, *A Review of Methods to re-introduce anadromous fish in the Elwha River:*

> "in brood collection, at least 75% of the native population should remain in the river to guard against failure of the supplementation effort."

How is it that Dr. Winter's view of the safe backup population of native fish has gone from 75% to ZERO? What happens if Dr. Brian Winter, the scientist is right? Isn't this simply a case of science yielding to political expediency?

Page 12 "Near elimination of spawning gravel"

This statement is incorrect, not supported by scientific evidence, contradicted by two fish scientists we have consulted and by Washington State Dept. of Fisheries surveys, and by our own observations. It is a <u>deliberate misleading of the public</u> in regard to a material fact. Accuracy, honesty and legality demand that it be changed:

SPAWNING GRAVEL *cont*

> "Chinook, coho and steelhead are stream dwelling species as juveniles. That means they are limited by the rearing habitat available and seldom if ever limited by spawning ground. To suggest gravel recruitment when there is no evidence that spawning areas below the dams are limited is not justified. Chinook salmon are bulldozers and I have regularly seen their redds over three feet deep in the stream substrate. Chinook will plow up their own gravel. Chinook in British Columbia " often use lake outlets for spawning because of the flow and temperature stability such sites provide. These circumstances are far more gravel devicient than the river below the dams on the Elwha, and chinook can do very well under those circumstances."
> - *Dr. Ernie Brannon - U of Idaho Acquaculture dept.*

*Dr. Brannon's opinion is shared by Dr. Robert Crittenden. Both men hold Phds from the University of Washington school of fisheries. Dr. Brannon's familiarity with the Elwha is certainly more intimate than that of any of the DOI staff.*

ELWHA DAM BY-PASS

The computer generated picture on page 359 shows a sharp zig-zag in the river where the Elwha (lower) dam now exists. Being aware that there exists a 75 foot drop in elevation between the river bottom levels immediately above and below the dam, and having seen that river pouring through the canyon at flood stage and having read of a historic flood which passed approximately 20 times the normal annual maximum, we deduced that flooding would probably straighten out that meander and create a falls of sufficient height that it would prevent salmon from migrating upriver beyond that point. We sent you a FOI request for detailed information about specifics of this by-pass, and got back the following statement:

> "The information you requested is not contained in documents or records, except for what is said in the second Elwha DEIS . ."

Should we conclude from this statement that you have not yet seriously addressed this major engineering problem? If so, perhaps your cost and time figures for the project are worthless. Or, have you considered it, but failed to put your plans into any government document because you know that the solution, whatever name is attached to it, will look and function very much like a fish ladder? If a fish ladder is to be built at the lower dam site anyway, what is the reason for removing the dam?





FISH STOCKS - Page 13 - Table 2
This table is labeled "New Wild Salmonid Production". However, the numbers given indicate it really refers to adults returning to the river. Once again the report fails in the science department. Since you have done no studies (at least that were published) on the salt water portion (66 to 95%) of the Elwha anadromous fishes' existence and since more than 99.9% of the smolt presently released near the river mouth and unaffected by the dams, expire in salt water, how can you possibly predict how many fish will return, regardless of what is or is not done in fresh water?

Most questionable of all is the prediction for enormous returns of pink salmon. Pink salmon have declined to the point of extinction in the Elwha (per Brian Winter), yet no studies have been done as to the cause of their demise (per Jeff Bohman, fishery restoration manager for the tribe). How do you know even one pink salmon will return to the Elwha, let alone 274,000? The prediction becomes downright ludicrous when one realizes that pinks are entirely ocean-reared and spend almost no time in the river.

You spent some $30,000 studying a fungus which may or may not occur in the lake bottoms. You spent nearly $40,000 studying the waterfowl on the lakes, even though you had already decided to destroy their habitat and thus eliminate them. Yet, you did no study on the pink salmon. Why? One can make any kind of prediction so long as one does not have to answer for it's accuracy, or logic.

SILTRATION - Page 13 & 14
Your plan calls for river flushing of some 80 years of accumulated silt. It is hard to imagine how a temporary stoppage by workmen would somehow prevent the river from continuing to flush this material. Unless you plan to stop the river from flowing, it will most certainly continue to flush silt. On page 10 you indicate turbidity rates of as much as 30+ times the normal annual high turbidity, and admit that even adults cannot cope with even 12 1/2 times normal maximum. How can you turn this on and off? The eggs are the most fragile stage of the fish's life. They require a constant flow of aerated water and are very easily suffocated by silt.

Previous statements you have issued implied no fish restoration effort until after the dams had been removed and the river had been allowed to return to a somewhat normal status which would provide "safe downstream passage". What factor has changed that would allow fish to continue in the river while 80 years accumulation of silt is simply sluiced down the river?

What will the contractor's crew be doing during the time they cannot work on the river? If they have a prolonged stoppage during the winter, then another during the summer, there will have to be some payment to workers. What will that do to costs and how will the job be completed in the 18 month period?

WATERFOWL HABITAT DESTRUCTION

We find no reference to any proposed mitigation for destruction of precious waterfowl habitat. I call your attention to the report by Martha Jordan, biologist and secretary of the Trumpeter Swan Society, which your group commissioned but did not reference in your DEIS. Following is a list of waterfowl she sighted on the lakes:

ELWHA LAKES WATERFOWL:

*Common Loon*
*Eared Grebe*
*Pied-billed grebe*
*Double-crested cormrant*
*Great blue heron*
*Tundra swan*
*Trumpeter swan*
*Canada goose **
*Mallard**
*Gadwall*
*Green-winged teal*
*American wigeon*
*Eurasian wigeon*
*Northern pintail*
*Northern shoveler*
*Wood duck*
*Ring-necked duck*
*Greater scaup*
*Common goldeneye*
*Bufflehead*
*Common merganser**
*Hooded merganser**
*American coot*
*Osprey (nests observed at Lake Mills)*
*Belted Kingfisher*

* = Birds observed nesting or with young

Also, we include a summary of her survey of trumpeter swans on the peninsula which shows that the Elwha lakes account for half of the peninsula's population of those rare birds.

Do you propose any actions on the peninsula which would provide alternate habitat for these birds? Apparently you do not. A cash payment to the society does not, in the view of local Olympic Peninsula residents, constitute proper mitigation for this loss.



RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR ELWHA DAM REMOVAL

LOST RECREATIONAL OPPORTUNITIES

We find no reference to any proposed mitigation for destruction of two valuable lakes which local residents have used without cost or restriction for three generations. Lake Aldwell and it's surroundings have been a free public park. Lake Mills has been free to use under NPS rules. Loss of both of these lakes will have a negative impact on the life styles of local citizens and on the tourism industry. Nowhere do we find any indication of compensation for these losses. Your publications speak grandly of "restored riverine habitat". We have lots of river bottom, but not many lakes.

SOCIO-ECONOMIC CONSIDERATIONS

You cite enormous economic benefits, but do not justify. You imply that these benefits could only come about through destruction of the dams, yet mention no benefit what would not accrue by restoring the fishery without destruction of the dams and lakes. You claim 446 permanent jobs would be created, but do not even explain who would be the employer or what the workers would be doing. If these jobs are in the tourism industry, they would not be year-round and not family wage jobs. On the other hand, removing the dams would cause a loss of 9 family wage jobs in dam operation.

The construction company jobs you refer to would be temporary, and part-time due to the on-again-off-again work schedule. Since no Clallam County contractor would be qualified to take on the project, most of these workers would undoubtedly be brought in by the outside contractor.

ECONOMICS

We see little real economic benefit, coupled with permanent loss of a wealth-creating industry which annually produces approximately six million dollars worth of clean, cheap electrical energy, and is a source which can continue to do so indefinitely without using up any resource. We see a permanent loss of excellent and growing waterfowl habitat. We cannot find in your proposal, a single benefit that could not be obtained by simply providing fish passages around the dams. Fish passage cost would be in the neighborhood of 10% of dam destruction cost, even if one ignores the costs of power and habitat loss.

# RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR ELWHA DAM REMOVAL

DETAIL AND COMPLETENESS

Overall, the DEIS contains lots of charts and optimistic predictions for events to occur long after the principals have moved on to other things. It is severely lacking in detail. (The falls created by removing the lower dam is only one of these items) It would seem that for six million dollars, the tax payers should at least see a cohesive plan which explains what you intend to do. You need to go back to the drawing board.

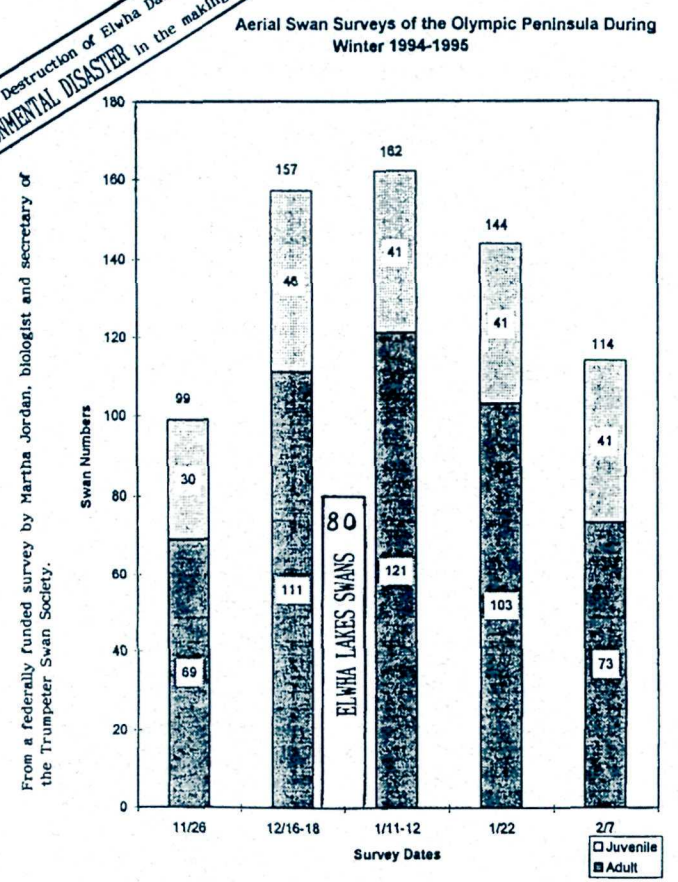
OBSTRUCTION & OBFUSCATION

Fish could have been returned to the entire Elwha watershed many years ago were it not for the obstruction of the department of interior to the installation of fish passages and the restocking of fish. We could, today be enjoying the benefits of a fish-producing river were is not for the obsession of certain groups and individuals centered in the department. Interior department management should find another target. If you won't be part of the solution, at least stop being part of the problem.

J. Marvin Chastain, secretary
356 Lawrence Road
Port Angeles, WA 98363
360 928-3154



Proposed Destruction of Elwha Dams is an ENVIRONMENTAL DISASTER in the making




Destruction of the Elwha Dams will destroy 50% of the trumpeter swan habitat on the Olympic Peninsula. It will also displace a large number of other migratory waterfowl. (See *REAL's* videos, 1 & 2 and Appendix *N of REAL's* anadromous fish restoration plan)

*inside passage*
p.o. box 639
port townsend, wa 98368
(360) 385-6114
(206) 781-3575 (voice mail)



June 20, 1996

OLYM-404-06-169

Dear Ms. Branscom,

A few notes on the Elwha River EIS:

In Appendix 3 (p.450), the list of "plant species recommended for collection" was not printed. I was able to obtain that list separately but feel it should appear in the Final edition of the EIS.

Within that list, under "Secondary" collections, it says merely "misc. native grasses and sedges; 10-20 additional species." Between "Secondary" and the very brief "Tertiary" it should be possible to spell out some preferred inclusions, notably including some of the more common (in the Elwha drainage) and indicator herb species from Table H-1 (of the Elwha Report). Since seed collection is prioritized in the opening phases of restoration, the species appearing on the recommended list will have to be located and provided soon after the implementation phase gets under way.

I can be contacted about this if needed, but I believe that NPS staff in Port Angeles will have no difficulty in providing recommendations.

Lastly, one addition to the Appendix H-1 "shrub" species list:

Lonicera involucrata -- twinberry. Can be found on the Elwha River Rd. a short distance outside the park entrance.

Sincerely,

Forest Shomer

Forest Shomer
seeds and native plant services

OLYM-404-06-178

Sarah Bransom
National Park Service - Denver Service Center
Resource Planning - DSC-RP
12795 West Alameda Parkway - P.O. Box 25287
Denver, CO 80225-0287

June 6, 1996

Dear Sarah Bransom

The Washington Wilderness Coalition (WWC) submits the following comments to the Elwha River Ecosystem Restoration Implementation Plan. WWC is a coalition of 40 local and statewide groups working to protect Washington's public lands. We have over 2,000 individual citizen members across the state.

The Washington Wilderness Coalition is concerned with the Elwha River Ecosystem Restoration Implementation plan. After having read the accompanying D.E.I.S., we offer comments which address various components of the proposed course of action.

For several reasons, our organization supports the river erosion alternative. First, and most generally, a low-impact approach is advised when attempting to reverse the harmful effects of historically negative high-impact actions along the Elwha River. The dredge and slurry alternative calls for a disturbance of both the river bottom and shoreline. Allowing sediment to erode under natural processes would return spawning gravel and other sediments downstream while restoring the river's natural meandering and flood stage. The river erosion proposal, in contrast to the dredge and slurry alternative, would minimize: 1) aesthetic problems along the shoreline, 2) disturbance of wildlife, and 3) the problems associated with depositing the dredged material at one location in the Strait of Juan de Fuca. In addition, the river erosion plan is highly desirable because it will cost $16 million less than the slurry pipeline and dredging proposal, due specifically to the difference in "sediment management" costs.

Yet WWC is concerned with the complete reliance on natural methods of sediment removal. Due to humans' interference with the river, there may simply be too many fine-grained and coarse-grained materials in the river. Will natural processes be able to remove an optimal amount of sediment? Furthermore, what type of long-term sediment monitoring will be implemented? We would also like to have two other questions addressed. With the removal of hydroelectric facilities, how will power be supplied to the Daishowa mill and other users of Elwha River-generated hydroelectric power? Secondly, fish restoration will be effective in the years following dam removal, but by what year are the anadromous fish populations expected to return to the desired and sustainable level?

The Washington Wilderness Coalition supports your decision to follow the lower-impact, more natural river erosion alternative. Physical and social considerations have been well accounted for in the production of an environmentally sound and cost effective restoration plan. We thank you for your efforts toward proper stewardship of the Elwha River ecosystem and the Olympic National Park.

Sincerely,

Jeffrey A. Taylor

Jeffrey A. Taylor, Roadless Area Manager (Washington Wilderness Coalition)



OLYM-404-06-181

Received
JUL. 29 1996
DSC-RP

595 Gossett Road
Port Angeles, WA 98363
June 25, 1996

Sarah Bransom
National Park Service
Denver Service Center
Resource Planning, DSC=RP
12795 West Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287

RE: Elwha River DEIS

Dear Ms. Bransom:

The following comments are submitted on the Draft Environmental Impact Statement (DEIS) for Elwha River Ecosystem Restoration Implementation dated April 1996.

**Alternatives**

The Elwha River Ecosystem and Fisheries Restoration Act directed the Secretary of the Interior to consider alternatives to dam removal. The Park Service has not given any serious consideration to restoration of fisheries without dam removal. A study was prepared by Rescue Elwha Area Lakes (R.E.A.L.) that would accomplish fisheries restoration without removing the dams. R.E.A.L.'s proposal has been delivered to the Park Service and is incorporated by reference into my comments on the Elwha River DEIS as an alternative to be considered.

**Economic Impacts**

Removal of the dams and related facilities from the tax roles will cost Clallam County $230,000 per year in lost tax revenues. Other county landowners will be required to make up the difference. The DEIS does not proposed any mitigation of this adverse impact as is required under the National Environmental Policy Act (NEPA). The Park Service should mitigate this adverse economic impact by returning a sufficient amount of federal land to private ownership to make up for the loss of tax revenues from the dams. Preferably, this would come from Park Service land, but an exchange of Forest Service land would also be appropriate.

The dam removal proposal should ensure that there in no net loss of private property, and no net loss of tax revenues resulting from dam removal.

The Park Service should begin discussions with the County to designate lands for exchange. The final EIS needs to include mitigation and evidence of consultation with Clallam County.

Job Creation through Dam Removal

There is no supporting documentation in the DEIS to substantiate the alleged economic benefits to be derived from dam removal. The reference to 'Meyer 1995' does not give any indication who prepared this analysis, their qualifications, the methodology used, who they worked for, or how the report could be obtained. This is a serious flaw. A supplemental DEIS should be issued with complete information.

Implementing fish restoration using R.E.A.L.'s proposal would have similar economic benefits as dam removal, but at a much lower cost.

A statement on page 313 states that the tribe considers fishery restoration as its most significant economic asset. Again there is no justification for this statement. The tribal income from fishing is estimated at about 2 million per year. The tribe is planning to move ahead with a casino, and it is likely that revenues generated by this facility would dwarf the economic benefit of river restoration.

**Levee Removal and Flooding**

The purpose of the Elwha Dam removal studies was to find a way to **fully restore** the river ecosystem. The purpose of removing the dams was not only to allow for fish passage, to also to allow gravel to flow downstream and provide fish spawning habitat.

Removal of the levees would allow the river to meander over it's natural floodplain and provide additional fish habitat. Removal of the levees in addition to removal of the dams is the only way to 'fully restore' the river ecosystem.

On the Dungeness River where there is no law requiring full restoration, Dept. of Interior employees assisted in preparing a proposal to remove dikes and displace landowners. On the Big Quilcene river, Jefferson County is being forced to remove dikes and purchase land to allow it be 'go back to nature.' The disparity in treatment between people who live on these rivers needs to be explained in the final EIS.

Even without removal of levees, it is likely that the river will meander more than it presently does due to the increased elevation of the bottom of the river after dam removal. The potential for the river to change course and cut a new channel BEHIND the existing levees needs to be addressed.

2

If the river cuts a new channel behind either of the levees, it will result in substantial loss of property and resulting liability to the government.

In California, removal of the Sweasey dam on the Mad River resulted in the river meandering over three miles. Obviously, a similar situation on the Elwha River would result in substantial losses of both tribal and non-tribal property. The Park Service should have done an analysis of the Mad River to help in determining the probable impacts of dam removal.

**Construction of Cultural Facility on Ediz Hood and Purchase of Land for Tribe**

The Elwha River Ecosystem and Fisheries Restoration Act provides for the lease of land on Ediz Hook to the Lower Elwha Tribe for the construction of a cultural center. The Act also provides $4 million dollars for the purchase land in Clallam County to be placed in trust status for the Tribe. This land would be used for housing, economic development, and moorage for the tribal fishing fleet.

In accordance with federal regulations for implementing NEPA (40 CFR Part 1502.4), "proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement."

Clearly, the provisions of the Elwha River Act related to construction of the cultural facility and purchase of lands for the Tribe are inextricably related to dam removal and should be evaluated in the same DEIS. Specifically, the following issues should be addressed:

- Environmental and economic impacts related to leasing land on Ediz Hook and construction of a cultural center.
- Loss of tax revenue to the County resulting from $4 million in land being taken out of private ownership and placed in tribal trust status.
- Proposed location of the land to be purchased for the Tribe.
- Will eminent domain be used to acquire the land from unwilling sellers.
- Replacement of the private land to be placed in tribal trust status with land of equal value currently owned by the federal government (no net loss of private property).

A supplemental DEIS should be prepared to address these issues in accordance with NEPA.

**Siltation**

Construction companies are required to build elaborate silt fences and other control measures to prevent a few tablespoons of sediment from getting into wetlands and streams. The sediment control forced on private business was promoted by scientists and

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environmentalists who are now stumping for dam removal and dumping 8 million cubic yards of sediment into our drinking water.

Why doesn't the Park Service act as responsibly as private business? Is the Park Service exempt from the environmental laws that would prevent any private business from dumping 8 million cubic yards of sediment into a river, or will the Park Service be given favorable treatment by the permitting agencies?

Without a responsible plan for managing the release of silt accumulated behind the dams, it is likely that the project will not be able to obtain the necessary permits. One of the basic purposes of the National Environmental Policy Act was to reduce duplication of effort with other state, federal and local agencies. As presently written, the DEIS could not be used to obtain the necessary permits and should be revised to include a responsible plan for managing silt that could be used by the various permitting agencies .

**Water Quality Mitigation**

The chart on page 64 indicates that there are mitigation measures planned for water treatment, but there are no preliminary drawings, plans, specifications, etc. for these facilities. There is no way to determine if the proposal will be adequate to meet water quality standards. The DEIS does not meet even the most minimal requirements of NEPA. Imagine the Dept. of Transportation putting out a DEIS that simply said they were going to build a road, without giving any idea where it would be located, how it would be built, etc.

The Park Service chose to do a two tiered EIS process. The second phase (current DEIS) was to be the implementation phase, yet there is less information in this DEIS than there was in the preceding DEIS. At the public hearing on the first phase, we were told that the details of dam removal and mitigation would be laid out in the second phase. However, the information in this current DEIS is so inadequate that it precludes meaningful evaluation. The current DEIS demonstrates either gross incompetence or a complete disregard for NEPA.

A supplemental DEIS needs to be prepared giving enough detail about the water treatment activities to determine if the proposal will be adequate.

**Park Service needs to Provide an Alternative Source of Power.**

The Elwha Dams are the only local source of power generation on the North Olympic Peninsula. By removing the Elwha Dams, we will become completely dependent on power generated by the Columbia River dams.

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The same groups that are advocating removal of the Elwha Dams, are also advocating removal of the Columbia River Dams. Where will we get our power from when both the Columbia River dams and the Elwha dams are removed?

The Park Service needs to provide another source of power for the North Olympic Peninsula when the Elwha Dams are removed. We cannot risk being left completely without a source of emergency power to run hospitals, police stations etc. if power from the BPA is ever interrupted.

Rescue Elwha Area Lakes has found evidence that the cost of making the Elwha dam energy compatible with BPA facilities would cost as little as $200. They have also found that in 1957, the BPA power supply to Port Angeles was interrupted and electric from the dams was switched to the City until BPA power was restored.

**Fish Stocks**

Earlier Elwha Reports stated that there is viable stock for only one species of the native Elwha River Fish. Stock availability for the other nine species was rated marginal or nonexistent. Yet in spite of the lack of available stock, the EIS concluded that dam removal would result in "good" to "excellent" fish runs for all 10 species.

This is like a farmer saying "I have NO SEEDS to plant this year. But my soil is good, and the rain is plentiful, so therefore, I will have an EXCELLENT CROP."

If the dams are removed, it is very likely that we will end up with NO DAMS and NO FISH.

**Cultural Impacts**

The discussion of cultural resources under 'Euro-American People' states that "For some members of the Port Angeles community, the dams became part of their history because family members worked on the construction or lived in the valley during construction." This may be true for some members of the community, but it displays a total disregard for the larger cultural issue.

Many people in our community see the dams as a beneficial resource by: providing fresh clean water to the City of Port Angeles and two mills; providing hydroelectric power to one mill; providing a source of potential emergency power for the community; providing recreation and wildlife habitat on the Lakes. Destroying the dams without first making a sincere effort to restore fish runs by other means is an affront to many people in this community.

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The issue also goes much deeper than the resources to be destroyed. The destruction of the dams represents the continual effort of groups and individuals such as Earth First! and the Unabomber to destroy western civilization. That the U.S. Dept. of the Interior has undertaken to advance the misanthropic agenda of extreme environmentalism is very discouraging to many people.

The cultural issue to be addressed in the case of dam removal is the larger cultural issue related to the deliberate destruction of industrial civilization as advocated by environmental extremist, and now also by the Department of the Interior. Steps to accomplish this goal include depriving people of potable water, energy, and food. Dam removal will accomplish two of these objectives related to the community of Port Angeles - destruction of water resources and destruction of a source of power.

The Park Service's persistent minimization of this issue demonstrates a grotesque lack of cultural sensitivity. Failure of the Service to understand and address the cultural issue and values that are important to many people in our community will only continue to deteriorate the already low regard with which the Park Service is held.

THE CULTURAL ISSUE IS NOT ABOUT SOMEONE'S GRANDPA WORKING ON CONSTRUCTION OF THE DAMS! The cultural issue is about whether we value a clean water supply and a clean source of power and the benefits they provide, or whether we will seek to destroy these things and return to a hunter-gatherer society.

Whether the Park Service's minimization of this issue is a deliberate attempt to ridicule a large segment of our community, or is simply a demonstration of ignorance may never be known. However, the final EIS needs to rectify the situation and deal with the cultural issue in an honest manner.

**Interpretation**

Interpretation plans need to be sensitive to the cultural issues identified above. Interpretive activities need to be muted rather than trumpeting the destruction of the dams. Interpretive facilities should limited to the dam sites - not placed along the highway or displayed at Park Service visitor facilities.

To those who see the Elwha Dams and reservoirs as valuable assets, destroying them is a disgrace that should not be advertised. Since people writing the Elwha reports are apparently oblivious to the revolting nature of the project, an analogy might help them understand. Suppose you were raped and the culprit proceeded to show video tapes of the act all over town and bragged about it to his friends. In addition to the initial violation, you would suffer the humiliation of having the act become entertainment for low minded individuals.



Any interpretive facilities should provide space for R.E.A.L. or other groups opposed to dam removal to show their side of the story.

The interpretive activities should have been fully documented in the DEIS rather than stating that interpretive opportunities are 'being investigated.' Without details of the plan, it is impossible for the public to comment on the full scope of the interpretive activities. This is a flaw in the plan, and a supplemental DEIS should be prepared to fully address the issue.

**Purchase of Dams Sets Precedent**

Government purchase of the Elwha Dams sets a costly precedent for the federal government. The cost of dam purchase and dam removal will be born entirely by the taxpayer. Considering that environmental extremists are agitating to remove ALL dams on ALL rivers, the long term costs to the taxpayer resulting from this policy will be staggering.

In addition to the cost of removal, there is potential for government liability for any mishaps that occur during dam removal, and any flooding that occurs after dam removal. The long term implications and cost of government purchase and removal of the dams has not been addressed in the DEIS.

**Another Alternative**

Instead of removing the dams, the dams should be relicensed for their useful remaining life. James River should be required to set aside enough money each year to pay for eventual removal of the dams. This way, the taxpayers wouldn't have to pay for dam removal.

In the meantime, the Elwha River could be used as experimental place to try a variety of fish passage methods - such as fish ladders, or the proposal prepared by R.E.A.L..

It would be something like the Experimental Forest out in Forks - a living laboratory to find out what works and what doesn't work. The results could then be applied to other rivers with dams.

**Summary**

This DEIS on Elwha Dam removal is inadequate in its treatment of the issues listed below, and precludes meaningful analysis of these issues. In accordance with federal regulations for implementing NEPA (40 CFR Part 1500-1508) a new DEIS should be prepared and circulated.

- Quality of water supply to the City of Port Angeles and the Rayonier mill after dam removal. While the DEIS states that water quality will be maintained, the DEIS contains no analysis or documentation which would support this claim.
- Flooding after dam removal. The DEIS does not adequately address the issue of river meander after dam removal and the potential for the river to cut a new course behind the existing levees.
- Emergency power supply. The DEIS does not provide any meaningful discussion, analysis, or mitigation to provide the community of Port Angeles with an emergency supply of power.
- Loss of property tax revenues. The DEIS does not provide any meaningful discussion, analysis or mitigation to replace the property taxes paid by dam owners to Clallam County.
- Siltation and permitting requirements. The DEIS does not deal with release of silt in a manner that would meet permitting requirements of the various state, local and federal agencies who will be required to issues permits.
- Environmental and economic impacts associated with construction of long house and museum on Ediz Hook.
- Discussion of lands to be acquired for the Lower Elwha Tribe in Clallam County and resulting loss of tax revenues from these lands. The proposed location of these lands should be identified.

Removal of the dams without first making a sincere effort at restoring fish though other measures is unconscionable. Let's give R.E.A.L.s proposal a try!

Sincerely,

Melanie J. Caltrider

Enclosures:
- Letter to the Editor of Peninsula Daily News 5-13-96.
- Peninsula Daily News opinion poll 5-13-96.
- Port Angeles Chamber of Commerce Position on Elwha Salmon Restoration and Dam Removal, June 1996.
- Clallam Citizens Coalition Resolution in support of the R.E.A.L. proposal for fish restoration.
- Summary of Sweasey Dam Removal on the Mad River, California, June 25, 1991

cc: The Honorable Slade Gorton
The Honorable Norm Dicks
The Honorable Patty Murray
Clallam County Commissioners



**Elwha panel off track**

In response to the "Elwha Citizens Advisory Committee backs dam removal." Rescue Elwha Area Lakes has studied for near three years every aspect of the river and the problems that would come from dam removal. Then along comes a group of people that meets together for a very short period of time and thinks they know the whole story of what is best. Certain people on this committee have held up or stopped every good thing that could have taken place in this area for years.

I know some of the people of this group believe the dams should stay. The real people such as six Grange organizations, the Realtors, the Clallam County Republican Party, the home builders groups and many others have endorsed ideas of retaining the dams. Now it the time for them to speak out. Some of the worst-case scenarios are first, in the study the Elwha committee talks of planting fish in the mid-river between the two dams; all well and good, but as soon as they started to remove the dams these fish would be lost when they came back to spawn.

There isn't much question the Rayonier mill would lose their clean water supply, the river would be full of silt for a long time.

A10 Peninsula Daily News, Sunday, May 12, 1996

Just a short time ago the secretary of energy said that in a short time we will have to increase our electrical energy by at least 40 percent to take care of the future demand. You sure know what the supply and demand causes — yes, higher prices; by no means the time to take our power dams.

REAL plans to get fish to where they should be is the best plan and it won't cost $100 million or more like $300 million. Let's hope some common sense pre-vails on this issue before we have an ecological disaster on the Elwha River by removing dams.

Donald E. Rudolph, *Port Angeles*

Call Peninsula Telepoll's free phone lines from 8 a.m. today through 7 a.m. Monday to share your opinion on the question of the week. Telepoll is not purported to be a scientific gauge of reader views.

Yes: 417-3507 or 1-800-884-3557 No: 417-3508 or 1-800-884-3558

Reader responses to today's question on Monday's editorial page.

Reader responses to the question we asked on Sunday totaled 450. Here is the breakdown:

| | |
|---|---|
| 06.6% | Yes |
| 93.4% | No |

Note: Peninsula Telepoll is not purported to be a scientific gauge of reader views.

MONDAY 5-13-96

**PORT ANGELES CHAMBER OF COMMERCE**
**POSITION ON ELWHA SALMON RESTORATION AND DAM REMOVAL**

The primary concern of the Port Angeles Chamber of Commerce is the equal protection of the rights and economic survival and success of all members of our business community.

To restore Elwha Salmon and protect the interests of all business in the area, implementing the following plans and practices.

☐ Guarantee suitable water for domestic and industrial use.

☐ Adopt and implement a comprehensive plan to begin restoration of Elwha Salmon as soon as possible. Have the plan and begin the process by mid 1997.

☐ Congress modify the Elwha Act to guarantee that any dam removal plan will protect all indigenous fish species in the river.

☐ Congress purchase the dams and offer to lease or contract with another entity the operation and production of power..

☐ Dam owner or lessee contribute an appropriate amount of the wholesale value of power generated to a fund for the purpose of operating and enhancement of the fishery.

☐ Establish a fisheries supervisory committee with a representative of the Lower Elwha Tribe, Olympic National Park, Washington State Fish & Wildlife, a Clallam County Commissioner, and at least two non-government members of the local public as representatives. The local representatives must not have had any connection with any of the other participants.

☐ In the event that the government does not purchase the dams, all levels of government will provide a guarantee to the private dam owner that they will not be held liable for the cost of dam removal.

☐ The process does not result in any net loss of private property.



**CLALLAM CITIZENS COALITION**
PO Box 1284, 316 West First Street, Port Angeles, WA 98362
Phone 360-452-5112, Office Hours 12 noon - 4:00 p.m.

## RESOLUTION

WHEREAS, the salmon and steelhead fishery is vital to the economic and social welfare of the North Olympic Peninsula community, and:

WHEREAS, it has been determined by numerous scientific studies and the opinions of qualified fish biologists that the Elwha River is excellent salmon/steelhead spawning and rearing habitat, and:

WHEREAS, the upper and middle reaches of the River have been too long without anadromous fish due to government procrastination and political machinations.

THEREFORE BE IT RESOLVED that the Clallam Citizens Coalition does hereby endorse and support the restoration of salmon and steelhead to the Elwha River above the dams.

WE HEREBY RECOMMEND to all our county, state and federal officials that they take whatever steps are necessary to implement the restoration plan prepared by RESCUE ELWHA AREA LAKES and that such actions begin as soon as possible.

This Resolution is done by vote of the membership on the 13th day of April, 1996.

/s/
Rebecca Berry, President

/s/
Fernie F. Missall, Secretary

## SUMMARY OF SWEASEY DAM REMOVAL ON THE MAD RIVER, CALIFORNIA

A brief summary of the findings of the review of the Sweasey Dam removal is presented here. A more detailed analysis is presented in Appendix II.

Background

Removal of dams on the Elwha River would represent the first destruction and clearing of a dam on the West Coast with the object of ecosystem restoration. Although not removed solely for fish restoration purposes, the removal of Sweasey Dam on the Mad River in northern California offers a comparison of the effects of dam removal on an anadromous salmon and steelhead river. The Mad River offered the only West Coast case study relevant to the Elwha River Proposal. The Mad and Elwha Rivers are similar in fish resources, in that each supports populations of chinook and coho salmon and steelhead trout. Both rivers are also similar in discharge rates.

The Sweasey Dam was removed in after 20 years of operation in 1970 because of a build-up of sediments that reduced the storage capacity and presented a safety hazard. Essentially all of the 2.4 million cubic yards of stored sediments were released down stream during the next two years. Immediate resulting impacts were an unstable river course, negative impacts on fish spawning grounds from sedimentation, and a decrease in the depth of the river downstream from the dam site to an extent that reduced up-stream returning adult chinook salmon and caused significant mortalities.

Long-term impacts of the Sweasey Dam removal are difficult to separate from other environmental and man-caused effects. However, potential dam removal-related impacts include a three mile movement in the mouth the Mad River due to a build of fine sediments, continued problems with adult fish passage upstream in the lower river due to a wider, shallower river channel, water temperature related adult mortalities, and continued relative heavy fine sediment load in the lower river. After 20 years, there has been no significant increase in salmonid production above the dam site and overall returns to the Mad River have been highly variable.

Summary of Conclusions

The Elwha River DEIS should address the stabilization of sediments within the reservoir in greater detail, since release of these sediments downstream could have catastrophic impacts on fish production.





The potential effects of changes in the Elwha River channel downstream from the dam removal sites is not adequately addressed in the DEIS.

Potential changes in the mouth of the Elwha River caused by sediment release in the dams removal scenario should be more adequately discussed by the DEIS.

The DEIS should present more detail on methods to be employed to assure increased utilization of the Elwha River above the dam removal sites.

# REVIEW OF SWEASEY DAM REMOVAL

Removal of dams on the Elwha River would represent the first destruction and clearing of a dam on the West Coast with the object of ecosystem restoration. Although not removed solely for fish restoration purposes, the removal of Sweasey Dam on the Mad River in northern California offers a comparison of the effects of dam removal on an anadromous salmon and steelhead river. The Mad River offered the only West Coast case study relevant to the Elwha River Proposal. Mr. Jeffrey June of NRC had previously worked on the Mad River and was familiar with the dam removal project. Natural Resources Consultants, Inc., has conducted interviews with current and retired California Department of Fish and Game (CDF&G) and Humboldt State University personnel to collect information on Sweasey Dam removal on the Mad River in Humboldt County, California.[1]

## Background

The Mad and Elwha Rivers are similar in fish resources, in that each supports populations of chinook and coho salmon and steelhead trout. Both rivers are also similar in discharge rates. The following information summarizes characteristics of each system:

| Characteristic | | Elwha River | Mad River |
|---|---|---|---|
| Drainage Area | | 321 sq mi | 700 sq mi |
| Basin Width | | 10 miles | 8-11 miles |
| Basin Length | | 35 miles | 75 miles |
| Gradient | Upper | 6-16% | 8-6% |
| | Middle | 1% | 1-3% |
| | Lower | 0.13% | 0.6-1.0% |
| Discharge | | | |
| Low | | 800-1,000 cfs (Jul-Sept) | 75-300 cfs (Jul-Sept) |
| High | | 2,000-3,000 cfs (Nov-Mar) | 1,000-3,000 cfs (Dec-Mar) |
| Peak | | 27,700 cfs (Nov & Mar) | 10,000 cfs (Jan-Feb) |
| Low | | 200 cfs (Sept) | 25 cfs (Sept) |
| Water Quality | | High | High |
| Sediment Load | | Moderate | Moderate |
| Fishery Resources (Approximate number of return spawners) | | | |
| Steelhead | | 1,000 | 1,000 |
| Chinook | | 19,000 | 1,000 |
| Coho | | 17,000 | 650 |

[1]Telephone interviews were conducted between mid-May and early June 1991 with Mr. Larry Preston--CDF&G, Mr. Phil Warner--CDF&G, Mr. Don LaFonce-CDF&G retired, Mad River fish hatchery personnel, and Dr. Terry Roelofs-Humboldt State University researcher.





Sweasey Dam was constructed in 1950, primarily for municipal water storage. It is located approximately 11 river miles upstream from the mouth of the Mad River. Sweasey dam was 55 ft above the stream bottom and impounded approximately 1,300 acre feet of water. The dam was equipped with a step/pool-type fish ladder which allowed passage of salmon and steelhead above the dam site. Downstream migrating fish were passed over a spillway during high flows and through a bypass during lower flows.

## Dam Removal

By 1969, the storage area behind the dam had become almost entirely filled with 2.4 million cubic yards of sediment and woody debris. Fine sediments had also impacted the river two to three miles above the reservoir. The Army Corps of Engineers, California Department of Fish and Game, and the City of Eureka Department of Public Works evaluated the safety and maintenance requirements of the facility and a decision was made to remove the dam and associated structures.

Although there were no formal removal or fish restoration plans developed or implemented, the opinion of most of the participants was that (1)there would be an acceptable sediment load for several years which might adversely effect fish spawning, (2) the river would form a channel through the fine sediment and debris behind the dam, carrying most sediment down the river on high flows while the remaining sediment banks would re-vegetate naturally and stabilize, and (3) the stream channel downstream from the dam would have minor changes resulting in an increase of one foot in the flood stage.

Preliminary minimal site investigations were conducted in late 1969. No attempt was made to assess the configuration of the sediment behind the dam to determine post-dam removal sediment loads or stability of remaining sediment banks. The dam removal was approved in late 1969. Sweasey Dam was removed with explosives in August 1970 during a low-flow period. A steelhead trout hatchery was built about four miles below the dam site in 1970 and began operation in 1971. The hatchery was not built for mitigation purposes and has produced mainly steelhead trout.

## Recovery and Short- and Long-Term Effects

The Mad River below the dam remained heavily loaded with sediments for several weeks immediately after the dam removal. The first substantial rains and resulting runoff occurred in late September 1970 and resulted in additional movement of fine sediment from the dam site downstream. During the first winter after dam removal (December 1970 - February 1971), nearly all of the sediment from the dam site was transferred downstream. Little, if any, sediment remained in the area behind the dam location. During each storm the Mad River had higher than normal turbidity, based on visual observation by CDF&G personnel. By the next summer (1971), it

was evident that the river channel three to five miles below the dam site had been altered. Previous to the dam removal, the river channel had been a series of riffles and pools which provided upstream adult salmon and steelhead migration routes. After dam removal the river channel became wider and shallower. Most, if not all, of the deeper holes had filled in with coarse and fine sediment.

Anecdotal information from CDF&G personnel indicated that the Mad River contained a stock of exceptionally large chinook salmon, with individuals of over 30 lbs not uncommon. During the summer/fall low-flow periods in 1971 and 1972 when adult chinook salmon were migrating upstream, the shallow areas which had developed below the dam site essentially restricted further upstream migration. CDF&G personnel reported seeing many salmon "beached" in the shallows and killed by elevated water temperatures and stranding. At least 150 chinook salmon died in the summer/fall of 1971.

Although alterations in the river channel were expected to be only a temporary phenomenon, the channel remained shallower and wider up to seven miles below the dam site for five to ten years after removal of the dam and presently remains shallower than from the pre-dam removal period in some locations. Although pools have re-formed in most areas below the dam site, the Mad River continues to have problems with upstream chinook migration and mortality due to elevated water temperatures. A second dam, Ruth Dam, which is still in place, was constructed in 1962 approximately 30 miles upstream from Sweasey Dam. Ruth Dam continues to be required to release storage water during low-flow periods to attempt to maintain flows adequate for upstream migration, particularly during drought periods.

Researchers at Humboldt State University have monitored sediment size composition at several commercial gravel mining sites on the Mad River downstream from the Sweasey dam site. Their data suggest that the fine sediment "wave" from the dam site may just now be exiting the lower river, 20 years after the dam removal. However, this is difficult to prove conclusively, since much of the lower Mad River valley is a farming area which contributes to river sediment levels, and logging in the upper watershed may also be contributing some sediment load. The stream channel below the dam site remains somewhat unstable, resulting in bank erosion and frequent channel changes during high flows. This bank erosion also contributes to the river's sediment load.

Since the Sweasey Dam was removed, the mouth of the Mad River has moved steadily northward from its historical outflow location into the Pacific Ocean. It is presently over three miles farther north than its pre-dam removal location. Whether this is the result of increased sediment load caused by removal of Sweasey Dam is not known, but the effect of sedimentation at the mouth may further impede upstream fish migration.





CDF&G biologists believe the removal of Sweasey Dam will, if it has not already, ultimately result in improved conditions for salmon and steelhead production in the Mad River. Returns of salmon and steelhead to the Mad River[2] have been quite variable since the dam removal:

| | Chinook salmon | | | Coho salmon | | | |
|---|---|---|---|---|---|---|---|
| Year | Males | Females | Immature | Males | Females | Immature | Steelhead |
| 1971-72 | 60 | 178 | 85 | 90 | 178 | 66 | 42 |
| 1972-73 | 241 | 415 | 390 | 105 | 130 | 231 | 32 |
| 1973-74 | 337 | 83 | 105 | 105 | 178 | 46 | 1,056 |
| 1974-75 | 110 | 71 | 80 | 67 | 74 | 19 | 311 |
| 1975-76 | 83 | 41 | 184 | 187 | 239 | 1,597 | 190 |
| 1976-77 | 323 | 155 | 981 | 88 | 139 | 976 | 858 |
| 1977-78 | 95 | 66 | 87 | 165 | 289 | 194 | 1,191 |
| 1978-79 | 37 | 19 | 190 | 42 | 31 | 524 | 2,190 |
| 1979-80 | 51 | 77 | 17 | 39 | 80 | 223 | 1,411 |
| 1980-81 | 26 | 40 | 20 | 55 | 105 | 341 | 730 |
| 1981-82 | 32 | 6 | 213 | 16 | 62 | 135 | 442 |
| 1982-83 | 257 | 391 | 200 | 73 | 76 | 473 | 1,087 |
| 1983-84 | 119 | 194 | 134 | 11 | 11 | 65 | 774 |
| 1984-85 | 21 | 13 | 48 | 13 | 8 | 4 | 991 |
| 1985-86 | 149 | 26 | 98 | 24 | 14 | 7 | 783 |
| 1986-87 | 106 | 121 | 72 | 39 | 39 | 265 | 12,807 |
| 1987-88 | 253 | 315 | 278 | 94 | 126 | 733 | 4,303 |
| 1988-89 | 49 | 110 | 63 | 93 | 181 | 591 | 2,829 |
| 1989-90 | 10 | 19 | 17 | 18 | 17 | 221 | 1,027 |
| 1990-91 | 0 | 0 | 1 | 17 | 27 | 48 | 915 |

Unfortunately, estimates of returning escapement run sizes are not available for the period prior to the dam removal. Most other coastal river systems in California have had declines in anadromous fish populations but year-to-year fluctuations in return run strength have generally not been as great as the Mad River system. CDF&G conducted periodic fish counts at the Sweasey Dam fish ladder and spawner ground counts above the dam site. Chinook, coho, and steelhead utilized the upper Mad River by way of the fish ladder on Sweasey Dam prior to the dam removal. There is no indication that upstream utilization of the Mad River by chinook and coho has increased since the dam was removed. Some evidence exists that Sweasey Dam did impede fish migration, since the fish ladder was observed clogged with debris on many occasions. During these instances, Canyon Creek, located just below Sweasey Dam, often had large concentrations of fish. Although factors other than those influenced by dam removal may have impacted the returning run sizes, there has, nevertheless, been no substantial increase in the production of salmon or steelhead in the 21 years since Sweasey Dam was removed. In 1990-1991 only one chinook salmon was captured at the hatchery weir.

[2]Capture statistics are measured at the Mad River hatchery weir.

Summary

Several important considerations concerning the Elwha River proposals are evident from reviewing the Sweasey Dam removal on the Mad River.

1. The ability to stabilize sediments in the drainage area behind the dam removal sites is questionable.

   Although there was no formal stabilization plan for sediments behind Sweasey Dam, the basic instability of the stream channel flowing through essentially unstable river banks within the uncovered reservoir tended to cause erosion of sediment banks and movement of fine sediments to downstream spawning areas. On the Elwha River, this may be of particular concern in Lake Mills where sediment banks and the river channel will be at relatively high gradient. The total amount of sediment behind the Elwha River dams is estimated to be at least 16.93 million cubic yards[3] in contrast to the 2.4 million cubic yards behind Sweasey Dam. Loss of the entire sediment loads behind Elwha, Glines Canyon, or both dams could be catastrophic, certainly for several years and perhaps much longer, to fish spawning grounds below the dams where the Elwha River gradient is relative low.. The DEIS should offer a more detailed analysis of the precise method of sediment stabilization to be used in the Elwha River after removal of the dams, since this may be one of the most critical issues in wild stock restoration.

2. Changes in the stream channel downstream from the dam sites due to sediment movement may disrupt fish passage.

   The Mad River channel downstream from Sweasey Dam was altered by the removal of the dam and the resulting displacement of stored sediments. The resulting channel was wider, shallower, and less stable. During the first several years after dam removal, chinook salmon passage upstream was blocked during critical low-flow periods by the shallow stream channel resulting in significant fish mortality. The river channel remains altered after 20 years, with reduced upstream adult fish habitat and continued fish passage and water temperature problems. The Elwha River has experienced chinook adult mortalities (up to 30%) from disease/elevated water temperatures. These problems, combined with upstream passage problems due to potential stream channel changes, are not adequately addressed in the DEIS.

[3] Draft Environmental Impact Statement - FERC/EIS-0059D, Glines Canyon (FERC No. 588) and Elwha (FERC No. 2683) Hydroelectric Projects, Washington, Federal Energy





3. Increased sediment movements may alter the outflow and possibly the location of the mouth of the river.

   The mouth of the Mad River has continually migrated north of its historical location since dam removal. It is not known whether the movement of sediment caused by dam removal is responsible for the movement of the river mouth. The DEIS should address this possibility and its effects on the Elwha River and surrounding Strait of Juan de Fuca.

4. Fish production has not increased significantly above the dam removal site.

   Although many factors, including harvest rates, drought, and other environmental factors, affect the production of fish in any river system, the production of coho and chinook salmon have not significantly increased in the Mad River since removal of Sweasey Dam. Coho, chinook, and steelhead utilized the upper Mad River by way of the fish ladder at Sweasey Dam prior to dam removal. Sweasey Dam was observed to be an impediment to upstream fish passage under some conditions. However, 21 years after removal of the dam, there has been no significant increase in production of coho and chinook salmon in the Mad River. Returning run sizes have fluctuated widely from year to year. Presumably, no marked increase in production has occurred for coho or chinook above the dam site. Coho and chinook are not reared in the Mad River hatchery and wild stock production is dependent upon natural migration to spawning areas. The history of the Mad River may indicate that the use of areas above dam removal sites by wild fish is a slow process requiring long-term changes in spawning migration patterns. The DEIS should more clearly address the time required for full utilization of the upper Elwha River by wild stocks.

# THE ELWHA RIVER AND OUR COMMUNITY'S FUTURE

## Recommendations of the Elwha Citizens' Advisory Committee

April 30, 1996







### INTRODUCTION

The purpose of this report is to outline the recommendations of the Elwha Citizens Advisory Committee (hereinafter "Committee") for resolving the controversy surrounding restoration of the Elwha River ecosystem. The Committee is composed of a number of Clallam County citizens involved in area businesses, local government and citizen groups. They collectively have a vast experience in local government and issues of community concern. The Committee formed in response to the call from the Washington Congressional delegation which requested guidance and local input on resolving the Elwha River controversy.

### BACKGROUND

The Elwha River drains an area of approximately 321 square miles of land on the Olympic Peninsula, 83 percent of which is within the boundaries of the Olympic National Park. Historically, the Elwha River system was one of the largest producers of salmon and steelhead on the Olympic Peninsula. These runs, however, have seriously declined in recent years.

The Elwha and Glines Canyon dams were constructed on the Elwha River to provide hydroelectric power for local consumption. The Elwha Dam was constructed from 1910 to 1913. The Glines Canyon Dam was constructed from 1925 to 1927. The dams were built without fish passage and block access to salmon spawning grounds. The Elwha Dam does not have a Federal license to operate. The Glines Canyon Dam received a 50-year license from the Federal Power Commission in 1926. The project has been operating under an annual license since 1976.

The Elwha and Glines Canyon dams together produce approximately 172 gigawatt-hours (GWh) of electric energy per year[1]. Title to the projects is currently held by the James River Corporation. However, Daishowa America, as local owner of the directory paper mill and user of the energy from the dams, has a significant interest in the projects. The dams produce approximately 40 percent of the power supply needed for the directory paper mill. The mill currently has 320 employees and is the second largest private employer in Clallam County.[2]

[1] Federal Energy Regulatory Commission (FERC), *Draft Staff Report: Proposed Elwha (FERC No. 2683) and Glines Canyon (FERC No. 588) Hydroelectric Projects, Washington (FERC Draft Staff Report)* 2-5, 2-8 (March 1993).

[2] National Park Service, *Final Environmental Impact Statement, Elwha River Ecosystem Restoration (Elwha FEIS)* 90 (June 1995).

In 1973, a predecessor to James River applied to the Federal Energy Regulatory Commission (FERC) for a new license for its Elwha River hydroelectric projects. The National Park Service, the Lower Elwha Klallam Indian Tribe and conservation and sport fishing organizations opposed licensing. During the 1980s the FERC licensing process became extremely contentious. Continued efforts to license the projects resulted in protracted litigation that has not been resolved.

In 1992, Congress passed the Elwha River Ecosystem and Fisheries Restoration Act (Elwha Restoration Act) in an attempt to resolve the continuing controversy over the fate of the Elwha dams. The goal of the Elwha Restoration Act was the "full restoration of the Elwha River ecosystem and native anadromous fisheries."[3] The Act authorized the Secretary of the Interior to acquire the Elwha and Glines Canyon projects and remove the dams if the Secretary determined that dam removal was necessary to meet the goal of full ecosystem and fisheries restoration.[4]

The Interior Secretary's Report was completed in January 1994. After considering a number of alternatives, the Secretary determined that removal of both the Elwha and Glines Canyon dams is the only way to achieve the goal of full restoration of the Elwha River ecosystem and native anadromous fisheries. The Secretary also determined that removal of the Elwha and Glines Canyon dams, while providing for ecosystem and fisheries restoration and the protection of water users, is feasible. Consequently, as required by the Act, the Secretary included in the report a "definite plan" for removal of the Elwha and Glines Canyon dams.

The advisability of removing the dams has come under close local scrutiny and has not received complete local endorsement. Funding also is questioned.

## Elwha Citizens' Advisory Committee

The controversy surrounding the fate of the Elwha dams has continued to the present day. Concerns about the cost of the Interior Secretary's dam removal plan caused the Washington Congressional delegation to request interested parties to explore fish restoration alternatives for the Elwha River. In response, a number of Clallam county residents formed an ad hoc citizens' advisory committee to study and offer recommendations to resolve the controversy surrounding restoration of the Elwha River. The Committee began with a wide range of views about the wisdom and feasibility of fisheries restoration and dam removal. Nevertheless, the Committee considered itself a group of reasonable people that

[3] *See* Elwha Ecosystem and Fisheries Restoration Act (Elwha Restoration Act) § 3(c), 106 Stat. 3173.

[4] Elwha Restoration Act at § 3(c).



were open-minded about possible solutions to the Elwha controversy. The Committee's common interest was a concern about the future of its community and about resolving the uncertainty surrounding this issue.

As a first step, the Committee prepared the following statement of goals and objectives for Elwha River restoration to use as a guideline for its deliberations.

## Goals and Objectives

1. Maintain family-wage jobs in the community, including those in local mills.

2. Provide an efficient and reliable electric power supply for current and potential future users of electricity from the Elwha River dams.

3. Find fiscally responsible and achievable solutions for the Elwha's fish restoration challenges.

4. Ensure an adequate, good quality water supply for those currently dependent on water resources of the Elwha Basin.

5. Identify specific measures to address local concerns about implementation or modification of the Elwha Restoration Act.

6. Ensure that plans to resolve Elwha-related issues result in the most cost-effective approach for the nation's taxpayers.

7. Remove the threat of litigation for current dam owners and economic uncertainty for the community resulting from this issue going unresolved.

The next step occurred late in 1995 when the Committee wrote to the Washington congressional delegation and the secretaries of Interior and Commerce to inquire about their willingness to receive local input. On the basis of the responses the Committee decided to move forward to learn about the issues and to develop its own solutions.

At its request, the Committee received presentations from the following stake holders in the Elwha restoration controversy: Daishowa America and James River, Inc., the Lower Elwha Klallam Indian tribe, Rescue Elwha Area Lakes (REAL), conservation and sports fishing organizations, the Bonneville Power Administration (BPA) and the National Park Service. The Committee wanted to learn more about their goals for the Elwha. The Committee felt this would be a good starting point to determine whether a compromise solution would be possible.

On March 7, 1996, the Committee held a town meeting. It felt strongly that community input was critical to forming a locally developed solution. The Committee hoped to hear from those in the community who had not yet had a chance to voice their opinions concerning the issue.

## Conclusions and Recommendations

The Committee's recommendations to the Congressional delegation and the secretaries of Commerce and the Interior are --

1. Pursue immediate acquisition of the projects from James River and place these projects in Federal ownership.

2. Create an Elwha River restoration fund to finance restoration activities to be funded with power revenues from the operation of the projects, fees from Olympic Park visitation, grant revenues from non-federal resources, proceeds from sale of project lands and federal appropriations.

3. Begin an immediate restoration of Elwha River salmon stocks. The highest priorities are Elwha chinook stocks that are at a critically low abundance.

4. Implement a restoration strategy for the Elwha ecosystem with milestones to ensure fiscally responsible solutions and to verify dam removal feasibility, salmon stock restoration feasibility and protection of critical water supplies

5 Assure no net loss of private property (or property tax base) resulting from project acquisition by utilizing land exchanges or by disposing of project lands (or equivalent value federal lands elsewhere in Clallam county)

6. Maintain public access to the Elwha River corridor after project restoration through project lands.

Strictly from a fish/ecosystem restoration perspective, the Committee believes that the case for dam removal is compelling. However, this is not a forgone conclusion for a very practical reason which is the matter of financing. The climate in Congress clearly does not favor such an extreme and expensive idea. For Congress, there may be some willingness in the future to consider removal subject to adequate funding. This would be more plausible if the Elwha Restoration Fund is successful, providing unappropriated dollars through initiatives which are mainly:





1. Federal operation of the dams for profit
2. Sale or trade of project lands
3. Earmarking a portion of Olympic National Park receipts for use of the Fund

These funds, once available, could be used to set the stage for the initial removal of the Elwha dam. The success of this venture would then be used to judge the advisability of removing the Glines project. The Committee does not support dam removal without implementation of a fiscally sound strategy.

The Committee also questions the cost estimates contained in the Elwha Report. Specifically, two seem inordinately high: water quality protection ($24.838 million) and project management ($8.096 million). The Committee agrees that both are critical elements to a successful project, especially water quality protection. However, both costs should be reevaluated. The Committee believes major cost saving can be achieved with better planning and thereby improve the cost effectiveness and fiscal soundness of any restoration effort.

## THE ECONOMIC REALITY OF THE ELWHA DAMS

The Port Angeles directory paper mill has relied on mechanical pulping rather than chemical processes to produce high grade directory paper. This has required a stable low cost source of power which in part has been supplied by the Elwha dams. This has allowed mill owners to invest in plant and equipment, further improving the mill's competitive position. As a result the mill has been a leader in mechanical pulping technology, water and power conservation and recycling.

Since 1976, the mill owners have been forced to plan for capital renewal with no more regulatory certainty than annual licenses for the project. Continued uncertainty about the fate of the Elwha dams reduces the competitive position of the mill and inhibits future investment in plant and equipment.

Alternative energy supplies have increased dramatically over the last four years. Deregulation of the electric power industry has caused a reduction in the cost of electricity. This in turn reduces the value of hydroelectric power from the Elwha facilities. For the foreseeable future, BPA has sufficient generating and transmission capacity to replace Elwha River production at a competitive rate.

The Committee does not believe relicensing is a realistic outcome for the Elwha and Glines Canyon dams in today's regulatory environment. In 1992, the Federal Energy Regulatory Commission (FERC) estimated the cost of project modifications to attempt fish passage would exceed $38 million, excluding decreased power generation resulting from operational changes to facilitate fish

passage.[5] FERC's recommended project operations would reduce the projects' average annual energy output to 160.1 GWh, or about 93 percent of the current average.[6] The success of these modifications is speculative.[7] Consequently, costs for fish mitigation could be much higher.[8]

The companies oppose any solution that involves continuation of efforts to relicense the projects before either FERC or Congress. The Committee does not see anything to be gained for the community or the dam and mill owners to continue this effort into the future.

The Committee considered the value of the Elwha dams as an emergency power supply for the Port Angeles community. The hospital has its own emergency generating facilities. Furthermore, there is no current interconnection capability between the dams and the City of Port Angeles power distribution system. The distribution systems simply are not currently compatible. Development of such a capability would be costly and would not provide appreciable benefits for the community.

As a preliminary matter, the Committee strongly supports immediate acquisition of the Elwha and Glines Canyon projects by the Federal government. The Committee has come to the conclusion that continued non-federal ownership of the projects is incompatible with the goals of maintaining family-wage jobs in local mills, restoration of the Elwha River ecosystem and restoration of the Elwha River salmon and steelhead resources. No action surrounding Elwha restoration continues to threaten the viability of dependent economic activities. Our recommendations for project operations, disposition of the projects, and associated lands and interests therein and restoration strategies are described below.

## A PHASED APPROACH TO RESTORATION

The Committee proposes a phased approach to restoration of the Elwha River system. The Committee does not believe it is realistic to expect sufficient funds to implement the Secretary's restoration plan within the time frame contemplated by the plan. Furthermore, immediate removal of both dams would

[5] *FERC Draft Staff Report* at 5-30.

[6] *FERC Draft Staff Report* at 2-16.

[7] *See FERC Draft Staff Report* at 4-35.

[8] The FERC Staff Report estimates for conventional fish passage facilities would add $21.4 million to project mitigation capital costs. *FERC Draft Staff Report* at A-102, A-105, A-107. Conventional fish passage would further reduce average annual energy output by 6.4 GWh. *FERC Draft Staff Report* at 9-94.



have unpredictable consequences for the community's water supply and would needlessly forgo an economic resource that can be put to use to accomplish restoration objectives.

Specifically, the Committee recommends segregation of the restoration effort into several phases. The first phase includes acquisition of the projects, completion of necessary studies and engineering and construction of hatchery improvements to allow fishery managers to proceed with brood stock development. During the first phase, the Committee believes greater emphasis should be placed on short-term measures to protect and enhance existing fish resources. Fish restoration should begin immediately since Elwha River chinook are nearing extinction under current conditions. The initial chinook restoration plan focuses on improving adult survival by reducing crowding and by lowering water temperature. The first phase of the Elwha fish restoration plan should include actions to help minimize chinook mortality brought on by *Dermocystidium salmonis*, under certain conditions a fatal disease for a large segment of the Elwha chinook population. These measures include lower-river pool development and reservoir releases timed to reduce water temperatures.

The second phase includes construction of water quality improvements and out planting of chinook, coho and steelhead in the mid-river area above Elwha dam. This phase also includes gravel enhancement for spawning grounds below and between the dams and stream rehabilitation in Little River and Indian Creek to increase natural spawning. Distribution of hatchery-produced salmon carcasses into mid-river areas would begin the enhancement of nutrients to improve the river's ecosystem. This phase also would include operational changes for the Elwha (lower) project to facilitate downstream passage of juveniles. The process of restoring anadromous fish to the middle section of the river should begin when necessary stock assessment studies and hatchery improvements are completed. Furthermore, the fishery managers should place greater emphasis on determining the suitability for using Lake Sutherland kokanee to reestablish sockeye in the Lake Sutherland/Indian Creek drainage. Sockeye salmon are commercially valuable and their suitability for enhancement at an early stage of the restoration process appears promising.

The third phase assumes removal of the Elwha dam to enhance mid-river fish stocks. Removal of the Elwha dam would enable fishery managers to accelerate the process of recolonization of the mid-river habitat, particularly the mid-river main stem, Little River and Indian Creek. As described below, removal of the Elwha Dam also would provide needed empirical data to determine whether to remove the Glines Canyon Dam at a future date.

The fourth phase includes evaluation and continuation of fish restoration and water quality protection measures. It also includes out planting of a combination of fry, fingerlings and smolts to begin the process of utilizing

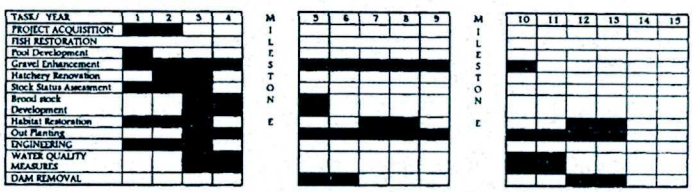
upper-river habitat. This phase would continue through the life cycle of initial out plants to the mid-river area.

The final phase may include removal of the Glines Canyon Dam and recolonization of upper-river salmon spawning habitat. The Secretary's recommendation for dam removal, however, is premised on three critical but unproved assumptions: 1) that sediment transport will not disrupt water supplies or significantly disturb lower-river fish habitat; 2) that salmon and steelhead will successfully recolonize currently unused but suitable habitat; and 3) that sufficient and economical power supplies are available over the long-term to meet the community's needs. Fish restoration efforts in the mid-river area will help determine whether the first two assumptions are valid. Time will tell whether the third assumption is correct. The phased approach outlined in the Committee's recommendations allows the Secretary, and the community, to determine whether these assumptions are valid before a final commitment is made to remove the Glines Canyon Dam or the continued use of the Elwha Restoration Fund for ecosystem restoration.





ELWHA RESTORATION TIMELINE
PROGRESSIVE RESTORATION SCENARIO




A Milestone is defined as the time for evaluation of the results of the phased strategy to date. The project moves forward to the next phase if all elements of the previous phase are funded and implemented. Results should indicate that future restoration activities will be successful and that there will be no deleterious impacts to the Elwha ecosystem , human communities or local economy.

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ELWHA RESTORATION COST ESTIMATE[9]
(Dollars in thousands -- present (1996) dollars)

| Activity/ Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 15 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Acquisition | 10,000 | 19,500 | | | | | | | | | | | | $29,500 |
| Other land acquisition costs | | 300 | | | | | | | | | | | | 300 |
| *Engineering Design* | | | | | | | | | | | | | | |
| Preconstruction data | 458 | | | | | | | | | | | | | 458 |
| Decommissioning | 50 | | | | | | | | | | | | | 50 |
| Water quality protection | | 1,523 | | | 8 | | | | | | | | | 1,531 |
| Flood protection | | | 297 | | | | | | | | | | | 297 |
| Dam removal | | | 300 | | | | | | 500 | | | | | 800 |
| Hazardous waste cleanup | 45 | | | | 4 | | | | | 4 | | | | 53 |
| Transmission line removal | | | | | | | | | | 10 | | | | 10 |
| Road rehabilitation | | | | | 24 | | | | | 24 | | | | 48 |
| Hatchery modifications | 405 | | | | | | | | | | | | | 405 |
| *Direct Construction Costs* | | | | | | | | | | | | | | |
| Decommissioning | | | | 150 | | | | | | 150 | | | | 300 |
| Water quality protection | | | 5,220 | 7,199 | | | | | | | 5,220 | 7,199 | | 24,838 |
| Flood protection | | | | 1,140 | 1,785 | | | | | | | | | 2,925 |
| *Dam removal* | | | | | *9,200* | | | | | | | *11,000* | | *21,200* |
| Hazardous waste cleanup | | 200 | | | | 167 | | | | | 167 | | | 534 |
| Transmission line removal | | | | | | | | | | | 650 | | | 650 |
| Road rehabilitation | | | | | | 240 | | | | | 240 | | | 480 |
| Hatchery modifications | | 3,180 | 860 | | | | | | | | | | | 4,040 |
| *Miscellaneous* | | | | | | | | | | | | | | |
| Construction management | | 507 | 1,695 | 2,533 | 1,648 | 61 | | | | | 23 | 1,650 | 155 | 8,096 |
| Waste disposal fees | | | | | 500 | | | | | | | 500 | | 1,000 |
| Sediment management/monitoring | | | | 100 | 610 | | | | | | | 460 | | 1,170 |
| Sediment modeling | 70 | 30 | | | | | | | | | | | | 100 |
| Cultural resources | | | 151 | 162 | 167 | 74 | | | | | | | | 554 |
| Fisheries restoration | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | 2,400 |
| Revegetation/wildlife | | | 75 | 75 | 255 | | | | | 75 | 75 | 255 | | 810 |
| Marine resource monitoring | 10 | 20 | 20 | | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | | 210 |
| Water treatment | | | | 412 | 1,088 | 1088 | | | | | 500 | 1,000 | 1,000 | 5,088 |
| Baseline/fish studies | 150 | 95 | 95 | 60 | 60 | | | | 50 | 50 | 50 | | | 610 |
| Hatchery outlet dredging | | | | | | 50 | | | | | 50 | | | 100 |
| TOTALS | 11,368 | 25,355 | 8,913 | 11,891 | 15,569 | 1,900 | 220 | 720 | 458 | 5,565 | 9,174 | 15,085 | 1,159 | $107,557 |

[9] Estimates of costs from *The Elwha Report*. The Committee feels that estimates for water quality protection and construction management are inordinately high and may be the source of major cost savings.

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## PROJECT OPERATIONS

The Committee recommends continued project operations for the period following Federal acquisition. The current dam owner is the obvious choice to manage the facilities and the directory paper mill is the obvious purchaser of energy. The Committee assumes the projects will be operated to benefit fish passage. Operational measures to improve passage effectiveness include increasing spill and removing one or more turbines at the lower dam. The result will be a substantial decrease in their effectiveness for power production purposes. Nevertheless, the projects will continue to provide economic value until removal. As described below, project revenues can contribute significantly to the cost of restoration.

## DISPOSITION OF PROJECT LANDS

According to the Elwha Report, the Glines Canyon and Elwha hydroelectric projects include approximately 1,150 acres of associated land. Lands associated with the Glines Canyon project comprise approximately 160 acres and are located within the boundaries of the Olympic National Park.[10] Lands associated with the Elwha project comprise approximately 990 acres, including those inundated by Lake Aldwell.[11]

Under the provisions of the 1992 Elwha Act, the Federal government intends to acquire all project lands. The Act calls on the Department of the Interior to manage Glines Canyon project lands as part of the Olympic National Park. The Act instructs the department to identify specific proposals for management of all project lands outside the boundaries of the Olympic National Park. In response, the department has considered a number of potential management scenarios, all of which contemplate public acquisition.

The Committee is greatly concerned about the continued erosion of the private land base of Clallam County. The loss of private property represents a lost opportunity for the county's economic development. Furthermore, the acquisition of private land by public agencies continues to reduce the property tax base, thereby increasing the tax burdens of local citizens. The current assessed value of the projects is approximately $19.7 million. The project owners pay over $228,000 in real and personal property taxes each year.[12] This

[10] US Department of the Interior, *The Elwha Report: Restoration of the Elwha River Ecosystem and Native Anadromous Fisheries* (*Elwha Report*) 117 (January 1994).

[11] *Elwha Report* App. I at 174-76.

[12] Statement of Hon. Martha Ireland, Clallam County Commissioner, Elwha Advisory Committee Town Meeting, March 7, 1996.

amount will be lost to Clallam County if the dams are removed and the project lands are placed in federal ownership. Payments in lieu of taxes under 31 U.S.C. § 6901 are available only for five years following acquisition. In-lieu payments are woefully insufficient compensation to the county for loss of taxes from the projects. During Federal operation of the projects, the government must continue to pay a full property tax equivalency to the County.

The Committee does not believe Elwha restoration should involve a net loss of private property in Clallam County. The Committee recognizes the importance of adding the Glines Canyon project lands to the Olympic National Park. Yet the Committee believes the addition should be offset by the disposal of federal land elsewhere in Clallam County. This is tantamount to a land exchange, for which ample precedent exists to acquire National Park in-holdings.

The Committee also recommends leaving project lands associated with the Elwha Dam in private ownership. Removing the Elwha project lands from private ownership and from the county's property tax base is unnecessary for the central purpose of the Elwha Restoration Act and needlessly adds to costs. The Committee believes it is critical to focus on the primary objectives at hand. They simply are not furthered by removing these lands from private ownership. Project lands should be sold. The new owners could engage in a land exchange with the Federal government for lands of equal value.

Finally, the Committee is concerned about ensuring public access to the river corridor for recreation purposes. Significantly, however, and unlike the proposal contained in the Interior Secretary's *Elwha Report*, the recommendation is limited to the riparian corridor *after* restoration. The Committee does not feel a riparian refuge delineated by the current shoreline of Lake Aldwell is appropriate after the river is restored to its previous configuration.

## FISH RESTORATION

The fishes of the Elwha River are unique resources that contribute significantly to the natural ecosystem of the Elwha River basin. Elwha fish resources are important to the economic and cultural well-being of the Lower Elwha Klallam tribe. They also have tremendous value for the non-Indian community, providing sports fishing opportunities for salmon and steelhead anglers, and revenue for local businesses that support recreational fishing. The natural runs of salmonids returning to the Elwha River, like many other runs of fish in the Pacific Northwest, have declined dramatically during the last several decades. Unlike any other river in the Northwest, however, the vast majority of the fish habitat on the Elwha River remains pristine due to its location in Olympic National Park. The restoration of salmon and steelhead stocks to this habitat could result in major increases in run sizes with a minimal investment in habitat restoration.





There is an urgency to immediately protect several of the very valuable and vulnerable wild salmon and steelhead stocks on the Elwha River. Consequently, the committee recommendations include both long-term and short-term restoration strategies. Regardless of the decision of when or how dam removal might occur, these unique stocks offer one of the best regional opportunities to rebuild anadromous fish runs in the shortest amount of time. The low returns of Elwha anadromous stocks, however, have put their very existence in jeopardy. For this reason, fish restoration efforts should begin immediately. A supremely tragic outcome would be for these stocks of fish to become extinct while we debate the wisdom and feasibility of dam removal.

The fish restoration plan outlined in Appendix G of the *Elwha Report* offers several strategies that can be acted upon at once. These, along with the Committee's recommendations, will be dealt with in five broad categories: Stock Assessment, Habitat Restoration, Hatchery Renovation, Out planting and Harvest Management. The Committee assumes it is unlikely dam removal will occur in the short term, say within the next three years, and a minimum a five-year planning horizon should be developed. Additionally, since the committee does not believe that removal of both dams at the same time is realistic and advisable, restoration planning needs to address the possibility of sequential removal over a several-year period.

Stock Assessment -- The Committee agrees with the *Elwha Report* that *"additional stock status information is needed to determine the suitability and* availability of most Elwha stocks for restoration."[13] Particular attention needs to be paid to determining the status of remaining 'wild' stocks, including their abundance, genetic makeup and run timing. Closely related stocks such as those found in the Dungeness River, Salt Creek and other nearby river systems should be evaluated for their potential contribution to restoration efforts. This information could be obtained by a joint effort of the Lower Elwha Klallam tribe, the Department of the Interior, the National Marine Fisheries Service, Washington State Department of Fish and Wildlife (WDFW), Peninsula College and volunteers.[14] A clearly defined plan established by a task force representing these entities could yield the necessary information in a cost-effective manner.

Habitat Restoration -- Habitat restoration opportunities are not specifically addressed in the *Elwha Report*. Nevertheless, habitat restoration efforts should begin immediately to benefit some stocks now and others if and when dam removal occurs. Funding may be an issue for some of these efforts. It may be possible to work with the Clallam County Conservation District to use

[13] *Elwha Report*, App. G at 120.

[14] Volunteer organizations might include the North Olympic Salmon Coalition, Wild Olympic Salmon, Restore Elwha Area Lakes (REAL), Long Live the Kings, Trout Unlimited and others.

their restoration crew's time or the Washington Conservation Corps crew that is operating in the area.

Chinook salmon are the real 'jewels' of the Elwha. These stocks have suffered severe mortality in recent years because of outbreaks of *Dermocystidium salmonis*. Fishery biologists speculate that a combination of factors including warm water temperatures and crowding increases the severity of this disease. One restoration activity that should begin immediately would be to create a series of pools to alleviate the crowding problem. The Committee understands that, because of flooding in recent years and the loss of large organic debris, the number of pools has decreased to essentially two. This limitation is a major factor in crowding.

Pools could be constructed in two ways. Excavation would be the fastest and most assured way of creating pools immediately. Root wads, logs and other large debris anchored in the substrate also will cause natural erosion and pool formation. Combining debris placement with excavation could protect these pools if the dams are removed and sediments begin moving downstream.

There is an urgency in this effort that cannot be overstated. The snow pack is light in the Olympic Mountains this year. With a warm summer, this could result in optimum conditions for another outbreak of *Dermocystidium salmonis* and severe chinook mortality. If pools are created and cooler water released from Lake Mills to cool the surface flow from Lake Aldwell to the lower river it may be enough to minimize chinook mortality. This reduction in overall mortality will assure the maintenance of this stock's genetic survival until overall restoration can occur.

Long-time local residents have stated many times that the run sizes of the Elwha fishes were strong many years after dam installation and that the lack of fish passage is not the only cause of the salmon and steelhead declines. The Committee agrees with their assessment. Sediment transportation was disrupted by the dams, but the adverse effects were delayed for decades. Gravel has been slowly migrating out of the river, gradually eliminating the once quality spawning habitat in the lower river. The gravel has not been replenished from upstream gravel sources because of the dams.

This loss of spawning gravel should be mitigated by creating spawning grounds with new gravel in the lower river. This gravel could be trucked from local pits. While access is limited and improvements will be modest, any increase in quality spawning habitat will undoubtedly be used by the fish. This measure may seem superfluous in light of the proposal for dam removal and natural migration of sediments. Yet if the dams are not removed in the short term, each year of increased natural spawning should enhance the strength of each run and reduce the time for optimal restoration. If it is determined that the lower dam should be removed first, it might be possible to pump gravel from Lake Mills over the Glines Canyon Dam and so that it may redistribute naturally in that section. Again, any additional quality spawning will help the restoration effort.



Stream restoration projects should begin on Indian Creek and Little River in the near future. These are important tributaries of the Elwha that will see significant use by salmonids once they become accessible. Indian Creek, especially, might play a major role in the re-establishment of sockeye back into the system. Volunteers, sport clubs or restoration crews could contribute to the work force needed for this effort.

Sockeye salmon runs may develop from the kokanee or land-locked sockeye of Lake Sutherland. These fish are primarily shore spawners. The shorelines of the lake that are critical to spawning need to be determined so they can be protected. Lake shore owners need to be informed as to where these critical habitats are located. It might be feasible to place signs on the spawning grounds during spawning season to inform boaters and anglers of the importance of the area.

Out Planting -- Out planting of eggs, fry, juveniles and adults can be an effective tool in fish restoration. Out planting of eggs and fry will allow these fish to begin a more natural life cycle in the system. It will take advantage of the rearing habitat in the 70+ miles of tributaries and main stem available to the fish. The natural mortality of eggs and fry is extremely high. Sufficient numbers would have to be planted to assure significant survival of these fish to the point in time they begin downstream migration. Juveniles can also be planted at a point in their life history when they are about to migrate to salt water. Planting during this pre-smolt condition will allow them to imprint on their planting location so that as adults they will return to the same area to spawn.

Downstream migration for both groups could result in heavy mortalities if the dams are not operated to maximize fish survival. Steps to maximize downstream survival should be considered and include: 1) control water flow during out-migration to maximize passage over the spillways while shutting down the turbines; 2) put the Eicher screens back on-line; 3) pull out the turbines; 4) draw down the reservoirs so they are more riverine in nature. The return of the adults could be handled in two ways. The first requires dam removal within one to two years of out-migration. This would be the best scenario for natural development of the runs. As this is not likely in the short term, however, the returning adults could be used to maximize the development of brood stock of the most critical fish runs. At a minimum, currently viable runs such as the coho at will be kept at harvestable levels.

Scientific evidence does not support passing live adults above the dams (trap and haul). There are several reasons. Handling adults during the spawning season adds stress to these fish and increases their mortality. This would be counter--productive to the Committee's goal of maximizing the survival of critical stocks. The number of fish needed to be passed to insure significant survival of progeny would be extremely high. Even to have enough fish to find each other in the 70+ miles of habitat may be impossible given the currently low number of returning spawners. If adults were passed it should be

limited to the coho that are the current "healthy" stock. The chance of success is so low that it would not be worth the gamble to use the depressed stocks.

It could be helpful to the ecosys.. n and subsequent generations of fish if adult carcasses from the hatcheries were transported upstream to begin returning the nutrients from these fish to the system. This natural fertilizer would help increase productivity in many levels of the food chain. These carcasses could be randomly distributed in the upper reaches of the river. Although this methodology is unproved, initial research in carcass deposition suggests there would be a benefit to ecosystem health.

Hatchery Renovation -- Out planting, brood stock development and run supplementation all require hatchery upgrading. Money allocated to this project would support immediate restoration needs and prepare the hatcheries for later major efforts. The Committee agrees with the hatchery upgrades recommended in the Elwha Report including the improvements in water supply and egg incubation for both the State and Tribal facilities.

Harvest Management -- Harvest of Elwha River fish is affected by state, federal and tribal management entities as well as international negotiations. There needs to be a recognition among all these organizations that the restoration effort is underway and that rules need to be adopted that will allow more fish to return to and survive in the river. It is our recommendation that in-river harvest of critical stocks such as the Chinook and wild steelhead be eliminated during the recovery period and the harvest of hatchery sustained populations be severely restricted.

Tribal fishers should eliminate the use of gill nets in the river. This harvest method indiscriminately kills all fish it captures regardless of whether the fish is from a weak stock or not. The technology is available to establish traps, weirs or fish wheels that will allow non-target species to pass unharmed and allow the retention of the target species. If the Tribes were to adopt these alternative methods of fish harvest, it would show the community that the tribe really cared about re-establishing fish runs for everyone and not just to increase their commercial harvest. This action alone would go a long way in developing community support for fish restoration. It is difficult to build community support when the Tribal fishers refuse to consider fish capture techniques that will allow them to maintain their harvest levels yet protect fish that need to be protected.

Restoration efforts would be even more effective if accompanied by harvest quotas set by US - Canada Salmon Treaty negotiators and Pacific Fishery Management Council harvest managers that allowed greater escapement of Elwha River salmon stocks that move along the west coast of Vancouver Island.

Conclusion -- The *Elwha Report* fish restoration recommendations are appropriate and should be considered for immediate implementation.



Additional suggestions proposed in this document also should be considered for addition to the restoration plan. It should not be assumed that removal of the dams will occur in the next three years and that a delay in restoration is appropriate. Action needs to begin immediately. Several stocks of wild salmon and steelhead need to be protected and targeted for enhancement before they become extinct.

Even though immediate restoration of the Elwha River fish might require an up-front investment in time and money, total cost savings will accrue if restoration is accelerated. Re-establishment of recreational and tribal fisheries also will begin generating funds that otherwise would be lost.

## PROJECT IMPACTS

Water Supply Needs -- The City of Port Angeles holds water rights for approximately 200 cubic feet per second (cfs) of water from the Elwha River. The City's water supply comes from a Ranney well[15] collecting approximately 50 cfs of water and a surface diversion three miles upstream of the river's mouth providing approximately 150 cfs of water. The Ranney collector provides water for municipal purposes. The surface diversion provides water for three industrial users, two large paper and pulp mills and the Washington Department of Fish and Wildlife fish rearing channel.

Private water purveyors possess additional groundwater water rights that may be affected by Elwha restoration efforts. The largest private water user is the Dry Creek Water Association. The Association supplies water to 373 customers from a well field located approximately 230 feet east of Elwha River near River Mile (RM.) 4.2. The Association's well field produces approximately 6.0 cfs. The Elwha Place Homeowners Association supplies water to 16 customers from two wells located on the west side of the Elwha River near RM. 1.0. The combined capacity of the Homeowners Association is about 0.4 cfs. There also are a number of individual and multiple use wells located along the river. Finally, the US Government retains additional water rights in trust for the Lower Elwha Klallam Tribe.

Water Quality -- The Interior Department estimates that the Elwha River historically delivered approximately 280,000 cubic yards of sediment annually. The Elwha and Glines Canyon dams have blocked sediment transport down river for approximately 85 years. As of 1994, the volume of sediment trapped behind Glines Canyon Dam was estimated to be approximately 13 million cubic yards.[16] The volume of sediment trapped behind the Elwha dam is

[15] A Ranney well consists of a vertical caisson located on one bank of the river connected to perforated pipes located under the river bed. The Ranney collector system filters the water through river bed gravel. *Elwha Report* at 96 n. 1.

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approximately 4 million cubic yards.[17] Approximately 190,000 cubic yards of material has been trapped each year behind the Glines Canyon dam since its construction in 1927. The Secretary's preferred alternative is to rely on natural erosion to transport sediment downstream. The Bureau of Reclamation estimates approximately 7 to 9 million cubic yards of sediment would erode naturally from Lake Mills and approximately 2 to 3 million cubic yards of sediment would erode naturally from Lake Aldwell.

The Committee is aware of the several water quality protection measures included in the Secretary's Plan. The Committee remains concerned, however, about the potential impacts of massive sediment release on community water supplies. Furthermore, the Committee is concerned about the impacts of sediment release on lower river anadromous fish resources. The techniques used to stimulate and control sediment removal through erosion has not been empirically tested. Instead, the US Army Corps of Engineers relied on computer modeling to determine the ability of the river system to transport all trapped material out of the reservoir areas.[18] The Interior Department has acknowledged the ability to predict and control the effect of sediment moving through the river system is poor.[19] Nevertheless, the department proposes to remove both dams at once. In the face of such uncertainty, the Committee believes a more prudent course of action would be to proceed with more caution, removing one dam, studying the effects and if warranted remove the larger dam at a later stage.

In addition to the other advantages to the committee's recommendations, the Committee believes sequential restoration of the Elwha River would allow for gradual release of sediment into the river system. Removing the Elwha dam would allow for the release of 2 to 3 million cubic yards of material to erode from Lake Aldwell. The project managers then could evaluate sediment removal and water quality protection techniques before making a final decision on the appropriate method of removal or stabilization of the 7 to 9 million cubic yards of material currently stored in Lake Mills. This approach could result in greatly reduced costs and increased assurance of water quality.

River Access -- The Committee is aware of the concerns about access to the Elwha River. Currently, the area around Lake Aldwell is privately owned,

[16] *Elwha FEIS* at 30.

[17] *Elwha FEIS* at 31. The *Elwha Report* estimate was approximately 2.6 million cubic yards (mcy) behind the Elwha Dam, consisting of approximately 1.5 mcy of coarse sediment in the Lake Aldwell delta region and 1.4 mcy of fine sediment in the lake area. *Elwha Report* App. F at 12.

[18] *Elwha Report* at 79, App. F at 12.

[19] *Elwha Report* at 80, App. F at 53.

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but access is allowed through informal acquiescence. There are no provisions to ensure public access to the lower Elwha River in the Secretary's restoration plan. Furthermore, the Committee is disturbed by National Park Service plans to manage Glines Canyon project lands and adjacent areas as wilderness. This decision is unrelated to Elwha River restoration and should be addressed separately. Specifically, the Committee is concerned about proposals to eliminate vehicular access to the area west of Lake Mills.[20] The Olympic Hot Springs Road and Altaire Campground provide important opportunities for physically impaired persons to enjoy National Park resources. Access to this area should not be denied for those whose disabilities prevent them from visiting other areas of the Olympic National Park. There is no reason to link this change in National Park management policy to restoration of the Elwha River and its fishery resources and the committee is opposed to efforts to do so.

The *Elwha Report* describes a river corridor area comprising of approximately 600 acres of land suitable for conservation and recreation purposes.[21] The Committee recommends that public access be assured for the river corridor area. The Committee also believes verifiable cultural sites should be accessible to Lower Elwha Klallam tribal members. The State of Washington has established a program known as the Washington Wildlife and Recreation Program (WWRP) which provides funding for water access acquisitions by state and local government agencies. The Washington Department of Natural Resources (DNR) also provides grants through its Aquatic Lands Enhancement Account (ALEA). The ALEA program does not receive revenues from taxes. Instead, the program is funded by revenues from DNR leases to public and private entities such as ports and marinas and the sale of aquatic resources such as sand and gravel and shellfish. Public acquisition of the river corridor also could be accomplished by DNR through exchange. As previously explained, the committee prefers exchange to purchase because of the impact of public purchases on private land and county property tax bases. The river corridor itself adds little or no value to the county's economic and tax bases. For this reason, the Committee is willing to make an exception from its general opposition to loss of private land and tax base. In any event, in addition to assuring public access, acquisition by DNR or another state or local government agency would help to reduce Federal appropriation needs by providing funds from the State of Washington.

This does not mean the Committee is satisfied with the Interior Secretary's recommendation to establish a mid-river conservation refuge. The Secretary's *Elwha Report* describes a conservation refuge and recreation corridor area comprising of approximately 600 acres of land.[22] The river corridor should be

[20] *See Elwha Report*, App. I at 183-84.

[21] *Elwha Report*, App. I at 174.

much smaller, including approximately 200 acres of land. The river corridor should consist of the riparian corridor *after* restoration of the Elwha River to its natural configuration.

## FUNDING

The Committee believes funding scenarios in the Secretary's proposal are unrealistic. Appropriations for Interior Department programs continue to decline. The 1992 Elwha Restoration Act provides the Interior Secretary, acting through the Assistant Secretary for Wildlife and Parks, with authority to seek Congressional funding for implementation of the Act. Efforts in 1994 to amend the Act to allow for a broader base for Interior Department funding were unsuccessful. This means funding must come at the expense of existing National Park Service and US Fish and Wildlife Service programs. Attempts to fund dam acquisition, removal and mitigation and fish restoration measures entirely through federal appropriations over a five-year period could prove extremely disruptive to other programs and for that reason would be resisted.

The Committee's recommendations include two significant departures from the Secretary's preferred alternative. First, the committee's proposal would spread funding needs over a longer period of time by using an incremental approach to implementation. Second, the Committee recommends that the National Park Service establish an Elwha Restoration Fund to augment Federal appropriations.

Elwha Restoration Fund -- The Committee recommends Congress establish an Elwha Restoration Fund to serve as a primary source of funding for Elwha restoration. Potential funding sources for the Elwha Restoration Fund are described below.

Federal Appropriations -- The Secretary's Elwha restoration plan relies entirely on Federal appropriations for funding. As previously indicated, the committee does not believe that this approach is viable. Instead, the Committee recommends that the Congress provide initial funding for the Elwha Restoration Fund and provide periodic capital contributions to augment other sources of revenue. The need for funding augmentation is greater during the early stages of restoration. Assuming capital contributions from Federal appropriations of $15 million each year for the first four years, the Committee believes its approach to funding will eliminate the need for direct Federal appropriations after the first four years of project implementation. Alternatively, without contribution of National Park Service visitor revenues, appropriations of $15 million each year would be needed for five years before the restoration project could become financially self-sustaining.

[22] *Elwha Report*, App. I at 174.



Project Operating Revenues -- Interim operating revenue from hydroelectric power generation can offset restoration costs.. The Committee recommends that the National Park Service continue to generate electricity at the projects and deposit net operating revenues into the Elwha Restoration Fund.

Continued operation during restoration will generate significant revenues and will provide a substantial source of funding for restoration. Annual operation and maintenance costs range from $1.2 million to $1.4 million annually.[23] Assuming that no physical fish mitigation measures would be constructed, and using BPA's current PF-1 (priority firm) rate of 24.9 mills per kilowatt hour, the dams could generate $4.3 million in gross revenue and $2.9 million to $3.1 million in annual net revenues. Interim operation of the Elwha dam to facilitate downstream passage could reduce power generation by as much as 20 percent.

Olympic National Park Visitor Fees -- The Committee believes the primary purpose for restoring the Elwha River ecosystem is to enhance the resources of the Olympic National Park. The primary beneficiaries will be Olympic National Park visitors and the park itself. Consequently, the Committee feels it is appropriate for park visitors to share in the costs of restoration.

In 1995, the National Park Service reported nearly 4.7 million visitors to Olympic National Park. In addition, the Park Service reported over 312,000 overnight visitors at concession lodging and campgrounds and National Park Service campgrounds, excluding back country visits. The National Park Service reported collections of $650,000 to $700,000 from visitor entrance fees and $500,000 to $600,000 from campground and lodging fees. This represents a total potential income from visitor fees of approximately $1.3 million annually.

Visitation in 1995 increased approximately 7 percent from 1994. The National Park Service expects significant visitor revenue increases to continue in the future. In addition, Congress currently is considering legislation to eliminate or relax legislatively-imposed limits on the authority of the National Park Service to collect user fees. Together, increased fees and increased visitation will provide substantial new revenues that should be used to further enhance national park resources.

The Committee recommends that the National Park Service be allowed to transfer income from visitor fees to the Elwha Restoration Fund during the period of time restoration activities are underway. Transfer of an amount equal to current visitor revenues would provide $1.3 million each year for restoration activities. The National Park Service contribution to the Elwha Restoration Fund

[23] *Elwha Report*, App. E at 7.

could be generated either by imposing a minor surcharge on visitor fees or by earmarking a portion of current collections. Either method would provide a source of matching funds derived from the beneficiaries of restoration.[24] Together with project operating revenues and the proceeds from disposal of project lands or equivalent-value federal lands, the visitor matching funds would reduce the need for direct Federal appropriations by as much as 45 percent.

Disposition of Project Lands -- As previously mentioned, the Committee strongly recommends that project lands should remain in private ownership. Alternatively, the project lands should be acquired by direct or indirect land exchange. To accomplish such an exchange the committee recommends the disposal of Federal lands of equivalent value located elsewhere in Clallam county. The Committee believes the project lands could be worth $1 million or more.[25] Proceeds from the disposition of Federal land could partially offset the cost of project acquisition, thereby reducing even further the amount of funding needed through direct Federal appropriations.

State Contributions -- Currently the WDFW provides operation and maintenance funding for its fish rearing channel. According to the *Elwha Report*, this facility ultimately will be used as a rearing facility under the Secretary's fish restoration program. The Committee believes the WDFW should continue to provide funding for Elwha fish enhancement activities roughly equivalent to its current contribution for the rearing channel and other Elwha-related management activities. Another source of non-federal funding would be a voluntary contribution from state recreation fishing license holders. A similar program for voluntary contributions from motor boat license holders was authorized in the 1996 Legislative Session for maintenance of the historic ships *Lady Washington* and *Virginia V.*

Finally, potential savings resulting from an indirect state contribution could be realized by exempting restoration activities from state sales taxes. The State of Washington has agreed to exempt other major capital construction projects such as the new King County baseball stadium and the Emerald Downs

[24] After completion or termination of the project, funds could be used for other Park improvement projects in other communities or the funding mechanism abandoned.

[25] This a very conservative estimate of the value of the 600+ acres of timbered land that will be disposed under this recommendation. The Committee estimates the true value is between $1-10 million. The proposed transaction is highly complex. As such, the achieved value may be less that true market value given the reduction in competitive bidders for the property.



horse race facility in Auburn. A state sales tax exemption would reduce direct construction and construction management costs by approximately 8 percent.

ELWHA RESTORATION FUND
($000)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sources | | | | | | | | | | | | | | |
| Federal Appropriation | 15,000 | 15,000 | 15,000 | 15,000 | 777 | | | | | | | | | 60,777 |
| Power Sales | 3,000 | 3,000 | 3,000 | 3,000 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | | | 21,100 |
| NPS User Fee | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 | 16,900 |
| Land Deposal | | | 1,000 | | | | | | | | | | | 1,000 |
| Previous Balance | | 7,932 | 2,082 | 13,575 | 21,716 | 10,631 | 11,873 | 14,858 | 17,497 | 20,531 | 18,813 | 12,986 | -134 | 152,165 |
| Interest (5.1%) | 0 | 405 | 106 | 692 | 1,108 | 542 | 606 | 758 | 892 | 1,047 | 959 | 662 | -7 | 7,760 |
| Funds Available | 19,300 | 27,637 | 22,488 | 33,567 | 26,200 | 13,773 | 15,079 | 18,217 | 20,989 | 24,178 | 22,162 | 14,951 | 1,159 | 259,702 |
| Uses | | | | | | | | | | | | | | |
| Program Expense | 11,368 | 25,555 | 8,913 | 11,851 | 15,569 | 1,900 | 220 | 720 | 458 | 5,365 | 9,174 | 15,085 | 1,159 | 107,537 |
| Balance Forward | $7,932 | $2,082 | $13,575 | $21,716 | $10,631 | $11,873 | $14,858 | $17,497 | $20,531 | $18,813 | $12,988 | ($134) | ($0) | |





## CONCLUSION

The Elwha dams have served the Port Angeles community well. Yet their contribution has come at a price. The once-famous Elwha River salmon runs now return to the river at a fraction of their former numbers. The Elwha River chinook may be lost forever if corrective action does not begin immediately. The time has arrived to reconsider the role of the Elwha River dams in its community's future. Their continued operation should be reconciled with restoration of the river's non-power resources. The issue should not be resolved at the expense of long-term stability for the community's family-wage jobs. For this reason, the Committee supports immediate federal acquisition of the projects.

The Committee is convinced the Elwha River should be restored to protect and enhance its salmon and steelhead resources. The restoration process, however, should take place one step at a time, thereby avoiding an irreversible commitment of resources until absolutely necessary. A number of intermediate steps should be taken prior to removing the Elwha dam. These should begin without further delay. The Committee believes a final decision to remove the Glines Canyon dam should be deferred pending successful restoration of the mid-river area.

The Committee's approach ensures Elwha River restoration is accomplished in a fiscally prudent and environmentally responsible manner. In this way costs will remain manageable and funding prospects realistic. The community's concerns about the impacts of removal and ecosystem restoration can be addressed.

## ACKNOWLEDGMENTS

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William Sanchez
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Michael T. Smithson
Richard Stachorek
Brooke Taylor
Chuck Towslee
Norma Turner
Pat Willits



About the Elwha Citizens' Advisory Group

*Members* --

Bill Ashley is a retired Marine Corps Lieutenant Colonel and is active in numerous civic organizations.

Orville Campbell is a member of the Port Angeles City Council.

Dorothy Duncan is a Clallam County Commissioner and member of the Board of Natural Resources. She also is a former mayor of Port Angeles.

Walt Forsberg is a retired dairy farmer and life-long resident of the Elwha Valley. He is a 50-year member of the Grange and is active in numerous farm organizations.

Bill Hermann is co-owner of Hermann Brothers Logging and Construction Company and current Vice President of the Forestry Training Center.

Richard G. Kott is President of Atlas Trucking, Inc. and was Resident Manager for Crown Zellerbach, the former owner of the Port Angeles directory paper mill.

Harry Lydiard is a conservationist and former Clallam County Commissioner.

Eleanor Naddy is a senior citizen activist and retired school teacher.

Jerry Newlin is President of NTI Engineering & Surveying Company. He is the current President of the Clallam County Economic Development Council and a past-President of the Port Angeles Chamber of Commerce and Port Angeles Rotary.

Kathy Northrop is the owner of a State Farm Insurance agency and former long-time member of the Port Angeles School Board. She is the Chair of the Board of the Olympic Park Institute and a board member of the North Olympic Land Trust.

Bart Phillips is the Executive Director of the Clallam County Economic Development Council and a board member of the North Olympic Salmon Coalition.

Dr. James Walton is the Dean of Professional Technical Education Services at Peninsula Community College and former Chair of the Washington Fish and Wildlife Commission.

Glenn Wiggins is a forester for Merrill & Ring Company and a member of the Port Angeles City Council.

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Save Our Wild Salmon Coalition •

Save Our Wild Salmon Coalition Offices:
Main Office: 1516 Melrose Avenue, Suite 200 Seattle, Washington 98122
(206) 622-2904 / (206) 622-2924 fax
Field Office: 1511 North Eleventh Boise, Idaho 83702 / (208) 345-9067
921 Southwest Morrison, Suite 432 Portland, Oregon 97205 / (506) 497-0188

American Rivers
Antioch Living Systems Collective
Association of Northwest Steelheaders
Boulder-White Clouds Council
Clearwater Forest Watch
Coalition for Salmon and Steelhead Habitat
Coast Range Association
Defenders of Wildlife
Extension Sea Grant
Federation of Fly Fishers
Friends of the Earth
Idaho Conservation League
Idaho Rivers United
Idaho Steelhead and Salmon Unlimited
Idaho Wildlife Federation
Institute for Fisheries Resources
Long Live the Kings
The Mountaineers
Natural Resources Defense Council
North Cascades Conservation Council
Northwest Conservation Act Coalition
Northwest Environmental Defense Center
Northwest Resource Information Center
Northwest Sportfishing Industry Association
Oregon Natural Desert Association
Oregon Natural Resources Council
Oregon Trout
Pacific Coast Federation of Fishermen's Associations
Pacific Rivers Council
Rivers Council of Washington
Salmon For All, Inc.
Salmon For Washington
Sawtooth Wildlife Council
Sierra Club
Sierra Club Legal Defense Fund
The Wilderness Society
Trout Unlimited
Washington Kayak Club
Washington Trollers Association
Washington Wilderness Coalition
WaterWatch of Oregon
Western Ancient Forest Campaign

Received
JUN 28 1996
DSC-RP

June 26, 1996

Sarah Bransom
National Park Service
Resource Planning DSC-RP
P.O. Box 25287
Denver, CO 80225-0287

RE: Elwha River Ecosystem Restoration Implementation Draft EIS

Dear Ms. Bransom:

The Save Our *Wild* Salmon Coalition supports the preferred alternative (River Erosion) for dam removal as described in the Draft Environmental Impact Statement.

The 1992 Elwha River Ecosystem and Fisheries Restoration Act requires the full restoration of the Elwha ecosystem and its historic salmon runs. The DEIS correctly notes that the only way to achieve that legal mandate is through dam removal. The preferred alternative selected in the DEIS is a cost-effective, environmentally-sensitive method for removing the two aging Elwha River dams and restoring the river's ecosystem. The River Erosion approach is the most scientifically sound and fiscally responsible option.

Restoring the Elwha makes good economic sense. Removal of the Elwha River dams is one of the best opportunities to restore wild salmon anywhere in the Northwest. The combination of pristine habitat protected within Olympic National Park and the ability to remove the only obstacles to access that habitat add up to an excellent likelihood of success for rebuilding Elwha River salmon runs.

The DEIS identifies the huge environmental and economic benefits from this project. It is the most cost-effective solution for addressing the complex issues surrounding the Elwha River.

As the DEIS points out, the preferred alternative will restore more than 390,000 adult salmon and steelhead per year to the Elwha River (page 13). Removing the Elwha dams will also provide over $60 million in business activity and another $32 to $34 million of personal income to workers on the Olympic Peninsula (page 18).

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As part of its process for establishing management recommendations for 1996 ocean salmon fisheries, the Pacific Fishery Management Council passed a resolution on April 22, 1996 regarding the Elwha River. The Council strongly endorsed the acquisition and removal of the Elwha and Glines Canyon dams as the only cost-effective and beneficial way to fully restore the Elwha. *[see attached PFMC letter and resolution.]* The EIS should incorporate this recent endorsement in the section discussing fishery management objectives (page 179).

We are concerned that the DEIS understates the urgency of the situation and the need for action. Elwha River salmon runs face serious risk of extinction if the dams are not removed soon. Yet the implementation schedule for the project proposed in the DEIS calls for a very protracted time frame for pre-construction activities -- including approximately three additional years after acquisition before actual removal activities would begin (page 487).

It is crucial that the federal government press forward as quickly as possible. We urge the Park Service and cooperating agencies to consider ways to shorten the permitting and design work and expedite the bureaucratic process associated with restoration of the Elwha. Utilizing streamlined and concurrent permitting processes would allow for quicker implementation of the proposed action and better address the emergency nature of the situation.

We appreciate the opportunity to comment on this DEIS, and request you fund and implement the preferred alternative for dam removal and river restoration as soon as possible.

Sincerely,

Tim Stearns

Tim Stearns
Executive Director

attachment

cc: Senator Slade Gorton
Senator Patty Murray
Representative Norm Dicks
Representative George Nethercutt


OLYM-404-06- F85



June 25, 1996

Sarah Bransom
National Park Service
Resource Planning DSC-RP
P.O. Box 25287
Denver, CO 80225-0287

Dear Ms. Bransom:

Friends of the Earth (FoE) is a national environmental advocacy organization dedicated to protecting the planet from environmental degradation and empowering citizens to have an influential voice in decisions affecting the quality of their environment. Our regional field office in Seattle focuses on issues of specific importance to the Pacific Northwest. This letter is to provide comment on the Elwha River Ecosystem Restoration Implementation Draft Environmental Impact Statement (DEIS).

FoE commends the National Park Service for the thorough analysis contained in the DEIS. We support the preferred alternative (River Erosion) for dam removal as the most environmentally sound and fiscally responsible option. The DEIS clearly demonstrates that removing the dams and restoring the Elwha's historic salmon runs can be done in a cost-effective, environmentally sensitive manner. It is imperative that the federal government now fund and implement the proposed action as quickly as possible.

FoE has been the lead conservation organization for over ten years in the coalition effort to remove the Elwha River dams and restore the incredible salmon and steelhead runs that once flourished in the river. We became a formal intervenor in the FERC licensing proceeding for the Elwha dams in 1986. We were a party to the legal appeal in the U.S. Ninth Circuit Court of Appeals challenging FERC's legal jurisdiction to issue a new operating license for the Glines Canyon dam. We participated in the discussions leading up to passage of the 1992 Elwha River Ecosystem and Fisheries Restoration Act (P.L. 102-495). And we remain actively involved in the process of implementing the Elwha Act.

Although we have retained our ability to resume our administrative and court challenges, FoE firmly believes that this issue can best be resolved through timely implementation of P.L. 102-495. The consequences of *not* doing so would be extremely harmful for all parties concerned and would have serious consequences for the environment and the economy.

We remain committed to working cooperatively with the unique, broad-based coalition of conservation organizations, business interests, labor unions and Native American Tribes to resolve this issue. It is in the best interests of the salmon, the Tribes, Olympic National Park,

4512 University Way, NE • Seattle, WA 98105 • Phone: (206) 633-1661 • Fax: (206) 633-1935 • E-mail: foewase@igc.apc.org
Northwest Office



the local community, and the nation as a whole that the Interior Department remove the Elwha dams and the restore the river's ecosystem.

In that regard, we offer the following comments on the DEIS.

## GENERAL COMMENTS

The DEIS explains clearly the purpose and need for federal action. As numerous studies and reports have affirmed, removal of the Elwha River dams is the single best opportunity to restore wild salmon anywhere in the Pacific Northwest (for example, see Status of Pacific Salmon & Their Habitats, by McHenry, Lichatowich, and Kowalski-Hagaman, pages 138-146). The preferred alternative in the DEIS will fully restore Elwha River salmon and steelhead runs in 10 to 20 years, producing nearly 400,000 adult fish per year. Restoration of the habitat and fish runs would also provide major beneficial impacts to numerous wildlife species, including bald eagles and elk.

Removing these two aging dams will also provide certainty and stability for the Port Angeles economy. The Elwha Act protects over 300 high-wage union jobs at Daishowa's Port Angeles mill by providing the mill access to a reliable alternative supply of electricity. If the dams aren't removed, Daishowa faces high uncertainty over its ability to license and operate the dams, and may have to close down its Port Angeles mill operations.

The DEIS also correctly points out that removing the Elwha dams will provide over $90 million in new income to construction workers and businesses on the Olympic peninsula. And following restoration of the Elwha River, increased commercial and sport fishing, recreation and tourism activities will generate millions of dollars per year in new business revenues.

Dam removal is a wise investment and remains the most cost-effective solution for addressing the complex issues surrounding the Elwha River. If anything, the DEIS understates urgency of the situation.

In particular, FoE is concerned with the protracted timeframe for pre-removal activities articulated in the DEIS. We urge the Park Service and cooperating agencies to re-examine the proposed schedule allocating nearly 3 years for "permitting" prior to the beginning of dam removal activity.

After three distinct EIS processes, a formal report to Congress by the Secretary of Interior, plus numerous other studies and reports of the issue by tribal, state, and other non-federal entities, it is crucial that the federal government press forward as quickly as possible. There is an urgent need for expediting the bureaucratic process associated with restoration of the Elwha. The Glines Canyon Project has been operating on "temporary, annual licenses" for 20 years; more than six years have passed since the National Park Service formally called for removal of the two Elwha dams; and it has been nearly four years since the Elwha Act was passed by Congress and signed into law by President Bush. It is time to remove the dams!

In order to more clearly illustrate the value and viability of the Elwha project, the DEIS would benefit from a brief discussion of previous salmon restoration efforts on other river systems.

For example, the DEIS should point out examples of places where providing new access to quality habitat for anadromous fish has been tried and succeeded. Specific instances could include Sunset Falls on the Skykomish River, the Deschutes River near Olympia, the Frazier River in British Columbia, and numerous streams throughout Washington state previously blocked by poorly designed road culverts.

It would be valuable to the general public to include in this EIS a comparison of the proposed action on the Elwha to the experience on the Toutle River following the eruption of Mount St. Helens. ( A useful description was included on pages 41-42 in the June 1995 Elwha FEIS.) By describing the volume and duration of sediment loading as well as the natural fish recolonization in the Toutle River, the likelihood of success of the proposed action on the Elwha can be better illustrated.

In addition, the EIS should put removal of the Elwha dams into the context of the hundreds of other dams that have been removed across the United States. While the specific details of the Elwha restoration effort are somewhat unique, it is important to note that dam removals have taken place in every region of the country for environmental, safety, and economic reasons. Rat Lake Dam in Washington, Lewiston Dam in Idaho, Blue Bird Dam in Colorado, Two Mile Dam in New Mexico, Indian Rock Lake Dam in Missouri, and Prairie Dells Dam in Wisconsin are just a few examples of the numerous medium and large-sized dams that have been taken out. (Additional details on these and other removals are available from FoE's Northwest office.)

## SPECIFIC COMMENTS

*page 43*

Regarding the "Water Quality Impacts" section for the No Action Alternative, the EIS should include a discussion of potential requirements by the Environmental Protection Agency (EPA) concerning public water supplies dependent on surface water. The city of Port Angeles may well need to upgrade its existing water quality treatment capabilities as new monitoring and/or filtration requirements are required by EPA for currently unfiltered systems such as the system presently operated by Port Angeles. The water quality protection measures included in the proposed action could meet the need for such upgrades.

*page 48*

The Elwha Act seeks to resolve the complex regulatory, legal, and political battles surrounding the Elwha and Glines Canyon dams. Prior to its passage, years of protracted debate and controversy engulfed the licensing proceedings for these two dams. Concern regarding the condition of the Elwha's fishery resources and the uncertain state of the area's economy combined to make the timely resolution of this debate extremely important.

If the Elwha Act is not implemented, the various parties would be forced to pursue their goals through other means, including potential litigation. Thus failure to remove the dams under the No Action Alternative will (not might, as stated in the "Permitting" section of the DEIS) lead to resumption of the suspended licensing administrative proceeding and potential litigation. The costs to the federal government and private parties of a renewed licensing effort and/or litigation should be included in the EIS.



*page 66 (also relates to appendix 6, page 487)*

The permitting issues noted on page 66 and in appendix 6 raise serious concerns regarding the timeframe proposed for implementing the proposed action. The construction schedule on page 487 proposes nearly two years after dam acquisition before any actual construction activity begins. The schedule proposes 33 months for "permitting." And dam removal itself isn't proposed to begin until more than 3 full years after acquisition of the dams.

FoE is deeply concerned that the proposed schedule as outlined in the DEIS lacks the necessary sense of urgency and importance for moving forward on an expedited schedule. We understand and support the need to comply with the requirements of the numerous federal, state and local permit/review processes for a project of this size and complexity. Yet large scale construction projects involving multiple levels of government often utilize streamlined and concurrent permitting processes to allow for quicker implementation.

It is important to re-iterate the emergency nature of the proposed action. Time is running out for the severely depleted Elwha salmon runs; without speedy action to restore the natural river ecosystem, what was once one of the finest salmon rivers in the nation is at serious risk of seeing all its anadromous fish stocks driven to extinction.

In this regard, it is useful to note the permitting process associated with the removal of Rat Lake Dam near the town of Brewster in central Washington state. The entire permitting process and dam removal activities were completed in less than two years. In February 1988 the State of Washington Departments of Wildlife and Fisheries requested a Hydraulic Permit Approval for removal of Rat Lake Dam. In February 1988 the Department of Ecology issued an emergency exemption from SEPA permitting requirements for dam removal. The Okanogan Board of County Commissioners approved an emergency exemption from the provisions of the County's Shoreline Master Program under the State Shoreline Management Act in March 1988. Work on removal of the dams was completed in April 1989.

While permitting for removal of the Elwha and Glines Canyon dams may not need to be processed on an emergency basis, the Rat Lake example does point out how the process can be expedited and need not cause delays in implementing urgent actions.

*page 75*

The "Alternatives Considered but Rejected" section should include a more thorough discussion of options rejected. At the May 1996 public workshop on the DEIS, Park Service staff stated that as part of the environmental analysis of this project, sequential removal of the two dams was considered but rejected. The EIS should include a summary of the reasons why that option was rejected so as to address recent proposals advocating sequential removal.

FoE is concerned that a sequential or "phased" approach to removal would unnecessarily and undesirably delay crucial restoration measures and drive up the total project costs significantly. Costs would likely increase due to inflation and the need for two separate construction mobilizations. Even though concurrent removal of the two Elwha dams requires an up-front investment in time and money, overall cost savings will accrue as ecosystem and fisheries restoration is accelerated.

*page 154*

Under the "Electric Power Production" section, the EIS should note that the Elwha dams are not connected to the local Port Angeles power distribution system. The dams can only serve

power to the Daishowa mill; expensive new interconnections would need to be built in order to allow electricity from the dams to serve as a partial power supply to the Port Angeles community.

*page 162 (and page 323)*

Since its breach during construction in 1912, the Elwha dam has experienced significant seepage despite efforts to stop it. The EIS should quantify the amount of this seepage (70 cfs was a tentative figure given at the May 1996 public workshop) and discuss the safety concerns associated with a potential rapid, uncontrolled release of water resulting from a dam failure/blow out caused by an erosion of the alluvium that supports the dam foundation. The instability of the fill materials placed to plug the initial breach of 1912 and the potential for such a failure to recur is mentioned on page 79 of the DEIS; a more detailed discussion of that danger should be included as part of the dam safety section.

*page 179*

As part of the "Fishery Management Plan" section, the EIS should note that on April 22, 1996 the Pacific Fishery Management Council passed a resolution stating that *"the Council strongly endorses the acquisition and removal of the Elwha and Glines Canyon dams by the federal government at the earliest opportunity."*

*page 208*

Under "Flooding Impacts" section for the No Action Alternative, the EIS should note the potential catastrophic flooding danger similar to the 1912 event. Such an event could be caused by either seepage of water under the dam or earthquake activity in the vicinity of the dam. (see comments for page 162 above and page 321 below)

*pages 312-313*

The DEIS significantly understates the "Socioeconomic Impacts" of the No Action Alternative. For example, the $8.7 million in repair costs to the projects expected in the near future are expressed in 1990 dollars. In current dollars, those repairs would likely cost over $10 million.

In addition, even if the dams are not removed, numerous federal and state laws as well as requirements of international and Native American treaties would mean that millions of dollars would need to be spent on alternative fisheries restoration efforts. Attached is a chart prepared by FoE entitled *"Elwha River Restoration -- Cost Comparison of Dam Removal & Dam Retention Options"* which highlights likely measures which would be required if the dams are not removed.

*page 321*

The DEIS notes that the earthquake safety of Elwha dam is unknown. This issue is significant and should be related to the concerns noted above for pages 162, 208 and 323.

*page 327*

Under the "No Action Alternative," the DEIS states that hazardous materials found at the damsites would remain. Any such materials should be cleaned up/remediated under various state and federal laws regardless of whether or not the dams are removed. It is not acceptable to simply allow known contamination to remain.





*page 365*

In the "Impacts on Energy Consumption" section, the EIS should note that there currently is a large energy surplus in the Pacific Northwest. Bonneville Power Administration (BPA) is aggressively pursuing additional customer load to serve and has significant capacity to serve the full power needs of the Daishowa mill. As a result, the power from dams can readily be replaced from existing sources. In addition, as the DEIS points out, if new sources of power were to become necessary to replace the output from the dams, 1,500-4,000 megawatts of conservation are available in the region and could provide any new power needs related to dam removal.

## CONCLUSION

FoE supports the preferred alternative identified in the DEIS; the Park Service has selected a cost-effective, environmentally sensitive method for removing the two aging Elwha River dams and restoring the river's ecosystem. The DEIS identifies the huge environmental and economic benefits from this project. Our primary concern is the extended implementation time schedule and the lack of urgency for completing the project as quickly as possible.

Thank you for considering our views. We urge you to move swiftly in completing the final EIS as well as securing funds to acquire and remove the outdated Elwha River dams. Please contact me at 206/633-1661 if you have any questions regarding these comments, or if I can provide any assistance or additional information.

Sincerely,

Shawn Cantrell
Director, Northwest Rivers Project

cc: Senator Slade Gorton
Senator Patty Murray
Representative Rick White
Representative Norm Dicks
Representative Jim McDermott
Representative Jennifer Dunn
Representative Randy Tate

FRIENDS of the

## Elwha River Restoration – Cost Comparison of Dam Removal & Dam Retention Options

| | Dam Removal[1] | Dam Retention |
|---|---|---|
| Preconstruction Data Collection | 458,000 | |
| Project Decommissioning | 330,000 | |
| Water Quality Protection | 26,094,000 | |
| Flood Protection | 4,020,000 | |
| Dam Removal | 21,000,000 | |
| Hazardous Waste Cleanup | 587,000 | |
| Transmission Line Removal | 660,000 | |
| Road Rehabilitation | 508,000 | |
| Hatchery Modifications | 4,445,000 | 3,754,000[2] |
| Construction Management | 8,490,000 | |
| Waste Disposal Fees | 1,000,000 | |
| Water Quality Monitoring | 1,894,000 | |
| Sediment Modeling | 100,000 | |
| Cultural Resources | 665,000 | |
| Fish Restoration | 2,085,000 | 9,261,000[3] |
| Revegetation/Wildlife | 3,205,000 | |
| Marine Resources Monitoring | 150,000 | |
| Construction Related O&M Costs (water treatment facilities, etc) | 5,026,000 | |
| Trap & Haul at Glines Canyon Dam | | 6,404,000[4] |
| Fish Ladder at Elwha Dam | | 5,214,000[5] |
| Screens at Elwha Dam | | 9,300,000[6] |
| Screens at Glines Canyon Dam | | 10,900,000[7] |
| Gravel Additions | | 20,000,000[8] |
| Wildlife Studies/Monitoring | | 745,000[9] |
| Terrestrial Habitat Protection | | 1,490,000[10] |
| Ediz Hook Stabilization | | 1,440,000[11] |
| Standard Project O&M Costs | | 46,882,000[12] |
| Project Repairs & Replacements | | 8,713,000[13] |
| Subtotal | 81,337,000 | 124,103,000 |
| Convert to current 1995 dollars | | 18,739,000[14] |
| Subtotal | 81,337,000 | 142,842,000 |
| Project Acquisition | 29,500,000 | 29,500,000[15] |
| Other Land & Rights Costs | 300,000 | 300,000[16] |
| TOTAL | 111,137,000 | 172,642,000 |

4512 University Way, NE • Seattle, WA 98105 • Phone: (206) 633-1661 • Fax: (206) 633-1935 • E-mail: foewase@igc.apc.org
Northwest Office

**Notes:**

1. All dam removal costs are from the Department of Interior's 17-October-1995 *"Natural Erosion Alternative,"* developed by the Bureau of Reclamation for the National Park Service and are expressed in 1995 dollars.

2. From page A-120 of Federal Energy Regulatory Commission's (FERC) Draft Staff Report, March 1993. Includes new hatchery facility construction and equipment costs which would be required by FERC as a condition of a new license.

3. From page A-121 of FERC's Draft Staff Report. Includes annual O&M costs of fish restoration facilities which would be required by FERC as a condition of a new license.

4. From page A-131 of FERC's Draft Staff Report. Includes construction and annual O&M costs for upstream fish passage facilities which would be required by FERC as a condition of a new license.

5. From page A-131 of FERC's Draft Staff Report. Includes construction and annual O&M costs for upstream fish passage facilities which would be required by FERC as a condition of a new license.

6. From page 4-35, page F-125 and page F-557 of FERC's Draft Staff Report. Includes construction costs for conventional screens for downstream fish passage facilities which would be required by the federal fishery agencies under Section 18 of the Federal Power Act as a condition of a new license.

7. From page 4-39, page F-126 and page F-558 of FERC's Draft Staff Report. Includes construction costs for conventional screens for downstream fish passage which would be required by the federal fishery agencies under Section 18 of the Federal Power Act as a condition of a new license.

8. From page F-110 of FERC's Draft Staff Report. This is FERC's calculation of the cost of gravel augmentation program called for by the federal fishery agencies to replace materials trapped by the two dams to provide spawning and rearing habitat. Total figure is derived by using FERC's low-end cost estimate of $500,000 per year over a 40 year license period.

9. From pages 4-57 and 4-58 of FERC's Draft Staff Report. Includes costs for completing wildlife studies and monitoring programs which would be required by FERC as a condition of a new license.

10. From page A-131 of FERC's Draft Staff Report. Includes construction costs for terrestrial habitat protection measures which would be required by FERC as a condition of a new license.

11. From pages 3-20 and 4-153 of FERC's Draft Staff Report. FERC calculated 36% of the current Ediz Hook beach replenishment costs were attributable to sediments trapped by the two dams. Total figure is derived by multiplying FERC's cost estimate of $100,000 per year by 36% over a 40 year license period.

12. From page A-92 of FERC's Draft Staff Report. Includes all routine operation and maintenance activities associated with the hydroelectric facilities over a 40 year license period.

13. From pages A-96 through A-99, and page A-131 of FERC's Draft Staff Report. Includes FERC's forecast of repair or replacement costs required at the two dams over the next 40 years. These costs are in addition to standard O&M costs associated with operation of the dams during that time period.

14. All costs from FERC's Draft Staff Report are expressed in 1990 dollars. The conversion to current (1995) dollars was calculated by using an inflation multiplier of 0.151 from the Consumer Price Index Monthly Detailed Report by the Bureau of Labor Statistics, U.S. Department of Labor, October 1995.

15. Assumes federal acquisition of the Elwha River Projects, as stated in December 23, 1994 letter from Senator Slade Gorton, Senator Patty Murray, and Representative Norm Dicks to Interior Secretary Bruce Babbitt. Cost figure is from P.L. 102-495, the Elwha River Ecosystem and Fisheries Restoration Act.

16. Assumes federal acquisition of the Elwha River Projects, as stated in December 23, 1994 letter from Senator Slade Gorton, Senator Patty Murray, and Representative Norm Dicks to Secretary Bruce Babbitt. Cost figure is from the Department of Interior's 17-October-1995 *"Natural Erosion Alternative,"* developed by the Bureau of Reclamation for the National Park Service.

OLYM-404-06-188

# THE ELWHA DAMS REMOVAL FUND

P.O. BOX 20519
SEATTLE WA 98102-9998
206-731-8488

Received
JUN 2 0 1996
DSC-RP

Ms Sarah Bransom

The Elwha Dams Removal Fund is writing in support of the Proposed Action for dam removal presented in the Elwha River Ecosystem Restoration Implementation DEIS of April 1996. The removal of the Elwha and Glines Canyon Dams and the restoration of wild salmon runs within the Elwha River will benefit both the environment and the economy of the region.

Because the costs associated with dam removal and river restoration are high, appropriations of funds for the project is an investment by the federal government in both the river and the people who live around it. "The Elwha River Restoration Act" of 1992 stipulates that water quality and safety mitigation costs must be included in the project works. Although the costs for river restoration may seem high, a quarter of the budget (29.5 million) will be spent to purchase the dams and the land beneath the reservoirs, and a quarter of the budget (29.8 million) for water quality mitigation and flood control measures. The Elwha Dams Removal Fund fully supports all planned and recommended mitigation measures within the DEIS of April 1996.

One means of insuring a sound investment in the Elwha River, the surrounding community, and Olympic National Park is to involve as many of the local businesses and work force in the project works. In this way, the needs of the community and the health of the local economy can be addressed within the scope of the project budget, rather than in addition to it. This attention to the community surrounding the river would demonstrate that there is a strong sense of cooperation between Olympic National Park and the people and businesses outside the Park. It would also help assure local stewardship of the River once restoration efforts are complete.

The Elwha Dams Removal Fund is working to raise money to help support the removal of the dams and the restoration of wild salmon runs within the Elwha River. We strongly support the immediate start of appropriations of funds for dam purchase and water quality mitigation measures as outlined in the DEIS of April 1996.

Y. P. Rochon

Yvan Rochon
President

OLYM-404-06-197

Received
JUN 2 8 1996
DSC-RP

# National Parks and Conservation Association

PACIFIC NORTHWEST REGIONAL OFFICE

PHIL PEARL
*Director*

June 20, 1996

Ms. Sarah Bramsom
National Park Service
Denver Service Center
Resource Planning, DSC-RP
12795 West Alameda Parkway
Denver, CO 80225-0287

Dear Ms. Bramson:

The National Parks and Conservation Association (NPCA) is America's only private non-profit citizens organization dedicated solely to protecting, preserving and enhancing the U.S. National Park Service. NPCA was founded in 1919 and today has more than 450,000 members. The purpose of this letter is to comment on the April 1996 Elwha River Ecosystem Restoration Implementation/Draft Environmental Impact Statement (DEIS).

NPCA has long supported the removal of the Elwha and Glines Canyon dams followed by full restoration of the Elwha River ecosystem. The Elwha dam completely blocks an upriver migration of anadromous fish. The Glines Canyon dam, which continues to operate inside Olympic National Park borders with a license that expired in 1976, adds further insult to this situation. Together, these two dams eliminate 93% of the Elwha River's anadromous fish habitat - almost all of which is located within Olympic National Park - and are directly responsible for the precipitous decline in the Elwha's native salmon and sea-going trout populations. This decline has impaired and continues to impair the natural and cultural resources of Olympic National Park.

The Organic Act and the authorizing legislation for Olympic National Park require that the park's natural and cultural resources be managed and protected ***In their unimpaired condition*** for future generations. The Redwood Act, pursuant to the mandate of the Organic Act, gives federal land managers the obligation and legal means to regulate adjacent land uses that impact or may impact park resources. The Elwha River Ecosystem and Fisheries Restoration Act requires the "*...full restoration of the Elwha River ecosystem and native anadromous fisheries ...*" (Section 3(c)). Accordingly, the DEIS properly focuses on the preferred method of dam removal (as opposed to the dated and now irrelevant question of whether the dams should be removed at all).

**Pacific Northwest Regional Office**
P.O. Box 12216, Seattle, WA 98102
Tel: (206) 328-7274 • Fax: (206) 328-7281

**National Office**
1776 Mass. Ave., N.W., Washington, D.C. 20036
Tel: (202) 223-6722 • Fax: (202) 659-0650

NPCA supports dam removal via the preferred "River Erosion" alternative. This alternative offers the most environmentally sound and fiscally responsible means of remediation. The DEIS clearly demonstrates the feasibility and desirability of this approach.

In contrast, the "No Action" alternative maintains an unlawful status quo that is sure to result in the continued decline of anadromous fish populations, no resolution of the FERC licensing issues, disregard for trust agreements with Native Americans and on-going, costly litigation. The No Action alternative does not adequately address issues such as whether or not the Projects can legally continue to operate without a FERC licenses or whether they can produce power at competitive prices (i.e. stay economically viable and operational) - particularly if court action related to the FERC licensing requires the Projects to address anadromous fish issues, the clean-up of hazardous waste, etc.

The No Action alternative also appears to be scientifically flawed in its assumption that restoration efforts are possible without dam removal. Recent studies now underscore the role of gravel beds and fish carcasses to spawning areas and nutrient cycles. In this regard, national park fish biologists estimate that 90% of the Elwha's gravel supply is trapped behind the Glines Canyon dam. Likewise, unless fish carcasses are there to put nutrients back into the river, ferrying hatchery raised fish above the dam is fruitless.

The "Dredge and Slurry" alternative is a possible alternative to the preferred River Erosion method, although it is significantly more invasive from a construction and de-construction standpoint. Moreover, the permit process and potential impacts of slurry transport to the Strait of Juan De Fuca may prove to be extremely complex. This alternative is also significantly more expensive then the preferred River Erosion alternative - without any clear-cut advantages.

Disappointingly, all of the alternatives explored by the DEIS understate the urgency of the situation. Anadromous fish populations have, in recent years, been in precipitous decline. Those fish that that do return must compete for spawning habitat in the lower 4.9 miles of the river (i.e. the free flowing river below the Elwha dam). Studies now show that this competition and resultant overcrowding, along with the higher temperatures typical of impounded waterways, may be responsible for the unprecedented spread of an infectious disease known as *Dermocistidium*. In 1994 *Dermocistidium* is believed to have resulted in a 40% decline in native fish stocks. In 1995 researchers observed a further 70% decline. Mortality of this magnitude underscores why time is so critical.

In this regard, NPCA urges the National Park Service and other cooperating agencies to consider methods of collapsing the proposed three year permit process. To date here have been exhaustive studies on the Elwha and Glines Canyon dams and their affects on anadromous fish. There have also been three environmental impact statements (FERC EIS, Programmatic EIS and the subject Implementation DEIS). Accordingly, and with due consideration to the urgency of the situation, there does not appear to be good reason to spend three years permitting the project. Unnecessary delays only serve to put the Elwha's returning salmon populations in further jeopardy of extinction, compound the problem and make the project more costly.

To the extent that the implementation time-frame can be collapsed (i.e. through reduced permitting and more expeditious dam removal), cost savings may be realized. In this regard, it would be helpful to include in the final EIS an economic analysis on how project costs are affected by time (i.e. expediting the process vs. delaying the process). Such an analysis may also be useful to respond to individuals and organizations suggesting that removal of the dams should be delayed and/or phased in after further incremental study.

Assuming the EIS process is intended, in part, to educate the public, it may also be useful to provide proven examples and context on various issues related to dam removal, sediment impacts, ecosystem restoration, etc. For example, we would assume that this is not the first instance where a dam has been removed and an ecosystem restored. It would be instructive for the final EIS to cite such experiences and case studies. It may also be instructive to put the sediment issue in context. For instance, how does a controlled release of sediment relate to the catastrophic releases associated with record floods or the downstream sediment flow experienced during the Mt. St. Helen's eruption? How have the rivers and fish been affected and have they recovered? What have we learned from this experience?

It may also be helpful from an educational standpoint to include additional information on sediment and water quality issues. Clearly, the biggest concern expressed by local residents relates to water quality. In this regard, every effort should be made to provide, not only scientific modeling, but empirical information and proven examples of how the impacts of high sediment loads have and/or have not affected water quality and, very specifically, how impacts will be addressed. It may also be useful to be more specific and outline the various contingency plans in the unlikely event that things do not go as planned.

Finally, there is the issue of how dam removal will be interpreted on-site. We understand that the National Historic Preservation Act requires careful documentation of national historic register sites impacted by federal actions. We also understand that there is an important story to be told. However, we urge the National Park Service to consider leaving no physical trace of the dam and to pursue interpretation though photographs and other media.

In summary, NPCA: 1) supports the River Erosion alternative; 2) recommends that every effort be made to collapse the proposed permitting and implementation time-frames; 3) recommends that the final EIS include an economic analysis of various time-frames and how each may affect total project costs; 4) recommends that the final EIS provide more empirical and educational information on downstream sediment flow and its potential affects on water quality; and 5) requests that the National Park Service reconsider its approach to interpreting dam removal.

NPCA appreciates the opportunity to comment on this DEIS. If there are any questions, please do not hesitate to contact me at 206/328-7274.

Sincerely,

Phil Pearl
Regional Director



CLSM-404-06-223

Received
JUN 20 1996
DSC-RP

744 Hunt Road
Port Angeles WA 98363
June 25, 1996

Sarah Branson, National Park Service
Denver Service Center, Resource Maanagement-RP
12795 West Alameda Parkway,
P.O. Box 25287
Denver CO 80225-0287

Dear Ms. Branson,

We have the draft copy of the Implementation EIS report for the restoration of the Elwha River Ecosystem (dated April 19, 1996). We cannot see any reference to our concern that "aggradation" of the Elwha river, uninhibited by the two subject dams, would "increase water surface elevations by as much as 1 to 4 feet", and in time cause the river to meander to the cliffs on the western side of the river basin, erode them, thereby jeopardizing the homes which have been erected on the bluff. There are at present 12 homes constructed near the bluff's edge. One additional home is planned.

Representatives of our community, the Elwha Place Homeowners Association, have attended meetings called by government officials, designed to address our concerns. This particular problem has been raised and we have been told that it is not a likely event. However, we do not all share that optimism. Particularly mentioned is the levee on the east side of the river, constructed, I believe, in 1986. Its effect on the increasingly meandering river would be, it seems to us, to move the river westerly.

Homes are still being constructed in this development, the latest one about two years ago, and one remaining lot is to be developed in the near future.

State requirements prohibit construction within 100 feet of the edge of the bluff, but these requirements can be superseded by engineering studies which state that these cliffs are stable. I personally built my home in 1992 and was required to submit just such an engineering study which assured me and the County planners that I could build to the limit approved by deed restrictions, 15 feet from the cliff's edge.

Please let me and our association know exactly hov the event of cliff erosion, will be mitigated, particularly addressing the effect of the dyke on the east side of the river.

Yours truly

Scott P. Ewing

Scott P. Ewing

ccs: President, Elwha Place Homeowners Association
Clallam County Commissioners' Office

American Rivers



June 26, 1996

Ms. Sarah Bransom
National Park Service
Denver Service Center
Resource Management - RP
12795 West Alameda Parkway
P.O. Box 25287
Denver, CO 80225-0287

Re: American Rivers' Comments on Draft Environmental Impact Statement - Elwha River Ecosystem Restoration Implementation

Dear Ms. Bransom:

American Rivers supports the Proposed River Erosion Alternative of the Elwha River Ecosystem Restoration Implementation Draft Environmental Impact Statement (Elwha DEIS). American Rivers is a national, non-profit membership organization with the mission of protecting and restoring North American rivers and their associated riverine ecosystems. The Northwest Regional Office is located in Seattle and works in the states of Washington, Oregon and Idaho. One of our principle programs for restoring rivers is our dam licensing work. We were intervenors in the Elwha relicensing before the Federal Energy Regulatory Commission and are deeply committed to restoration of the Elwha's magnificent wild salmon runs.

Prior to 1911, the Elwha River was one of the few rivers in the Pacific Northwest to sustain substantial runs of all six species of Pacific Salmon as well as two species of anadromous trout. The salmon were an essential part of the Elwha River ecosystem, providing animals residing in the Elwha basin with a reliable food source and native plants with nutrients essential for their growth.

From 1911 to 1926, the Elwha River ecosystem was drastically altered by the construction of the Elwha and Glines Canyon Dams. These dams decimated the once abundant salmon runs of the Elwha by blocking fish passage to 93% of vital upstream salmon habitat. Now what was once one of the finest salmon fisheries in the country is at

NORTHWEST REGIONAL OFFICE
400 EAST PINE STREET
SUITE 225
SEATTLE, WA 98122-2360
206-323-8186
206-323-8188 (FAX)
arnw@igc.apc.org (INTERNET)



serious risk of complete extinction. Destruction of the runs has caused the displacement of many animal species that relied on salmon for food. The dams have also stopped the movement of organic material and sediment down the river, depriving the remaining salmon of spawning habitat below the dam as well as the nutrients needed to support their life cycle.

Because of the national importance of the Elwha ecosystem in one of the crown jewels of our National Park system, the Congress mandated the full restoration of its historical salmon runs in 1992 with the enactment of the Elwha River Ecosystem and Fisheries Restoration Act (Elwha Act). The Department of Interior, and specifically, the Secretary, released both draft and final environmental impact statements in 1994 and 1995, following the direction of the Congress to determine the best alternative for restoration. The Secretary chose dam removal as the only alternative that could fulfill the Congressional mandate. We agree with that determination and fully support it.

We are writing to comment briefly on the draft environmental impact statement issued April 19, 1996, which addresses alternatives for implementing dam removal. We fully support the preferred alternative to remove the two dams by notching them down over an 18 month to 2 year period and allowing sediment removal by natural river processes. This is clearly the most environmentally and economically sound of all the studied alternatives.

The Secretary projects that the river erosion alternative will allow the production of some 400,000 fish in the Elwha River within 10-20 years. Production of this number of fish will be of incalculable benefit to the numerous wildlife species that occupy the basin. In addition, it will allow sediment trapped behind the dams to be transported by natural processes downstream to the strait of Juan De Fuca which will in turn restore critical spawning gravel to the lower Elwha river. Coincidently, the natural erosion method of dam removal will minimize the period of high sediment concentration in the river while still allowing control over sediment transport during critical salmon life cycle stages.

The removal of the dams will also provide benefits to the local community. The mill that relies on the dams for power will be supplied with an alternative source of power, protecting the 300 jobs the mill provides to the area. The removal effort itself will infuse some $90 million in revenue to local construction workers and businesses in the area. After the removal is complete and the Elwha River is restored, increased recreation, tourism, and fishing opportunities will generate millions of dollars per year in new business revenues.

We have one caution. The time frame for implementing the Elwha Act must be advanced. The three study processes have taken some 4 years, time during which the at-risk stocks of the Elwha continue to decline. It is crucial for the Secretary to move as quickly as possible to implement the preferred alternative. Local citizens, the dam owners, business interests, sport fisherman, commercial fisherman, state and federal agencies, Native American Tribes and environmentalists all support removal of the dam and

restoration of Elwha River salmon runs. Further delay only increases costs and the likelihood of losing the runs forever.

American Rivers also requests the Secretary to provide more information on the value of Elwha ecosystem restoration by discussing successful salmon restoration projects throughout the Northwest and elsewhere. The FEIS would benefit from a discussion of some of these successful efforts and the benefits -- both economic and environmental -- that they provide.

We congratulate you on a great study effort. Let's get to implementation before it is too late.

Sincerely,

Mark Peternell
Katherine Ransel

cc: Senator Slade Gorton
Senator Patty Murray
Congressman Rick White
Congressman Norm Dicks
Congressman Jim McDermott
Congresswoman Jennifer Dunn
Congressman Randy Tate





D65-404-06-237

*For Wildness and Diversity in the Pacific Northwest*

NORTHWEST ECOSYSTEM ALLIANCE

Received
JUN 2 8 1996
DSC-RP

June 25, 1996

Sarah Bransom
National Park Service
Resource Planning DSC-RP
P.O. Box 25287
Denver, CO 80225-0287

RE: Comments on the Elwha Environmental Impact Statement

Dear Ms. Bransom:

I am writing on behalf of the Northwest Ecosystem Alliance (NWEA) to comment on the Elwha River Ecosystem Restoration Implementation Draft Environmental Impact Statement (DEIS). NWEA is a public-interest environmental organization of 2,500 members from around the Pacific Northwest with a commitment to protecting wildlands and biodiversity. Our members appreciate the Elwha as a beautiful place for recreational activities such as hiking and camping, as well as its importance as salmon and steelhead runs.

The DEIS thoroughly illustrates that the River Erosion alternative is both economically and environmentally feasible. For these reasons we have chosen to support the preferred alternative (River Erosion) for the removal of the Elwha river dams.

Numerous studies have concluded that the removal of the Elwha River dams is the Pacific Northwest's best opportunity to restore wild salmon. The preferred alternative in the DEIS would completely restore Elwha River salmon and steelhead runs within the next 10 to 20 years, which would produce close to 400,000 adult fish per year. The restoration of habitat and fish runs would also benefit numerous wildlife species, including bald eagles and elk. The increased sport and commercial fishing, recreation and tourism activities, following restoration, will generate millions of dollars per year in new business revenues.

It has been nearly six years since the National Park Service officially called for the removal of the two Elwha River dams, and four years since the Elwha River Ecosystem and Fisheries Restoration Act (P.L. 102-495) was signed into law by President Bush. It is past time that the dams be removed, and restoration of the Elwha River should occur as quickly as possible. For this reason we are concerned about the extended timeframe the DEIS has allotted for pre-removal activities. We urge the Park Service to reevaluate the proposed schedule which would allocate three years for "permitting" prior to beginning dam removal.

We urge you to consider these issues, with the swift restoration of the Elwha River foremost in your thoughts.

Thank You,

Jenny O'Farrell
Jenny O'Farrell
Conservation Associate

(360) 671-9950
FAX (360) 671-8429

Suite 316, 1155 N. State St., Bellingham, WA 98225
MAIL P.O. Box 2813, Bellingham, WA 98227-2813

OLYM-404-06-271

West Coast Conservation Office

45 S.E. 82nd Drive, Suite 200 Gladstone, Oregon 97027-2522
Phone: (503) 650-5412 Fax: (503) 650-5426

June 25, 1996

Sarah Bransom
National Park Service
Denver Service Center, Resource Planning
DSC-RP
12795 West Alameda Parkway
P.O. Box 25287
Denver Colorado 80225-0287

Dear Ms. Bransom:

I am pleased to have this opportunity to comment on the Draft Environmental Impact Statement on Elwha River Ecosystem Restoration Implementation. These comments are submitted on behalf of Trout Unlimited, the nation's largest coldwater fisheries conservation organization. Trout Unlimited has over 95,000 members in 450 chapters nationwide. Our 4500 Washington members have been especially active in deliberations concerning the Elwha River dams and its salmon runs for many years. We believe that complete Elwha River restoration is achievable and can be pursued in a manner that provides important social, economic, cultural and ecological benefits to the nation, the Pacific Northwest and the local area.

In our view, the Elwha River drainage represents one of the finest large-scale salmon restoration opportunities in the world. The basin once supported very large runs of anadromous fish--including chinook, coho, pink, chum and sockeye salmon, steelhead, along with searun cutthroat trout, anadromous char and sturgeon. The fabled chinook salmon reportedly ran to one hundred pounds in weight. These runs have international, national and regional significance. They historically numbered in the hundreds of thousands, but were depleted by a variety of human development activities. By far the largest cause of their decline and the most substantial impediments to their recovery have been the construction and continued operation of the Glines Canyon and Elwha dams on the Elwha River. These dams have blocked passage of the salmon runs in the bulk of the Elwha drainage and have dramatically degraded the riverine ecosystem above and below the projects. We agree with the numerous agencies and scientists who have concluded that dam removal is the only effective way to restore that ecosystem.

In 1992, after extensive regional discussions and careful Congressional deliberation, Congress passed the Elwha River Restoration Act. The legislation is an important settlement of controversies that raged for years and could be revived if the law is not fully implemented. The statute provides for the removal of the dams and the full restoration of the basin. Trout Unlimited actively supported the legislation and believes that its full implementation should be expedited.

We understand that a key requirement for implementation of the Restoration Act is the availability of adequate funding for dam removal and related restoration activities. We have a number of ideas about how that funding can be provided. It is not clear that continuing to operate the projects in what has become a highly competitive West Coast energy market will produce a large source of funds for the restoration effort and we would encourage the Park Service to have this issue evaluated with considerable care. We also wish to make it clear that we are skeptical about the earmarked diversion of funds for this effort from other important natural resource management purposes and would strongly oppose any suggestion that funds be diverted from the Columbia River salmon restoration effort to accomplish this task. We believe that both the Columbia and Elwha restoration efforts are urgent and can and must be pursued without one impinging on the other. We do not want to pit one badly depleted set of salmon runs against the other. In fact, much can be learned from the Columbia River salmon restoration effort where relatively modest improvements in the riverine ecosystem of the Columbia Basin have not been sufficient to reverse the enormous declines in the once-bountiful salmon populations there.

We appreciate the support the Clinton Administration has provided for dam removal and Elwha restoration. We note that the Lower Elwha S'Klallam Tribe has supported the removal of the Elwha dams for some time, as has the Washington Department of Fish and Wildlife. These two managers of the fishery resource are in concurrence on the merits and desirability of dam removal. It would be consistent with their management objectives to conclude the task that Congress and the Clinton Administration have supported repeatedly throughout the early 1990s.

We commend to your attention the recently completed work of the Elwha Citizens' Advisory Committee. Trout Unlimited worked closely and cooperatively with the Committee as it reviewed the merits of dam removal and ecosystem restoration. The Committee--comprised of local officials, business and civic leaders from the Port Angeles area--has concluded that the biological and fisheries restoration case for dam removal is compelling. The Committee also observed correctly that a practical source of supportive funding is essential for pursuit of dam removal. We urge that these funding issues be resolved very soon, since the Elwha River salmon are in desperate shape and require immediate attention.

The Advisory Committee recommended acquisition of the Glines Canyon and Elwha dams, prompt initiation and completion of necessary production facilities to protect and enhance depleted runs and the creation of a fund to help finance future restoration activities.

The Committee further recommended the implementation of a restoration strategy that would improve water quality, enhance gravel for spawning, distribute carcasses to enhance stream productivity and provide benefits to numerous other species of fish and wildlife, among other important measures. The intent of the Committee's immediate recommendations is to focus now on actions to protect the Elwha chinook stocks that are at critically low levels and start the restoration process expeditiously.

The Committee adopted a phased approach to dam removal. It suggests that Elwha Dam should be removed first in order to provide an early opportunity to learn in more detail about the prospects and challenges of removing dams of this size. We believe that the removal of both dams should be expeditiously undertaken in a way that will quickly restore the riverine ecosystem. In undertaking this effort, we should proceed in a disciplined manner that will provide important guidance for future river restoration work in the Elwha drainage and at other appropriate dam sites around the region. As dams wear out, or are otherwise found to be problematic or unnecessary, the lessons learned in Elwha dam removal will be especially valuable if carefully documented. We have found this to be true in a variety of national efforts to restore rivers, including recent Trout Unlimited work on the Clyde River in Vermont and elsewhere.

On many of the issues addressed by the Committee, Trout Unlimited believes that the Committee has arrived at an important consensus and their efforts should accelerate the day when the Elwha River watershed can be restored to a natural river condition. We applaud the problem-solving approach they applied to this issue. We would of course hope that the schedule proposed by the Committee can be accelerated further so that the process of dam removal and full restoration can be completed on a more expeditious schedule. We believe that the economic concerns raised by the Committee can be adequately addressed and that the economy of the local area will not be weakened and will in fact benefit substantially in both the short and long-term when the dam removal effort is undertaken and the runs can be restored. While we believe that the implementing agencies are best able to sort out the technical and engineering issues raised by the Committee, we see no substantial obstacle to completing restoration once the Elwha is a riverine ecosystem again. We urge that the Department of the Interior proceed with the dam removal and restoration activities as rapidly as feasible.

The Environmental Impact Statement is a solid and clearly written document. It analyzes the available alternatives and reaches the appropriate conclusion in our view. Removal of the Glines Canyon and Elwha dams is the centerpiece of the restoration effort. The preferred alternative, which relies on natural erosion to distribute accumulated sediments, appears sound and, in conjunction with the proposed monitoring of sediment transport and river channel topography, provides the essential safeguards for pursuit of this low-cost sediment removal option. Coupled with a modest amount of related habitat and production work and carefully restricted harvest for the recovery period, the restoration effort should proceed in the very near future. The preferred alternative also proposes measures covering municipal water quality, flood control and the protection of cultural resources, in particular those of importance to the Lower Elwha Klallam culture--all of which are key issues that must be addressed for the restoration effort to proceed in a manner that meets these concerns.

In conclusion, the opportunity to undertake this important restoration action is a welcome one for our organization and we urge the Park Service to proceed expeditiously to implement dam removal and full restoration of the Elwha River Basin and its storied fisheries resource as rapidly as feasible. If we can provide any assistance in this important effort, please don't hesitate to call on us as we would be happy to do so.

Sincerely,

Rick Applegate
West Coast Conservation Director

OLYM-404-06-280

**Olympic Park Associates**
13245 40th N.E.
Seattle, WA 98125-4617

June 25, 1996

Ms. Sarah Bransom, National Park Service
Denver Service Center, Resource Planning, DSC-RP
12795 West Alameda Parkway
P. O. Box 25287
Denver, Colorado 80255-0287

Dear Ms. Bransom:

Submitted herewith are the comments from Olympic Park Associates on the Elwha River Ecosystem, Restoration, Implementation Draft Environmental Impact Statement, dated April 1996.

Olympic Park Associates (OPA), founded in 1948, is a citizen organization advocating for and working on behalf of the protection, maintenance, and restoration (where deteriorated due to human activities) of the ecological integrity and wilderness of Olympic National Park and surrounding areas.

The Glines Canyon dam in Olympic National Park (ONP) and the Elwha Dam located outside the Park have had and continue to have major impacts on the Elwha River, its watershed, and the associated fish and wildlife populations native to Olympic National Park.

Olympic Park Associates was one of the original five conservation intervenors before the Federal Energy Regulatory Commission (FERC) after James River applied for a second 50-year license for the Glines Canyon hydroelectric project and a first license for the Elwha Dam (built prior to the Federal Power Act of 1921). We contended, and contend, that the Glines Canyon and Elwha Dam projects should not be licensed and should be removed. In addition to the current impacts and damage to the Elwha River and its associated fish and wildlife habitat, licensing Glines would be in direct violation of the 1921 Federal Power Act's prohibition of hydroelectic installations within national parks and monuments. As the DEIS so thoroughly reveals, the Elwha dam was and is a major component causing the loss of genetically native anadromous fish once migrating to and inhabiting the upper Elwha River and its tributaries.

In spite of human-caused degradations such as this in ONP, UNESCO recognized and designated ONP as both a Biosphere Reserve and a World Heritage Site. Restoring the Elwha River, its immediate surroundings and its watershed to its previous ecological integrity





**Olympic Park Associates**
13245 40th N.E.
Seattle, WA 98125-4617

will be a major achievement in adhering to the mandate of the 1916 National Park Act and the 1938 Olympic National Park Act requiring the natural systems and indigenous wildlife to remain "*unimpaired.*" Restoration of the Elwha system will also result in ONP becoming an even more ecologically viable and valuable Biosphere Reserve.

GENERAL:

Olympic Park Associates commends the National Park Service for its quite thorough analyses and documentation of the past and current impacts of the Elwha and Glines Canyon Hydroelectric Dam installations on Olympic National Park, as well as on other affected communities.

Olympic Park Associates supports the River Erosion Alternative in the Proposed Action. We will not address the other alternatives set forth in the Elwha River DEIS other than to note that the Dredge and Slurry Alternative would appear to result in a less natural recovery than river erosion and that the No Action Alternative to retain the Glines Canyon and Elwha hydroelectric operations is unacceptable.

RIVER EROSION ALTERNATIVE

ONP's Primary Management Goals: OPA fully concurs in the "first of the park's five primary management goals...to conserve, maintain and restore, where possible, primary natural resources and those ecological relationships and processes that would prevail were it not for the advent of modern civilization." Removing the Glines Canyon hydroelectric installations is one of the most important opportunities to fulfill this top primary goal.

Sediment: Olympic Park Associates is impressed with the procedures developed for the relatively gradual return of the sediments accumulated behind the dams to the down-river system of the Elwha River and its estuary. This ultimately results in a once-again free-flowing Elwha River from its headwaters to the Strait of Juan de Fuca.

OPA also anticipates that when the river is fully recovered to its natural condition, future sediments will again contribute to the "permanence" of such areas as Ediz Hook, without its having to rely on artificial augmentation.

Founded 1948 "To preserve the integrity and wilderness of Olympic National Park"

**Olympic Park Associates**
13245 40th N.E.
Seattle, WA 98125-4617



Fishery: OPA commends the National Park Service for its explicit plans to restore the genetically-evolved Elwha anadromous fish populations which have been substantially diminished by the existence of the river-blocking dams. However, it is essential to begin this process sooner than the proposed permitting and dam removal schedules outlined in the proposed action. Further delay can only exacerbate the hoped-for survival of some of these remaining stocks. OPA urges that the time frames be shortened from those outlined in the DEIS.

The future increased populations of these anadromous fish are of interest and benefit not only for the Lower Elwha S'Klallam Tribe and to commercial and sports fishing interests. These fish can also be expected to restore various wildlife populations within Olympic National Park, once dependent on this food source, to something like their pre-dam numbers.

Mention is made in the DEIS regarding potential interactions once the Elwha fish return to salt water. The DEIS should also note that another source of deleterious effects on the revitalizing Elwha anadromy could come from nearby "fish farms" having other genetic backgrounds, including Atlantic salmon.

Vegetation Restoration: OPA is in full accord with the proposed action to revegetate the Glines Canyon reservoir site and dam and hydroelectric structure sites with species native to the Elwha watershed. We note, however, one omission to this excellent plan. This is the proposed retention of the spillway structure.

Cultural Resources: OPA fully concurs with recovery and protection of the historical and pre-historical records/artifacts/locations related to the Lower Elwha S'Klallam Tribe.

OPA also recognizes the desires of those who wish to perpetuate some remnants of "modern civilization" as developed in the 1920's in Glines Canyon. But, Olympic Park Associates is shocked to find that consideration is being given to leaving any part of the Glines Canyon hydroelectric project in place to "interpret" the damage done by it within the park. The entire area covered by the dam, reservoir, spillway, power house, penstock, and other related structures should be completely restored to their natural state with the planting of native vegetation.



**Olympic Park Associates**
13245 40th N.E.
Seattle, WA 98125-4617



The "photograph" on page 361 portrays the scene after all structures except the spillway have been removed. This picture graphically shows the great blight a retained spillway will be to an otherwise aesthetically pleasing scene. It is appalling to learn that this could have even been contemplated.

Noted also is the photograph opposite page 413 which shows the 1926 excavation taking place for the spillway. It would appear to be perfectly feasible to remove the spillway and restore the site with native vegetation as a part of the recovering "wilderness" in adjacent areas.

Historical Interpretive Alternates: Historic aspects of the relationship of the Glines Canyon and Elwha hydroelectric projects to the Port Angeles area and its devastating impact on Olympic National Park can most assuredly be achieved by a mock-up of the installations. Interpretation of what the Glines and Elwha dams meant to the Port Angeles area could best come from the owner and operators of these dams and/or the local visitors' agency. They could develop the historical record and mock-ups of both projects, locating them on the premises of Daishowa America, or a Port Angeles visitor center, or the existing Pioneer Museum. And, as was suggested several years ago - perhaps with tongue-in-cheek - pieces of the dam and appurtentant structures could be sold to visitors.

Programmatic Agreement: It is noted in Appendix 5 that a "Programmatic Agreement" was signed in 1995 by the National Park Service, Lower Elwha S'Klallam Tribe, the Washington State Historic Preservation Officer, and the Advisory Council on Historic Preservation. This is important and essential for the Tribe to protect its historic and pre-historic cultural resources that are known or may become known. However, Olympic Park Associates does not believe it is the responsibility of "NPS [to] ensure that the story of the Elwha and Glines Canyon dams...be interpreted to park visitors" at the site of the hydroelectric operations. (Page 467, II.D.) The provisions called for in II.C. for "appropriate HABS/HAER documentation" are sufficient.

Elsewhere in the DEIS mention is made that the public was notified of this pending agreement. Such notification was not received by Olympic Park Associates nor, to our knowledge, by any other parties with a concern for restoring the ecological integrity of the Elwha River and its basin. OPA requests that it be invited to

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13245 40th N.E.
Seattle, WA 98125-4617

participate in any future discussions about the historic recording and potential disposition of any man-made installations associated with the Glines Canyon hydroelectric operations, or any other such historic considerations in other areas of Olympic National Park.

Boundary Change, Olympic National Monument: Most importantly, the predecessor to Olympic National Park's establishment in 1938 was the Olympic National Monument, administered by the U. S. Forest Service in the 1920's. The DEIS should record that in 1929 a Proclamation by President Calvin Coolidge moved the northern boundary of Olympic National Monument to the south. It has been thought that this action was taken to negate the conflict of having a hydroelectric operation within a National Monument as prohibited by the Federal Power Act of 1921.

This concludes our observations and comments on the DEIS. However, it may be of interest to give you additional background about Olympic Park Associates. OPA has for nearly fifty years taken actions on behalf of Olympic National Park's wilderness integrity, whether untrammelled, to be restored, or brought under the protection ONP can best provide. Some of OPA's past activities include:

--In 1948 the impetus for incorporation of OPA was the 1947 proposed Congressional deletion from ONP of the Bogachiel valley and its virgin forests. OPA founders, long active individually in defense of ONP, brought this threat to the attention of others, and with them were all able to prevent the loss to logging of this magnificent forested valley.

--OPA was the lead citizen organization that resulted in Congressional action adding to ONP the last seven miles of roadless coast known as Point of the Arches and Shi Shi Beach.

--OPA worked directly with members of Congress to secure final designation of Wilderness (as called for by the 1964 Wilderness Act) for ONP, and at the same time, for Mt.Rainier and North Cascades National Parks.

--OPA proposed that ONP's coastal strip be extended to extreme low tide instead of ending at mean high tide. OPA also suggested that the rocks and islands offshore from ONP be included within the





**Olympic Park Associates**
13245 40th N.E.
Seattle, WA 98125-4617

Park's exterior boundaries. Congressional action resulted in both the intertidal extension and the offshore rocks and islands becoming a part of ONP, thus giving them dual protection since the rocks and islands are also within existing National Wildlife Refuges. These classifications, together with the 1994 designation of the Olympic Coast Marine Sanctuary, will aid in continued protection of ONP's Coastal Strip.

Thank you for the opportunity to comment and share our interests and concerns.

Sincerely,

Polly Dyer

Polly Dyer, President
Olympic Park Associates

*Founded 1948 "To preserve the integrity and wilderness of Olympic National Park"*

OCRM-404-06-112

## Elwha River Ecosystem Restoration Implementation Environmental Impact Statement

**National Park Service**
**Department of the Interior**

**COMMENT FORM**

Please use this form or a similar format to provide us with your written comments on the *Elwha River Ecosystem Restoration Implementation Draft Environmental Impact Statement* released April 26, 1996.

Turn in your comments at the public workshop or send them to: Sarah Bransom, National Park Service, Resource Planning, DSC-RP, P.O. Box 25287, Denver, CO 80225-0287.

**Your comment form must be received by June 27, 1996.**

**NAME (PLEASE PRINT CLEARLY):** David King
**MAILING ADDRESS:** 239521 Hwy 101 West, Port Angeles, WA 98363

**AFFILIATION (IF ANY):** Olympic Raft & Guide Service

**Do you have any comments on the content of this document? Please explain your reasoning.**

Sarah. Thank you again for your valuable time on this project. As with previous letters I would like to voice my concern on a few topics. First there is still no mention of if my business would have access to Altaire Campground and the Elwha River. Should my employers expect long term employment or should they start actively seeking other employment opportunities? With dam removal will there be additions to the number of available launch and take-out sites along the river? Is my property in the area near Lake Aldwell slated for acquisition? Should I continue with business expansion plans needing investment or should I expect to be out of business soon? For the benefit of many people these questions should be addressed ASAP. Thanks again for your time.

Received
JUN 7 1996
DSC-RP

OCRM-404-05-244

Daishowa America Port Angeles MILL

Please Note Our New Area Code (360) 457-4474

June 24, 1996

Received
JUN 2 ? 1996
DSC-RP

Ms. Sarah Bransom
National Park Service
Denver Service Center
Resource Management - RP
12795 W Alameda Pkwy.
PO BOX 25287
Denver, CO 80225-0287

Dear Ms. Bransom:

Daishowa America Co., Ltd. has reviewed the April 1996 Draft Environmental Impact Statement (DEIS) for Elwha River Ecosystem Restoration Implementation. The following comments concern proposed mitigation measures for the Industrial Water Supply System.

The DEIS provides an overview of proposed mitigation measures that, we understand, is based upon a September 29, 1995 Draft Summary Report (DSR) of Proposed Industrial Water Treatment Measures for the Elwha River Restoration Project. Daishowa provided comments to the DSR in our October 19, 1995 letter to Mr. Robert Hamilton. The concerns raised in this letter, copy attached, remain unanswered by the DEIS. In summary, they are as follows:

Pre-treatment Target Turbidity

Performance of a pre-treatment facility must meet the Mill requirements for water quality at all times. The DSR and DEIS frequently refer to average conditions which mask the short term peak concentrations of dissolved and suspended materials. Further, page 227 of the DEIS states "....cumulative impacts .... could temporarily increase suspended sediment load .... and overload mitigation measures on a short term, infrequent basis." This is a serious concern to the Mill.

Design Standards

The DSR and DEIS do not cite which standards will be employed in design, construction, and operation of the pretreatment facility.

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Sedimentation Basin Concentration and Disposal

The DSR proposed to settle suspended solids to a concentration of 20%. This figure appears to be a parameter of the system design. Literature and our experience suggest 20% is not economically attainable.

The DEIS states that the river solids and water treatment flocculants will be returned to the river. We found no reference in the DEIS of any permit requirements for this method of disposal.

Facility Cost Estimate

The Daishowa Mill requires a continuous supply of water. The DSR and DEIS do not address whether or not the construction cost estimate allows for the pretreatment facility to be built without interruption of service. Further, the DSR did not provide evidence that the cost estimate included an allowance for routine maintenance and repair of the facility.

Long-term Operation

We found no discussion in the DEIS or DSR about the plans and cost to operate and to maintain the facility over the long term.

Daishowa American appreciates the opportunity to comment on both the DEIS and DSR. If you have questions about our response, please write to me at the Daishowa America Port Angeles Mill or telephone 360-452-4474.

Sincerely,

Stan A. Hicks
Resident Manager

SAH/rjr

Enclosure

cc: Robert E. Hartley, The Rockey Company
Mike Hafferty, Graham & James
Orville C. Campbell
Dean M. Reed

Branscom

Daishowa America Port Angeles MILL

October 19, 1995

Mr. Robert J. Hamilton
Reclamation Elwha Manager
United States Department of the Interior
1150 North Curtis Road
Boise, Idaho 83706-1234

Ref: Proposed Industrial Water Supply Mitigation Measures

Dear Bob:

Daishowa has reviewed the September 19, 1995 Elwha River Restoration Project Proposed Industrial Water Treatment Measures Draft Summary Report. As requested in your letter of transmittal, we offer the following comments:

Pretreatment Target Turbidity

We agree that relating the pretreatment output turbidity to upstream turbidity provides a better model than a relationship to river flow. Recognizing that the Elwha is a very dynamic river, it is imperative that the baseline data be collected in a way that captures the short-term (less than 24 hours) and extreme variations in river flow and sediment load. We do not have information on the data gathering method employed by the current monitoring station upstream of Lake Mills. We recommend that this be reviewed with the two Mills promptly so that we can accept the current method or propose changes which will assure our confidence that the data accurately represents actual river conditions.

The draft report introduces pretreatment performance audits that rely on averaging techniques. We are very concerned that reliance upon average calculations may understate the performance of the existing reservoirs, and overstate the performance of the pretreatment facility. Further, the report's text describing these performance audits did not leave us with a clear understanding of how they would be performed. Please consider adding sample calculations to the report.

Design Standards

The draft report does not cite which design standards were utilized to size the various components of the proposed pretreatment facility. We understand that Washington State and the Environmental Protection Agency have design standards/practices for installations such as this. The report should state the basis for the design so that we may evaluate its conformance with accepted standards.

1625DRSM.RPT

POST OFFICE BOX 275, PORT ANGELES, WASHINGTON 98362, [illegible]

Sedimentation Basin Concentration

The draft report notes a figure of 20% for solids concentration in the sedimentation channels and sludge equalization tank. What is the basis for this figure? Settled solids concentration has been reported in the literature to be 6% for alum sludge and up to 8% to 12% for polymer sludges.

The report should state the basis of the 20% solids concentration so that we may determine if the design is sufficiently conservative to meet our needs. If the solids concentration is determined to be less than 20%, and our experience suggests it is substantially less, the cost estimate for an acceptable facility may be understated.

Environmental Impacts

The draft report for industrial water treatment measures does not note that the proposed reintroduction of settled solids into the river is inconsistent with existing NPDES permits. Is this issue considered in another section of the Draft Environmental Impact Statement (DEIS)? The prospects for permitting this activity should be included in an appropriate section of the report since the cost for an alternative method of disposal would be very significant.

Facility Cost Estimate

The construction estimate does not appear to include the cost of the infiltration gallery. Is this item included in another section of the DEIS? Since the infiltration gallery performs the lion's share of the sediment filtration, it would seem appropriate to include it in the total of the water supply mitigation measures.

The construction estimate includes a line item for a bypass channel, pipeline, or pump station to keep the industrial water system in operation during construction of the pretreatment facility. The industrial water system is shut down infrequently (typically once every three to four years) and for short periods of time (less than 48 hours from water-to-water). Can the bypass design and cost estimate accommodate our needs for a continuous supply of water?

The yearly Operations and Maintenance Cost Estimate in the draft report has no backup detail except for alum and polymer usage. Please consider inclusion of additional detail so we may assess your plans to support the facility with routine maintenance labor and supervision of the operation.

Long-Term Operation

In other conversations, we have discussed various scenarios for dismantling and/or long-term operation of the pretreatment facility. Will the DEIS address the long-term plan and how we, the Mills, will come to agreement for this plan?





Bob, we truly appreciate the opportunity to comment on the draft report prior to its publication. If you or your staff have questions concerning our comments, please contact me at the Port Angeles Mill.

Sincerely,

Dean M. Reed
Engineering Manager

DA:Port Angeles Mill
DMREED/skc

cc: Steve Taniguchi (Plus 1 copy of U. S. Bureau of Reclamation Letter)
Thomas Suda (Plus 1 copy of U. S. Bureau of Reclamation Letter)
Stan Hicks (Plus 1 copy of U. S. Bureau of Reclamation Letter)
Mark Hannah (Plus 1 copy of U. S. Bureau of Reclamation Letter)
Orville Campbell (Plus 1 copy of U. S. Bureau of Reclamation Letter)
Bob Hartley - The Rockey Company (Plus 1 copy of U. S. Bureau of Reclamation Letter)

cc: Bill Jensen - Rayonier - Port Angeles Mill
Jack Pittis - City of Port Angeles

OLYM-404-CC-062

# Rayonier

**Donald L. Schwendiman**
Regional Counsel
Assistant Secretary

June 24, 1996

Received
JUN 27 1996
DSC-RD

Sarah Bransom
National Park Service
Denver Service Center, Resource Management - RP
P. O. Box 25287
Denver, CO 80225-0287

Re: Comments on Elwha River Ecosystem Restoration Implementation DEIS, April 1996

Dear Ms. Bransom:

Rayonier Inc. is pleased to have the opportunity to comment on the draft environmental impact statement (DEIS) for implementing the restoration of the Elwha River ecosystem as provided in Public Law 102-495.

**Background.**

Rayonier Inc. operates a pulp mill located in Port Angeles, Washington (the "Port Angeles Mill"), which produces high-purity, specialty pulps, as it has since the 1930s. The Port Angeles Mill draws its water from the Elwha River downstream from the Glines Canyon and Elwha dams. The high-quality cellulose acetate produced at the mill is used to manufacture photographic films, yarns, fabrics, high-impact plastics, cigarette filters and food additives. For these uses, the chemically pure cellulose is required to meet stringent specifications. It is, therefore, critical that the quality of all raw materials used in the mill's manufacturing process comply with strict standards.

Clean water is an essential raw material in the Port Angeles Mill's manufacturing process. The quality of water provided by the City of Port Angeles's industrial water system, combined with the water treatment facility located at the mill have allowed it to meet the stringent product specifications imposed by the mill's customers. The current targeted filtered water specification for suspended solids is .01 parts per million (ppm); and the maximum allowable suspended solids is .05 ppm. Rayonier's principal concern is that the mitigation measures to protect water quality described in the DEIS are not adequate and that high levels of suspended solids in the water delivered through the City's industrial water system will overwhelm the Port Angeles Mill's water treatment facility, causing the mill to shut down and the more than 400 employees to lose their jobs.

18000 International Boulevard, Suite 900 • SeaTac, WA 98188-4283
Mailing Address: P.O. Box 34162 • Seattle, WA 98124-1162
Telephone (206) 248-4133 • Fax (206) 248-4117



**Legal Requirement.**

Section 4(b) of the Elwha River Ecosystem and Fisheries Restoration Act (the "Act") requires that,

> The definite plan [prepared by the Secretary of the Interior for removal of the dams] must include all actions reasonably necessary to maintain and protect existing water quality for the City of Port Angeles, Dry Creek Water Association, and the industrial users of Elwha River water against adverse impacts of dam removal.

(emphasis added). Such actions may include the design, construction , operation and maintenance of water treatment or related facilities, the cost of which is to be born by the secretary. Additional contamination of the Elwha River water by suspended solids in excess of the levels existing at the time the Act was passed obviously is a reduction of the "existing water quality". Therefore, the plan must provide for water treatment facilities which will maintain the level of suspended solids delivered to the Port Angeles Mill's water treatment plant at no more that the levels existing at the time the Act was passed (the historic levels).

**Comment: The description the proposed mitigation measures to protect water quality is inadequate.**

The DEIS describes the infiltration gallery and open channel pre-treatment mitigation measures proposed to protect the industrial users of Elwha River water in general, non-quantitative terms and then concludes at page 227 that the surface water users would "not be affected in either the short or long term by dam removal, as mitigation to protect them against adverse impacts of dam removal is required". This reasoning is circular, at best, and totally fails to address whether the proposed mitigation measures are in fact adequate to protect existing water quality.

A Draft Summary Report entitled "Elwha River Restoration Project Proposed Industrial Water treatment Measures", dated September 29, 1995 (the BOR Report) was prepared by the Bureau of Reclamation and previously made available for review by the City of Port Angeles and the industrial water users. The DEIS does not state whether the conclusions contained therein are based upon this report, although some related reports are included in the reference section of the DEIS. However, there are a number of inadequacies contained in the BOR Report that seem also to be reflected in the DEIS; therefore, we will address the inadequacies of the BOR Report and the DEIS together.

1. The averaging method used in the proposal to design the water pretreatment facility is flawed. As indicated above, the Port Angeles Mill must meet strict specifications for maximum suspended solids in its water supply. Therefore, it is critical that the pre-treatment facility be capable of reducing peak turbidity levels such that the existing water treatment plant at the mill can insure that the specifications for maximum suspended solids are not

exceeded. This is critical because high turbidity levels can be expected to occur for periods of days or weeks.

Furthermore, the effects of high turbidity levels are cumulative. For example, according to Table 2 attached to the BOR Report, there will be 129 days (one third of the time) when the mean river total TSS is expected to be 5,108 ppm, which by column (7) of Table 2 equates to 749 cubic yards per day of material. If the assumptions are made that this turbidity level lasts at least 7 days during one high turbidity event, and that the system is designed to remove sludge at 20 gallons per minute (gpm) and 20% solids (1.1 sp. gr.) as stated in the report, then an accumulation of 4,777 cubic yards of sludge at 20% solids would occur by the end of the 7-day period. This would require 33 days of pumping at 20 gpm to bring the sludge level back to zero, during which time another 11 days of accumulation at the same rate would be expected to occur. Operationally, after depositing this material in the sedimentation channels, the area necessary for settling would be so significantly depleted that the outlet water turbidity would be raised to almost the turbidity of the inlet water, independent of chemical addition.

The proposed mitigation design does not take into account that high turbidity levels can be expected to occur for extended periods of days or weeks. Each sedimentation channel has a capacity of approximately 7,600 cubic yards. This mean that one channel would be 62% full of 20% solids sludge in 7 days of high turbidity.

2. The DEIS fails to address the environmental impact of the discharge of pollutants into the Elwha River in the form of concentrated sludge from the proposed pre-treatment facility. The proposed mitigation measures include pumping the sludge from the open channel pre-treatment facility, containing settled solids, polymer and alum, back into the Elwha River. Under Washington State and federal law this constitutes the discharge of a pollutant into the Elwha River and requires an NPDES permit; see *Pedersen v. Washington State Dept. of Transportation* 25 Wash. App. 781, 611 P2d 1293 (Div. 1, 1980); *Weyerhaeuser Company v, Department of Ecology* PCHB No. 85-220 (1986); and *Crown Zellerbach Corporation v. DOE* PCHB Nos. 85-223 & 85-242 (1986). Current Washington State NPDES permits contain a general clause that prohibits the resuspension or reintroduction of solids removed by water treatment plants into state waters.

The DEIS fails to address this requirement of Washington law. It also fails to adequately address the impact of this discharge on the environment. At page 225, the DEIS dismisses any environmental impact, stating,

> "As high turbidity would correlate to high flow conditions, the system would be removing the most sediment at the highest river flows, and the return of settled solids would not induce a measurable increase in down stream turbidity."

As indicated above, this is not true. Historically, the turbidity in the river fluctuates between highs and lows very quickly. The pre-treatment channels would collect large amounts of sludge during high-turbidity events which would then be removed and discharged over an



extended period of time after river flows had reverted to lower levels. The discharge of collected sludge during subsequent lower flows could have a significant impact on the river.

Finally, the DEIS totally fails to address the discharge of chemical polymers and alum into the river.

3. The plan for handling sludge created by settling out suspended solids is inadequate and not supported by reliable data. The mitigation plan proposed in the BOR Report calls for handling of the sludge created by using polymer and alum to settle out suspended solids at a consistency of 20% solids. Rayonier's experience in operating a similar water treatment system for a number of years indicates that this is a much higher percentage of solids than can be reasonably expected from normal compacting of the sludge material. No reliable data is provided to indicate that the 20% solids consistency is realistic; nor is there any provision in the proposal for dewatering equipment. This may substantially affect the required size of the settling basins and the rate of discharge back to the river.

Respectfully submitted,

Donald L. Schwendiman
Regional Counsel

cc: Dean Reed, Daishowa
Craig Knutson, City of Port Angeles

Rayonier
70 Years of Growth

FOLDER ID. 24627

DIVISION OF Specialty Cellulose Products
OFFICIAL FILE COPY
Port Angeles Mill

6307

FILE

June 14, 1996

Mr. Robert Hamilton
Reclamation Elwha Program Manager
United States Department of the Interior
1150 North Curtis Road
Boise, Idaho 83706-1234

SUBJECT: Proposed Industrial Water Supply Mitigation Measures –
Elwha River Restoration Project

Dear Mr. Hamilton:

It was a pleasure meeting you and discussing industrial water quality impacts of the proposed Elwha dams removal project during the EIS review meeting on May 22. As you know, we still have many concerns about the preservation of water quality and quantity during and after dam removal. We understand that detailed technical reports are forthcoming in the next 1-3 months. However, even if they came out sooner, we would not have adequate time to review them before the June 27 cut-off date for comments. We therefore request that comments on the technical reports be allowed for a two month period after we receive them. Our concerns on sludge accumulation, sludge disposal, water quality, treatment costs, and water quantity were listed in a letter to you from our Mr. Bill Jensen, dated October 13, 1995. Summarizing them once more:

- There is as yet no assurance that the proposed industrial water pre-treatment facility on the Elwha will be able to control turbidity to the point necessary to operate the mills. It is critical that the pre-treatment facility be capable of reducing peak turbidities to levels acceptable to the mills, and not just maintaining average historical levels.

- There is no apparent plan for how long the treatment facility would be operated under government supervision, and when and to whom it may be turned over.

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- The proposed water pre-treatment processes are apparently designed to maintain the same average water quality that the mills have been receiving. But peak turbidities as high as 50,000 ppm (5%) are expected during dam removal, and flooding periods following dam removal will also cause high turbidity. Even if these events are short in duration (1-2 days), the impact on the mills could be devastating.

- We need assurance that the guaranteed rate of 150 cfs of inlet flow will be maintained even if river conditions (extremely low flow) and Fisheries phenomena conflict after dam removal.

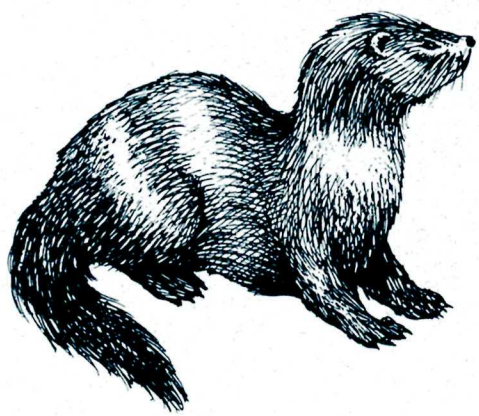
- As explained in the earlier letter, we have many concerns about the methods used to estimate sludge settling rates and capacities in the proposed pre-treatment facility, as well as the issue of re-introducing sludge to the river.

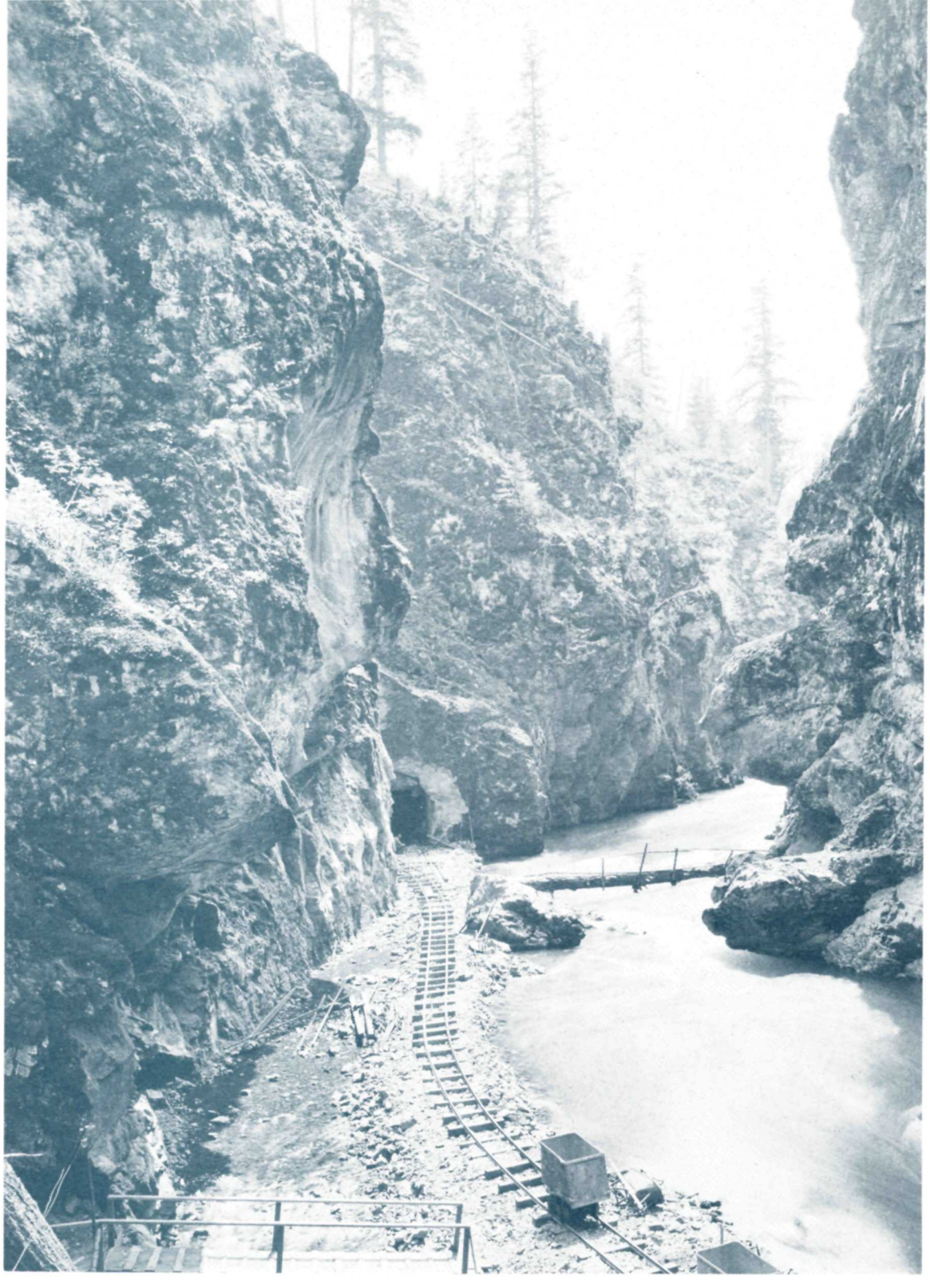
We appreciate the opportunity to be involved in this process, as the protection of water quality to the Port Angeles mills is vital for the economic security of our area. Given the critical nature of water quality, any proposal that differs significantly from the technology previously recommended by $CH_2M$ Hill will require close scrutiny. If you have any questions concerning this response or need additional information, please contact me at the address below or at (360) 457-2480.

Sincerely,

Mark R. Johnson
Operations Manager

cc: J. D. Tatom
B. D. Jones
E. J. Nelson
D. C. Robertson
J. Saarma
D. L. Schwendiman
W. J. Pugnetti
J. Pittis - Director of Public works - City of Port Angeles
D. Reed - Daishowa





# *Appendix 7*

# Appendix 7

## Biological Opinion in Regard to the Elwha River Restoration Project

(Errata sheets for appendixes 1, 2, 3, and 4 are included in the Errata Sheets section of this document.)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
North Pacific Coast Ecoregion
Western Washington Office
3704 Griffin Lane SE, Suite 102
Olympia, Washington 98501
(360)753-9440 Fax: (360)753-9008

August 5, 1996

Memorandum

To: Assistant Regional Director, North Pacific Coast Ecoregion, U.S. Fish and Wildlife Service, Region 1, Portland, Oregon

From: Supervisor, North Pacific Coast Ecoregion, Western Washington Office, Olympia, Washington

Subject: Biological Opinion in Regard to the Elwha River Restoration Project, FWS Reference: 1-3-96-FW-334

This memorandum constitutes the U.S. Fish and Wildlife Service's (FWS) Biological Opinion (BO) for the proposed Elwha River Restoration Project located near Port Angeles in Clallam County, Washington. The Biological Assessment (BA) that was prepared for the project was submitted to the Endangered Species Program staff of this office on May 13, 1996. This document represents the FWS's BO on the effects of that action upon the spotted owl *(Strix occidentalis caurina)*, marbled murrelet (*Brachyramphus marmoratus*), bald eagle *(Haliaeetus leucocephalus)* and peregrine falcon (*Falcon peregrinus),* in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.).

The project for which this Biological Opinion is prepared is a joint FWS/ National Park Service (NPS) project. The BO was prepared using information from a variety of sources, including: 1) the BA dated April 1996; 2) Draft Environmental Impact Statement (DEIS) dated April 1996; 3) information obtained during informal consultation between staffs; and 4) field investigations, reports, and documents in our files. These documents are incorporated by reference into the administrative record.

## CONSULTATION HISTORY

The FWS has determined that the proposed Elwha Restoration Project is "likely to adversely affect" the marbled murrelet and "may affect but is not likely to adversely affect" the bald eagle, peregrine falcon and the northern spotted owl. The "likely to adversely affect" determination for the marbled

murrelet is a result of surveys indicating that the murrelet is likely to nest in the Elwha drainage. Murrelets may be subject to blasting disturbance if nests are within close proximity of the dams to be removed. In addition, murrelets are known to forage in the area where the Elwha river drains into the Strait of Juan De Fuca. A complete analysis of effects for the marbled murrelet is provided herein.

The "may affect but not likely to adversely affect" determination for the bald eagle, peregrine falcon, and the northern spotted owl was based upon recent survey information indicating there is a low likelihood that bald eagles or peregrine falcons forage or nest within the project impact area inland of the Strait of Juan De Fuca. Surveys also conclude the closest of two known spotted owl territories located within the impact area is about 0.9 mile from the Glines Canyon Dam and over 2,000 feet at its closest point from the existing access road to that dam. Disturbance related effects to the spotted owl, as a result of blasting and road use, are expected to be minor because of the distance from the nearest nest, the topography, magnitude of the noise levels, and the 1-year construction period to complete the project. Any impacts upon the bald eagle, peregrine falcon and spotted owl are anticipated to be minimal, of short term duration, and strictly disturbance-related. The long-term effects to those species are anticipated to be beneficial because anadromous fish runs would be restored and additional conifer and mixed forest habitat would eventually become established in the two former lake beds of the Elwha and Glines Canyon Dams. Little, if any, forested habitat removal will result from the project. The FWS concurs with this determination and as such, the northern spotted owl, bald eagle, and peregrine falcon will not be addressed further in this BO.

Critical habitat for the spotted owl and marbled murrelet is designated within the project area. However, no critical habitat will be affected or adversely modified as a result of the proposed project.

## BIOLOGICAL OPINION

### DESCRIPTION OF PROPOSED ACTION

The action proposed is the full restoration of the Elwha River ecosystem and native anadromous fisheries through removal of two hydroelectric dams and implementation of fisheries restoration projects. The two hydroelectric projects are on the Elwha River and about 10 miles southwest of the City of Port Angeles, Clallam County, Washington. Project facilities, including the dams, reservoirs, and appurtenant facilities occur within Township 29 N, Range 7 W, Sections 4, 9, 16, and 17, and Township 30N, Range 7W, Sections 15, 21, 22, 28, and 33 (Figure 1).

Elwha Dam would be removed by controlled blasting, and Glines Canyon Dam would be removed by a combination of controlled blasting and diamond wire saw cutting of concrete blocks. Sediment would be eroded naturally by the river. Lake Mills would initially be drawn down with Glines Canyon Dam in place to provide flood control water storage until a diversion channel to drain Lake Aldwell is complete.

The main elements of the proposed project include the following:

1. The removal of Elwha and Glines Canyon Dams and their impoundments;

2. The removal of two powerhouses, transformers, penstocks, surge towers, power lines, intake tower, switchyard, and related facilities, removal of unneeded buildings and structures, and cleanup or remediation of hazardous wastes;

3. Roadway improvements, including raising, widening and resurfacing of portions of the Olympic Hots Springs Road, and improving access to Elwha Dam;

4. Construction of new water supply facilities (infiltration galleries, flocculation chambers, pipeline extension, settling basins) to maintain the existing water quality for the Tribal hatchery, the Washington Department of Fish and Wildlife rearing channel, and the City of Port Angeles/Industrial users, and others;

5. Removal of the water supply diversion dam at river miles 3.5;

6. Raising the 8,000 foot-long Lower Elwha (Federal) Flood Control Levee a few feet in height to maintain the existing level of flood protection;

7. Raising the private 900-foot-long private levee found along the west side of the Elwha River mouth to maintain the existing level of flood protection;

8. Raising the 300-foot-long river training dike near river mile 3.5 which protects nearby residences;

9. Expansion of the Tribal hatchery to accelerate the rebuilding of the fish runs;

10. Outplanting fry and pre-smolts anadromous fish in the upper Elwha watershed by helicopter.

**ELWHA DAM AND POWERPLANT REMOVAL**

The powerplant would be decommissioned by removal of the turbine runners from the vertical units, and removal and disposal of hazardous materials (Figure 2). The start date of the project (i.e., mobilization) would not occur before November 1, 1997, at the earliest. Demolition activities would begin in March, 1998. If funding of the project is delayed, the construction/demolition schedule would likely be delayed by a full year because several critical work elements are affected by river flow. Construction access would be provided by improving 0.4 mile of an existing unpaved road between State Route 112 and the right (south) abutment of the dam. Access to the left abutment can

be accomplished by using the existing bridge along the dam crest, and by a barge or floating bridge from the right abutment. Temporary haul roads will be required within the forebay area to remove channel fill materials.

Lake Aldwell would be drawn down to elevation 182 feet, by March 1, 1998 (assumed to be the first year of construction), using the south spillway and the 15-foot-diameter penstock. A 10-foot-high cofferdam would be constructed within the north (left) spillway approach channel for removal of the gunite cap and construction of a sheet-pile cofferdam to elevation 196 feet between the left abutment and the existing concrete block. A crane pad would be constructed at the intake structure for removal of the north spillway gates and 9.5-foot-diameter penstocks. A deep diversion channel would be excavated in bedrock through the south spillway to elevation 135 feet downstream from the cofferdam. Excavation would be accomplished by blasting. Rock drills would be used to create holes in which to place the explosives. After the spring runoff (May - June 1998), the cofferdam would be replaced by a lower precast concrete gravity wall to provided a work platform above the reservoir surface. The gravity wall and bedrock foundation plug would be blasted in stages to lower the reservoir in 7-foot increments between the approximate elevations of 174 feet and 139 feet over a 2 to 3-week period (July 1998).

Following completion of the diversion channel in July, the south spillway would be removed and the gravity section would be lowered to elevation 170 feet for construction access. A crane pad near the powerhouse and a rockfill cofferdam across the tailrace would be constructed for removing the remaining penstocks, surge tank, and powerplant equipment. The powerhouse would be demolished by blasting, with the upper floors wasted onto the penstock site, and the massive substructure deposited into the tailrace basin. The channel fill materials would be excavated and removed to elevation 145 feet. The remaining portion of the gravity section would be blasted to elevation 90 feet. Concrete rubble from the gravity section and intake structure would be temporarily stored on the former penstock site. Rockfill materials would be removed from the forebay area below elevation 145 feet, diverting streamflow to the original river channel and completely draining the reservoir between the period, July - October 1999. Concrete rubble and earthfill would be used to backfill the diversion channel and establish natural looking contours on the left abutment. Remaining wood-frame structures (storage buildings and residences) would be removed if they are not needed for public education or visitor use.

**GLINES CANYON DAM REMOVAL**

The powerplant would be decommissioned by removal of the turbine runner from the vertical unit, and the removal or remediation of hazardous materials. Access to the left abutment would be provided by improving the Olympic Hot Springs Road as required for construction equipment. The left abutment dike would be removed to construct a crane pad and contractor staging area (Figure 3).

Lake Mills would be drawn down to elevation 535 feet using the spillway and power penstock, and the dam would be operated for flood protection at Elwha Dam until completion of the diversion channel in July 1998. The concrete apron at the toe of the arch dam would be removed and the downstream channel would be cleared of boulders and debris. The arch dam section would be removed in 7.5-foot lifts using diamond-wire saw cutting along in reinforced areas, and in conjunction with presplit blasting elsewhere to excavate the concrete in large blocks up to 35 tons each. Holes would be drilled into the dam for placement of explosives. Drilling and blasting would be used in conjunction, with blasting being the primary method employed for making the longitudinal "cuts" and the initial notch at each level below the penstock intake. No saw cutting is proposed between elevations 400 feet and 463 feet. About two concrete blocks would be removed each day and hauled offsite (either whole or crushed). Alternating notches (about 15 feet by 25 feet) would be made by blasting once the reservoir level drops below the intake to the power tunnel. The reservoir would be drawn down in 7.5- foot increments about every 2 weeks, with no draw down permitted between November 15 - December 15, 1998, and May 1 - June 30, 1999. The penstock intake tower and surge tank would be removed in November and the penstock openings would be sealed. The lower portion of the dam, including the sluiceway, would be removed to the final stream bed elevation of 400 feet by blasting in 7.5 foot lifts. All remaining concrete rubble would be removed from the river channel by October 1999. The concrete thrust block, gravity wall, and embankment on the right abutment would be retained for use as a public overlook. The gated spillway, penstock, gate house, powerhouse, and wood-frame structures may be retained for either their historical significance or interpretive potential.

**ROAD IMPROVEMENTS**

The Elwha Dam Road is expected to require upgrading to accommodate the increased construction-related traffic and the large heavily-loaded vehicles. Upgrade of the road would occur in November 1997.

The Olympic Hot Springs Road (also called the Elwha Valley Road) parallels the river along the east bank and provides access to the Olympic National Park (Park). Construction activities associated with dam removal would affect the condition of the road and require road repair and maintenance during and after dam removal. Upgrade of the road would occur in November 1997. In addition, the road may be raised (between 1.5 and 2.5 feet) to concurrently serve as a low flood control dike to protect nearby residences.

**WATER SUPPLY IMPROVEMENTS**

Water supplies for two paper mills and the Washington Department of Fish and Wildlife's (WDFW) fish rearing channel is currently diverted from the river by a low head check dam located at river miles 3.5. This dam would be removed. The proposed mitigation for the water volume reductions due to check dam removal would be installation of an infiltration gallery beneath the river alluvium upstream

of river miles 3.5. Water would be withdrawn through perforated pipes buried beneath the river. The system would involve constructing a concrete pumping vault on the left bank of the river. From the vault, a supply pipe would direct water into the existing supply tunnel.

Because the river water would be more turbid during and following dam removal, additional water treatment facilities are proposed. Construction of two new concrete flocculation chambers, a concrete rapid mixing chamber, widening the channel for sedimentation, and construction of an access road to the sedimentation chamber are proposed.

The existing Tribal infiltration gallery, located at river mile 1, collects water from beneath the river bed in a perforated pipe, and delivers it to the hatchery through a non-perforated supply line. To provide for increased water volume and mitigate for reduced flow due to aggradation, additional perforated pipe would be installed.

In addition, there are a number of private wells that may require upgrading in case of reduced water levels or lower porosity. Mitigation options include upgrading existing wells, new well construction, or connection to the City of Port Angeles system.

**FLOOD PROTECTION**

Flood protection now exists at several locations along the river, including an 8,000 foot-long Federal levee, starting near the mouth of the river, and extending on the east bank to approximately river miles 1.5. A 900-foot-long private levee provides flood protection to houses near the mouth of the river on the west bank. Both the Federal and private levee would be raised by approximately 2 feet to maintain the existing level of flood protection. In addition, about 1,000 lineal feet of the setback Federal levee would require rip-rap protection from scour from future river meander, and the north end would need to be extended slightly. A 300-foot-long river training dike near river miles 3.5 would be increased by about 2 feet in height to maintain the dike's capability to direct high velocity water away from nearby residences. Flood stage changes caused by river aggradation would increase the frequency of flooding next to the City of Port Angeles Ranney Collector (shallow well field). Mitigation for flooding would involve constructing a dike around the perimeter of the pumphouse building above the 100-year flood level. Construction would involve placing and compacting fill material.

The Washington State rearing facilities near river mile 2.9 consist of concrete rearing ponds constructed by the river on the east bank. Mitigation for increased flood levels would require raising a road parallel to and west of the ponds by 2 feet along the entire length of the levee.

Private residences are in the 100-year flood plain near river miles 3.5, 8.4, and 9.7. Structures near river mile 3.5 would be raised above the flood plain; those near river mile 8.4 would be protected by raising the Olympic Hot Springs Road for a distance of about 2,000 feet. Near river mile 9.7, rip-rap would be placed along the bank.

**BLASTING**

The construction contractor will design the actual blasts based on operation constraints and site conditions. The potential noise level will be reduced by requiring the contractor to use "delays" for all blasting. That means that time intervals will be required between the detonation of various blast holes. The time interval can be roughly tens of milliseconds, but even this short time between detonation is sufficient to reduce air blast (noise level) and ground vibrations, and allow for movement of the blasted material to produce a better product (i.e., splitting of the concrete). In other words, the peak air blast (noise) level is dependent on the maximum charge per delay, and not the total weight of the explosive used in the total blast.

Time frames are estimates, because they are based on an assumed start date of November 1 and assumed durations for various tasks. The estimates are from the schedule developed by the Bureau of Reclamation, as of March 1996. The timing of the actual work will depend to an extent on the contractor's operation.

**CONCRETE SAWING**

To reduce blasting and resultant noise levels at Glines Canyon Dam, a diamond wire concrete saw would be used to cut the upper portion of the dam, which contains reinforcing steel, into blocks of suitable size (up to 35 tons) for removal by the overhead crane. On the average, two blocks per day would be removed from the dam. It is expected that the diamond wire saw would be operated on a relatively continuous basis when needed, resulting in a slight increase in the background noise levels. The increase would result primarily from the noise from the electric motor and generator required to operate the saw, rather than the actual cutting of the concrete.

**TRAFFIC**

At Elwha Dam, traffic involving large trucks will fluctuate depending on the specific activities. The greatest activity for traffic associated with Elwha Dam will occur during the low flow period of the last year (July through the end of job). For the first year and a half, about one load per day during normal daylight hours is expected. For the last 7 months of the job, there could be as much as 8 loads per hour for two 10-hour shifts, 6 days a week. Trucks would predominately consist of 10 to 12-yard dump trucks loaded to a maximum of 80,000 pounds (gross). Some flatbed trucks would be required occasionally.

At Glines Canyon Dam, transportation activities involving large trucks will remain moderate and consistent over the entire duration of removal. About three loads per day during normal daylight hours for the entire duration of the job is anticipated. Trucks would predominantly consist of flatbeds loaded to a maximum of 80,000 pounds. Some 10 to 12-yard dump trucks would be required occasionally.

In addition to the heavy vehicles transporting construction debris, there would be vehicles delivering construction equipment and fuels on a less frequent and intermittent basis. Construction worker traffic (arriving and departing the work site) would range between 40 and 72 vehicle trips per day at the Elwha Dam site, assuming each worker drives separately and makes only one round trip per day. Construction worker traffic at Glines Canyon Dam would be less, about 40 vehicle trips per day under the same set of assumptions.

Recreational traffic would decrease over existing levels during construction period at Glines Canyon Dam. The Park entrance on Olympic Hot Springs Road would be closed to private vehicles during the 2-year construction and demolition period. To provide public access to the trailheads beyond the construction site, a Park or concessionaire-operated shuttle service is proposed.

**WORK FORCE AND WORK SHIFTS**

The Elwha Dam site will have about 10 to 12 people per shift for the first year and a half, and about 18 people per shift for the last 7 months of the job. There will be two shifts per day, 6 days per week. The shifts will likely be from 7:00 am to 5:30 pm, and 7:00 pm to 5:30 am. This includes contractor and construction management personnel.

Glines Canyon Dam removal will need approximately 10 people per shift, two shifts per day, and 6 days per week. The shifts will likely be from 7:00 am to 5:30 pm, and 7:00 pm to 5:30 am. This includes contractor and construction management personnel. This should remain constant throughout the job.

**SEDIMENT TRANSPORT AND DEPOSITION**

Between one and three million cubic yards of coarse sediment and approximately five million cubic yards of fine-grained sediments would be released from the reservoir areas over a 3-year period. Sediment concentrations in the river would be relatively high during reservoir drawdown. Fine sediment concentrations released downstream from the eroding deltas would initially be very low, then would progressively increase with the decline in lake volume. For the first year of dam removal, water quality would experience months of high turbidity with concentrations between 500 and 6,000 parts per million; peaks could exceed 50,000 during high flows or drawdowns (DOI 1995).

Removal of the two dams would result in the downstream release and transport of about 60 percent of the accumulated silt and clay and 30 percent of the sand and larger sized sediments. Transport of the silt and clay to the Strait of Juan de Fuca would occur primarily within the 2-year period of project removal because the fine sediments, once disturbed, would generally stay in suspension. Transport of the sand and larger sediments to the Strait of Juan de Fuca would occur over a longer period, 2 to 10 years for sand and gravel, and decades for cobbles.

**HABITAT RESTORATION**

As a restoration project, the proposed action is expected to restore the natural river processes disrupted after the dams were built. This would mean that a significant amount of habitat would be restored for wildlife including endangered, threatened, and candidate species. Restoration of anadromous fish to 70 miles of river blocked by the dams would be especially beneficial to wildlife as at least 22 species in the basin use salmon for food. The project would restore and revegetate about 715 acres, 684 acres of which are now inundated by the reservoirs. Of these, 514 acres of riparian lands, 48 acres of wetlands, 122 acres of channel, and 5.3 miles of riparian habitat would be restored by this action. About 1,178 acres (i.e., 160 acres near Lake Mills and 1,018 acres near Lake Aldwell) of project lands that are not currently inundated or associated with the dam sites would be acquired by the U.S. Department of the Interior. All of the lands near Lake Mills would be included in Olympic National Park. It is anticipated that most of the steeply-sloped forest lands surrounding Lake Aldwell would be protected and managed under a natural/preservation designation to protect the Federal government's investment in restoration. It is expected that some Elwha Project lands would be transferred to, or held in trust for, the Lower Elwha Klallam Tribe for residential and economic development purposes. A decision on the disposition of the Elwha Project lands has not yet been made by the Secretary of the Interior.

Near Lake Aldwell, 38 acres of wetland may be degraded and a small stand of trees would have to be removed to locate a crane (DOI 1995). Other than the loss of the reservoirs and the small tree stand, no existing suitable habitat for any listed species is expected to be removed by the project.

**FISHERY RESTORATION - OUTPLANTING**

To accelerate the recovery of the anadromous fish runs, the transport and planting of chinook and coho salmon and steelhead trout fry by helicopter to the middle and upper Elwha River mainstem and tributaries is proposed. The outplanting program would occur over a period of 12 years, and typically involve 36 flights, annually. Winter steelhead would be planted near the Goldie and Hayes River between late June and early July. Chinook salmon would be planted in the Elwha River mainstem between river miles 34 and 42 during the late March to early April period. Coho salmon would be planted in mid-river side channels between Elkhorn and the Press Valley during the May. Twelve helicopter flights would be needed for each species, and each flight would involve a single drop (i.e., no partial releases) (Figure 5).

A Hughes 500D or a helicopter with similar load capacity would be used. Fish would be transported to Sweets Field near the Park boundary in a hatchery tanker and loaded into the water bucket attached to the helicopter. Upon reaching the release site, the water bucket would be lowered into the water and emptied of its contents by tripping the bottom dump valve. The helicopter would then return to the staging area to take on another load of fish and repeat the process at the next planting site.

**STATUS OF THE MARBLED MURRELET (RANGE-WIDE)**

The marbled murrelet was Federally listed as threatened on September 28, 1992 (57 FR 45328). Critical habitat was designated on May 24, 1996 (61 FR 26225). Basic life history information has been provided in previous FWS opinions, and is incorporated herein by reference.

Based on Perry's (1995) analysis and USDA/USDI (1994a) information, the FWS concludes that the actual amount of good quality nesting habitat available to murrelets in Washington, Oregon and California is less than the 956,465 ha (2,362,469 ac) of potentially suitable habitat remaining. The amount of good quality habitat could be significantly less than the amount of potentially suitable habitat, but the FWS does not have the information to make this estimate.

The U.S. Forest Service recently published the *Ecology and Conservation of the Marbled Murrelet* (Ralph *et al.* 1995), the most comprehensive summary of the status of the species to date. It was prepared, edited, and reviewed by a team of government and university scientists.

In their introductory chapter, the editors of Ralph *et al.* (1995) make the following conclusions regarding the status of the marbled murrelet:

1. Murrelet population trends in Washington, Oregon, and California are downward, although the magnitude of the decline is unknown (pp. 10, 12).

2. "(T)here is reason for concern for the continued viability of the species in some regions. Numbers at the southern end of the range are small and concentrated geographically, thereby leaving subpopulations vulnerable to damage by stochastic (catastrophic) events" (pg. 11).

3. "(E)vidence is mounting that population trends are downward where they have been measured, even though short-term fluctuations in climate and longer-term variation in ocean currents can result in apparent or temporary increases" (pg. 11).

4. Declines in populations "have coincided with the cutting of a large fraction of the old-growth forests," although "cumulative effects of oil pollution, gill net fisheries, and changes in the marine environment have undoubtedly played a role as well" (pg. 12).

5. The "ultimate fate of the marbled murrelet is largely tied to the fate of its reproductive habitat, primarily old-growth forest or forest with an older tree component" (pg. 16).

6. "(T)he trend in amount and distribution of suitable nesting habitat is the most important determinant of the long-term population trends" (pg. 17).

7. "The cumulative effects of further incremental loss of existing habitat, in addition to continued loss of adults at sea, must immediately be considered and dealt with by all

relevant agencies. To this end, we strongly suggest that a prudent strategy would be to curtail further loss of occupied nesting habitat in at least Washington, Oregon, and California" (pg. 17).

8. "We feel that any further reduction in nesting habitat or areas for the murrelet in Washington, Oregon, and California would severely hamper stabilization and recovery of these populations to viable levels. Occupied habitat should be maintained as reserves in large contiguous blocks and buffer habitat surrounding these sites should be enhanced" (pg. 21).

9. "The greatest threat to recovery, therefore, is continued loss of habitat, adult mortality, and causes of breeding failure, in that order. We stress that it is critical to maintain and enhance habitat, reduce adult mortality rates due to at-sea risks and predation, and reduce the loss of nest site contents to predators" (pg. 22).

The Draft Marbled Murrelet Recovery Plan (USDOI, USFWS 1995b) states that the following actions are necessary to stabilize the population and allow for continued existence of viable populations: (1) increase the productivity of the population, as reflected by total population size, the adult: juvenile ratio, and other measures of nesting success; (2) minimize threats to survivorship; (3) identify and conduct research and monitoring necessary to determine specific delisting criteria; and (4) develop a research cooperative to coordinate monitoring and research efforts. The key method to stop population decline and encourage future increase in population growth is to stabilize and increase habitat quality and quantity on land and at sea."

In Washington, Spiech and Wahl (1995) concluded that marbled murrelet populations in Puget Sound are lower now than they were at the beginning of this century. Total estimates for Washington are about 5,500 marbled murrelets (Ralph *et al.* 1995). Varoujean and Williams (1994) estimated that 2,600 birds occur on the outer coast of Washington and the western portion of the Strait of Juan de Fuca.

Beissinger (1995) constructed a demographic model of the marbled murrelet and concluded that the population may be declining at rates of 2 - 12 percent per year. However, it is possible that the age-ratio data used in the model are reflective of a relatively temporary decline due to unusual ocean conditions (Ralph *et al.* 1995).

Ralph *et al.* (1995) summarized some of the reasons for variability in population estimates among researchers, including differences in methodology, assumptions, spatial coverage, and survey and model errors. Nevertheless, both Ralph *et al.* (1995) and the Marbled Murrelet Recovery Team (1994) have concluded that the listed population appears to be in a long-term downward trend. The Recovery Team estimates that the population may be declining at rates of between 4 - 12 percent, which means that in 20 years the population could be less than one-half to one-twelfth its current size. The Recovery Team believes that possible reasons for the decline include the species' low

reproductive rate, its dependence on older forests for nesting that are now scarce and heavily fragmented, and adult mortality due to entanglement in gill nets and encounters with oil spills.

The FWS concludes that the listed marbled murrelet population is not stable or increasing within Washington, Oregon, and California, but is declining at a rate of at least 4 percent per year. In addition, the conclusions drawn by Ralph *et al.* (1995) and the Marbled Murrelet Recovery Team (1994) are regarded as the best available information on the current status of the species.

## ENVIRONMENTAL BASELINE

### Status of the Marbled Murrelet (in the action area)

The environmental baseline includes State, local, and private actions already affecting the marbled murrelet. Unrelated Federal actions that have completed formal or informal consultation also are part of the environmental baseline, as are Federal and other actions within the action area that may benefit the marbled murrelet.

The action area has been impacted by a number of human activities which have adversely affected the murrelet. The primary cause of the murrelet population decline is the clearing and logging of much of its nesting habitat (57 FR 45328, 61 FR 26225). Under the Northwest Forest Plan, however, protocol surveys for marbled murrelets are required prior to timber harvest, and all contiguous existing and recruitment habitat for marbled murrelets within a 0.5 mile radius of occupied sites will be protected (USDA/USDI (1994b). In marine waters used by murrelets, development along the coast, oil spills, pollution, fishing activities, and other human activities are part of the environmental baseline. These factors have resulted in a number of changes to the environment which have adversely affected murrelets. Direct mortality from oil spills, harassment, environmental contamination, and declines in prey abundance are factors which are known to have the potential for negatively affecting seabirds in general in marine waters. However, the degree to which these factors may have specifically affected the marbled murrelet in Washington has not been investigated.

Marbled murrelets have been observed flying in the Elwha Valley and are likely nesting in the drainage and foraging in the nearshore waters near the river's mouth. In western Washington, the marbled murrelet prefers to nest in old growth or large sawtimber forest stands that are within 39 miles of the coast and below 3,500 feet elevation. Nesting season in Washington is between April 1 and September 15. Murrelets may forage preferentially near kelp beds and at river mouths and feed on a variety of fish and marine invertebrates, preferring fish like Pacific herring, sand lance, northern anchovy, and rockfish, and invertebrates like euphausiids and mysids (USFWS 1995b).

Several surveys were conducted between 1990 and 1995 by the Federal Energy Regulatory Commission (FERC) (1993), Nysewander (1995), and Hathorn et al. (1995). FERC (1993) conducted a reconnaissance-level survey from March 3 through September 1, 1990, to detect marbled murrelet presence in the project area. During this time, 88 surveys were conducted including 55 at

dawn and 33 at dusk. There were 13 observation stations along the river, 6 north of the Park boundary and 7 south of the boundary. The protocol for the survey was based on the Pacific Seabird Group's Handbook for Marbled Murrelet Surveys at Inland Sites (Paton et al. 1989). Nine stations were also surveyed along the marine shoreline between Ediz Hook and Crescent Bay. Each site was visited twice a month and monitored for a least 10 minutes during each observation.

Along the river, a total of 85 detections of marbled murrelets, 1 visual and 84 acoustical, were recorded. All detections were from dawn surveys at stations found within the Park. Because some detections included groups of two and three individuals, approximately 142 murrelet detections were recorded along the river over the entire survey period. Based on analysis of the results, the Elwha Valley between Krause Bottom and the river apparently serves primarily as a flight corridor between the marine environment and nesting stands along the upper reaches of the Elwha Valley or tributaries, where an estimated 15 pairs of marbled murrelets nested during the 1990 season. Murrelets calling and circling the canopy in stands along Boulder, Cat, Idaho, and Stukey creeks and above Altaire Campground may suggest nesting. Other data from the WDFW also show the presence of murrelets near the project site. Five detections were confirmed as fly-overs within the project boundary and one just outside the boundary (Figure 4). One was detected just south of the Glines Canyon dam, two at the dam, and two on the west side of Lake Mills. The detection outside the boundary was just south of the reservoir.

A total of 1,018 marbled murrelets observations were made from the marine survey stations. Distribution at sea may be correlated with habitat complexity, such as the bays and/or mixed rock-sand substrates near Ediz Hook and Crescent Bay. Lower numbers of murrelets were observed in relatively featureless habitats, such as the river mouth. Nysewander (1995) found several rafts of up to 14 birds within 3 miles east and west of the river. These observations were in shallow waters (less than 10 fathoms) and close to the shore (within 0.5 mile). Other surveys conducted by Nysewander show that the area near the mouth was consistently used by murrelets (Figure 6-7). These areas seemed coincident with the well-established kelp beds.

The area potentially affected by dam removal was inspected by FWS and WDFW biologists in October 1994 to update occurrence of suitable habitat for marbled murrelet and identify potential survey stations. Suitable habitat was identified in forests next to Lake Mills, Glines Canyon Dam, Lake Aldwell, and the west side of the canyon below Elwha Dam. The habitat around Lake Aldwell is considered only marginally suitable. Hathorn et al. (1995) surveyed the area for murrelets using the current survey protocol developed by Ralph et al. (1994). In 1995, Hathorn made 147 detections in 67 visits at 15 survey stations from the Highway 112 bridge near the Elwha Dam to the Lake Mills delta. Of these detections, 129 were audio and 18 were visual. None of the detections suggested breeding behavior. Another survey to protocol is planned to be completed in 1996 to verify that there is no occupancy in the area.

All U.S. Forest Service lands and some State lands near the Elwha River have been designated as critical habitat for marbled murrelets under the Act. About 659 acres of critical habitat is within the impact area, of which 81 acres are part of the U.S. Forest Service Soleduck District and 578 acres

are owned by the State. Some Elwha Project lands are contiguous with this critical habitat (CHU No. WA-01-b). A decision on the disposition of these lands has not yet been made by the Secretary of the Interior. These lands may be transferred to, or held in trust for the Lower Elwha Klallam Tribe for residential and economic development purposes. The Park was not designated as critical habitat because one of its mandates is to "promote the conservation of all Federally-listed threatened, endangered, or candidate species." Currently, the Park has between 100,000 and 130,000 acres of suitable habitat for murrelets.

**Effects of the Action**

In determining the effects of the action upon the marbled murrelet it is important to define the impact area. The impact area is the area that will be directly impacted by decommissioning the dams. This area was defined as the reasonable extent of project impacts that would directly effect species by displacing them or removing their habitat or indirectly affect species by reducing the quality of their habitat. The boundary of the impact area was defined by a 0.25-mile buffer about Lake Mills and Lake Aldwell, a 1-mile buffer around the Glines Canyon and Elwha dams, the 100-year floodplain downstream of Lake Mills, 0.25 mile east of Olympic Hot Springs Road that runs along the east side of the river between Lake Aldwell and Lake Mills, and 2 miles offshore in the Juan de Fuca Strait between Observatory Point and base of Ediz Hook.

These boundaries were selected to account for changes in hydrology next to the river and reservoirs, the increase in noise levels at the dams from blasting and construction activity, and increased turbidity in the river and marine environment. The 100-year floodplain and reservoir boundaries show the expected limit of hydrologic change downstream of Elwha Dam. The FWS guidelines for marbled murrelet and spotted owl were used to determine the impact area near the reservoirs and dams. This guidance has thresholds of 1 mile for blasting and 0.25 mile for noise above ambient levels (USFWS 1995a). The strong water currents in the Juan de Fuca Strait off Angeles Point are expected to limit the effect of turbidity to within 2 miles of the shoreline (Canadian Hydrographic Service 1991, DOI 1995).

Direct effects upon the marbled murrelet could result from construction noise, tree removal for road improvements, and hydrologic changes to the area from the dam removal. Indirect impacts are expected to occur from prolonged high turbidity events from washing out the fine sediment that has accumulated behind the dams.

In the short term, murrelets could be adversely impacted in three areas: while foraging in marine waters; while flying upriver to nest sites; and while at nest sites. No suitable nesting habitat would be removed as a result of the project. Related activities, including water supply improvements, flood protection measures, and rubble disposal, are not expected to impact murrelets because these activities would not occur near suitable nesting habitat, nor significantly impact the prey resources of the murrelet.

Increased turbidity in marine waters would likely displace feeding murrelets. Displacement may be localized with foraging birds moving a short distance, and would depend on tide and currents, because the river's sediment plume sometimes tracks northeast and sometimes northwest (Schwartz

1994). During nesting and fledgling periods, murrelets feed more on small fish rather than on the invertebrates, which constitute the primary diet at other times (USFS 1995). High turbidity in marine waters may be avoided by fish and invertebrate prey species, and prey and murrelets may move to clearer waters. Farther west and east, from Crescent Bay to Ediz Hook and into Port Angeles Harbor, much larger numbers of murrelets were observed in the 1993 surveys (Nysewander et al. 1994). The 1994 survey results suggest that utilization in Freshwater Bay increased from the previous year. It should be noted that these surveys, part of the Puget Sound Ambient Monitoring Program, were not intended to address the relative importance of an area. These data indicate that murrelets forage along much of the nearshore zone between Crescent Bay and Ediz Hook.

It is likely that alternative foraging habitats would be available when areas near the river mouth are affected by high river turbidity. The turbidity levels should diminish with distance because of the changing tides and currents, and the effect of dilution.

Turbidity in the river would vary considerably during each stage of reservoir drawdown (Lake Mills and Lake Aldwell), with the highest spikes (20,000 to 50,000 ppm) occurring when the river downcuts through lake bed and delta deposits of fine sediments. Periods of clearing (less than 1,000 ppm) would occur throughout the dam removal process, but much more frequently during the winter and spring runoff periods. Inflow to the reservoir in excess of 1,400 cubic feet per second would cause the reservoir level to rise and with it the suspension of delta downcutting. Reservoir drawdown would be suspended between May 1 and June 30, 1999, for fishery conservation reasons. During these periods, feeding by murrelets close to the Elwha River mouth could resume, assuming prey species were available.

Demolition activities at Elwha and Glines Canyon Dams may cause murrelets to deviate from their accustomed route near the dams as they fly between the coast and their nest site. Although murrelets may be accustomed to primarily following the river corridor on these daily forays, it is expected that activity at either dam site would be avoided and would not have a serious effect on their movement between their nest and the Strait of Juan de Fuca.

It is necessary to presume nesting occurs within the vicinity of Glines Canyon and Elwha Dams until a second consecutive survey can establish absence. Therefore, it is assumed that adult birds, and also fledglings, may be adversely impacted from the noise and activity of the project. To date, no occupied behavior has been observed within 1 mile of either Elwha or Glines Canyon Dam. Suitable nesting habitat is considered marginal and sparse near Elwha Dam, but good and relatively abundant near Glines Canyon Dam. A second consecutive survey is scheduled for 1996 to comply with the established protocol for determining presence/absence.

Estimated noise levels at Glines Canyon Dam during demolition and the proximity of suitable nesting habitat nearby support the conclusion that disturbance impacts are likely if nesting occurs within a 1-mile radius. The same conclusion would be reached about Elwha Dam, although the risk would be much lower because of the limited amount of suitable nesting habitat nearby. At both dams, noise

from blasting, drilling, heavy machinery, and the loading of dump trucks would be much higher than ambient levels. Noise from heavy machinery and blasting could reduce the nesting success of marbled murrelets if they occur near the two dams.

The outplanting of fish into the upper watershed by helicopter could disturb murrelets if the flight path occurs within 0.25 mile of nest sites. Surveys would not be conducted to address this issue because of the vast area involved (i.e., the flight corridor would involve a minimum of 30 miles to the most distant planting location, and because of the relatively low anticipated impact). Noise disturbance to nesting birds could be reduced by requiring the helicopter pilot, when over suitable habitat, to maintain a height of at least 100 feet above the forest canopy, to avoid hovering, and to maintain a forward speed of at least 25 knots.

Over the long term, the lakebeds would return to old growth forest stands, creating additional nesting habitat for murrelets. Nesting murrelets in western Washington appear to select for sites with dominant trees of at least 20 to 30-inch diameter at breast height with multiple canopy layers (USFS 1995). At least 770 acres of conifer and mixed forest habitat would eventually be available.

A determination has been made that the marbled murrelet is likely to be adversely affected by the proposed project. It is presumed that murrelets nest within the project area and would be disturbed by the construction noise and activity. In addition, high turbidity may create a temporary loss of some foraging habitat located near the mouth of the Elwha River. Therefore, nesting success could be reduced, if murrelets nest within the vicinity of either dam. Occupied behavior was not observed during either the 1990 or 1995 marbled murrelet surveys.

In addition, at least some currently used foraging habitat within Freshwater Bay would be impacted by much higher turbidity levels that have the potential to reduce murrelet foraging success, both during and for a few years following dam removal. Given the general direction of the tidal currents away from the shoreline to the northeast and northwest, the strong tidal currents, dilution, and the better foraging habitat between one and three kilometers to the west of the mouth, the adverse impacts to foraging murrelets are not expected to be severe. Alternative foraging areas would likely be used, if and when turbidity levels preclude foraging near the Elwha River mouth.

Given the openness of the Elwha Basin and the absence of significant development adjacent to either dam, noise and human activity that would occur during the removal of the dams and related structures is not expected to have a material effect on the movement of murrelets to and from nesting habitat in the upper basin.

In the long term, the marbled murrelet would benefit from the 440 acres of mixed and coniferous forest that would re-establish itself within the former lakebeds. In addition, 330 acres of upslope forest land would be preserved. As a result, the proposed project would provide additional nesting habitat in the future.

As stated earlier, all U.S. Forest Service lands and some State lands near the Elwha River have been designated as critical habitat for marbled murrelets. The Park was not designated as critical habitat because of its mandate to promote conservation of all federally-listed threatened, endangered, or candidate species. Possible impacts to designated critical habitat on U.S. Forest Service lands would be minimal. Restored natural river dynamics may flood some existing vegetation along the 0.3-mile reach of river that is within national forest boundaries. No critical habitat will be destroyed or adversely modified as a result of the proposed project.

**Cumulative Effects**

Cumulative effects are defined in the implementing regulations of section 7 of the Act as those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (50 CFR §402.2). The cumulative effects of future Federal actions will be considered during the section 7 consultations required for those actions and, therefore, are not considered cumulative to the proposed action.

The WDFW has listed the marbled murrelet as threatened in the State. This listing requires other state agencies to address impacts to murrelets during project planning.

The DNR has issued policy guidance which requires the DNR to analyze timber sale impacts to *known* occupied marbled murrelet sites. Forest practices permits are not issued for timber sales on State or private lands that are within or adjacent to a known occupied site until a State Environmental Policy Act checklist is completed and results in a Finding of No Significant Impact. However, this policy does not include any survey requirements.

Continuing harvest activities on State and private lands can be expected to impact murrelets through the reduction, fragmentation, and/or degradation of murrelet habitat. Murrelets nesting in remaining fragmented habitats on non-Federal lands may potentially be subject to increasing predation from or competition with other species. Increased road densities and human disturbance may adversely affect or disrupt nesting activities for an unknown number of murrelets.

On a Province basis, numerous planned or ongoing activities on State and private lands in intermingled ownerships and adjacent to Federal lands will also present increased disturbance potential. It is possible that these activities may occur immediately adjacent to proposed Federal activities, possibly aggravating disturbance levels.

## CONCLUSION

After reviewing the current status of the marbled murrelet, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the FWS's biological opinion that the Elwha Restoration Project, as proposed, is not likely to jeopardize the continued existence of the

listed population of the marbled murrelet. Even though designated critical habitat for the marbled murrelet does occur within the project area, the action is not likely to result in the destruction or adverse modification of marbled murrelet critical habitat.

## INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the lead agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The NPS and the FWS have a continuing duty to regulate the activity covered by this incidental take statement. If the NPS or FWS (1) fail to require the contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the contract, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

### AMOUNT OR EXTENT OF TAKE

Incidental take of marbled murrelets is difficult to quantify because murrelets occur in habitat that makes detection difficult and murrelets are behaviorally secretive. The FWS anticipates that the proposed project could result in individuals taken in the form of harassment to such an extent as to significantly disrupt essential behavioral patterns that include breeding, feeding, and sheltering. In addition, the FWS anticipates that individuals could be taken in the form of harm as a result of significant habitat modification or degradation in the marine environment.

The proposed project could result in the incidental take (harm and harass) of marbled murrelets by: 1) reducing prey abundance in Freshwater Bay from higher turbidity levels; (2) causing nesting failures from high noise levels created from construction related activities; and, (3) causing disturbance due to the use of helicopters to plant fish in the upper watershed.

The number of marbled murrelets that use Freshwater Bay for foraging is significant. While the marbled murrelet boat surveys conducted in 1994 and 1995 (Nysewander 1995) show that the larger concentrations of murrelets are found at least 2 kilometers to the west of the Elwha River mouth, groups of two to four individuals have been observed much closer. Although the turbidity plume is expected to move offshore to either the northwest or the northeast and away from the shallow water habitat typically used by feeding marbled murrelets, some recirculation of turbid water is likely. Consequently, it is likely that some foraging habitat would be negatively affected. Significant concentrations of murrelets have also been observed near Crescent Bay and within Port Angeles Harbor (Nysewander 1994, James River II, 1990) which suggests that murrelets are not entirely dependent on the foraging habitat within Freshwater Bay. It is difficult to provide a scientifically based estimate of the number of murrelets that would be "taken." Based on the 1994 and 1995 surveys by Nysewander up to 10 birds could be "harmed" as a result of temporary high incidences of turbidity to some of their foraging area if it is assumed that the incidental take of murrelets is limited to the area within 2 kilometers from the mouth of the Elwha River.

Because no occupied behavior has been documented near Elwha or Glines Canyon Dams in either of the 1990 or 1995 surveys (James River II, 1990; Hathorn et al. 1995), it seems unlikely that incidental take of nesting murrelets would occur from construction-related noise. However, a second year of nesting surveys has been scheduled for 1996. Until that survey is completed it is assumed that murrelets are nesting within the impact zone and marbled murrelets associated with suitable habitat within 1-mile of the dams to be removed would be incidentally taken by disturbance.

The incidental take of marbled murrelets that could result from disturbance related to helicopter flights over suitable habitat is expected to be very low. Even though measures would be taken to reduce the risk of disturbing nesting birds within the flight path, there is still a slight risk that nesting murrelets within 0.25 mile of helicopter operations could be affected.

**EFFECT OF THE TAKE**

In this BO, the FWS has determined that this level of anticipated take is not likely to result in jeopardy to the marbled murrelet or the destruction or adverse modification of critical habitat.

**REASONABLE AND PRUDENT MEASURES**

The FWS believes the following reasonable and prudent measure is necessary and appropriate to minimize take:

> Minimize harm and harassment to marbled murrelets that nest and forage within the project vicinity.

**TERMS AND CONDITIONS**

In order to be exempt from the prohibitions of section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above must be complied with. These terms and conditions are nondiscretionary.

1. To minimize harassment of marbled murrelets due to activities that generate high noise levels (e.g., loading of concrete and rock rubble, operation of the crane and jackhammers) implement a time-of-day restriction at all times possible from 2 hours before sunset to 2 hours after sunrise each day between April 1 and September 15. Activities that must not take place during this period include blasting. Blasting should occur only between 2 hours after sunrise to 2 hours before sunset during the critical nesting period, if surveys confirm occupancy within 1-mile of either the Elwha or Glines Canyon Dam.

2. Ensure that diamond wire saw cutting is the primary method of removing the upper portion (top 50 feet) of Glines Canyon Dam even though some blasting to split the concrete into more manageable size blocks may be required.

3. When blasting, use delayed blasting techniques when and wherever possible to reduce noise levels.

4. Ensure that road widening is kept to the minimum necessary to provide access to large construction equipment (e.g., ringer crane and belly dump trucks). During the construction period public access through the road closure zone should be provided by the Park or the contractor.

5. Condition helicopter flights as follows when flight paths occur within 0.25 mile of suitable marbled murrelet habitat. Maintain a minimum height of at least 100 feet and a forward speed of at least 25 knots above the forest canopy. Prohibit hovering except for loading and unloading.

6. Suspend reservoir drawdown during the periods, November 15 to December 15 and May 1 to June 30.

7. Notify the FWS within three (3) working days upon locating a dead, injured, or sick endangered or threatened species specimen. Initial notification must be made to the nearest FWS Law Enforcement Office. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence

associated with the specimen is not unnecessarily disturbed. Contact our Law Enforcement office at (206) 883-8122 or our Western Washington Office at (360)753-9440.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures the FWS believes that no more than the number of marbled murrelets associated with the Elwha Restoration Project will be incidentally taken. Terms and Conditions 1 through 4 would not be required should completion of ongoing surveys indicate murrelets do not occupy the area within 1 mile of the dams to be removed. If during the course of the action, this minimized level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. In this case, the NPS in coordination with the FWS should immediately provide an explanation of the causes of the taking and review the need for possible modification of the reasonable and prudent measures.

While the incidental take statement provided in this consultation satisfies the requirements of the Act, it does not constitute an exemption from the prohibitions of take of listed migratory birds under the more restrictive provisions of the Migratory Bird Treaty Act.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Where possible, avoid any activity that generates large amounts of noise during the marbled murrelet nesting season, or at least schedule as many of those activities as possible after August 6 and before April 1. This would avoid disturbance to marbled murrelets that may occupy stands within close proximity to the project.

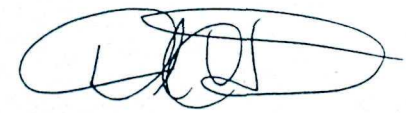
In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

## REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the request for consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law)

and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this Biological Opinion, please contact Jeff Haas of my staff at (360) 753-6045.



David C. Frederick

jh/jkp
c: FWS, Region 1, OTS (Henson, Knudsen)
NPS, Olympic National Park (Winter)
FWS- RO, Div. of Consultation and Conservation Planning

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***Figure 1.*** *Project Area*

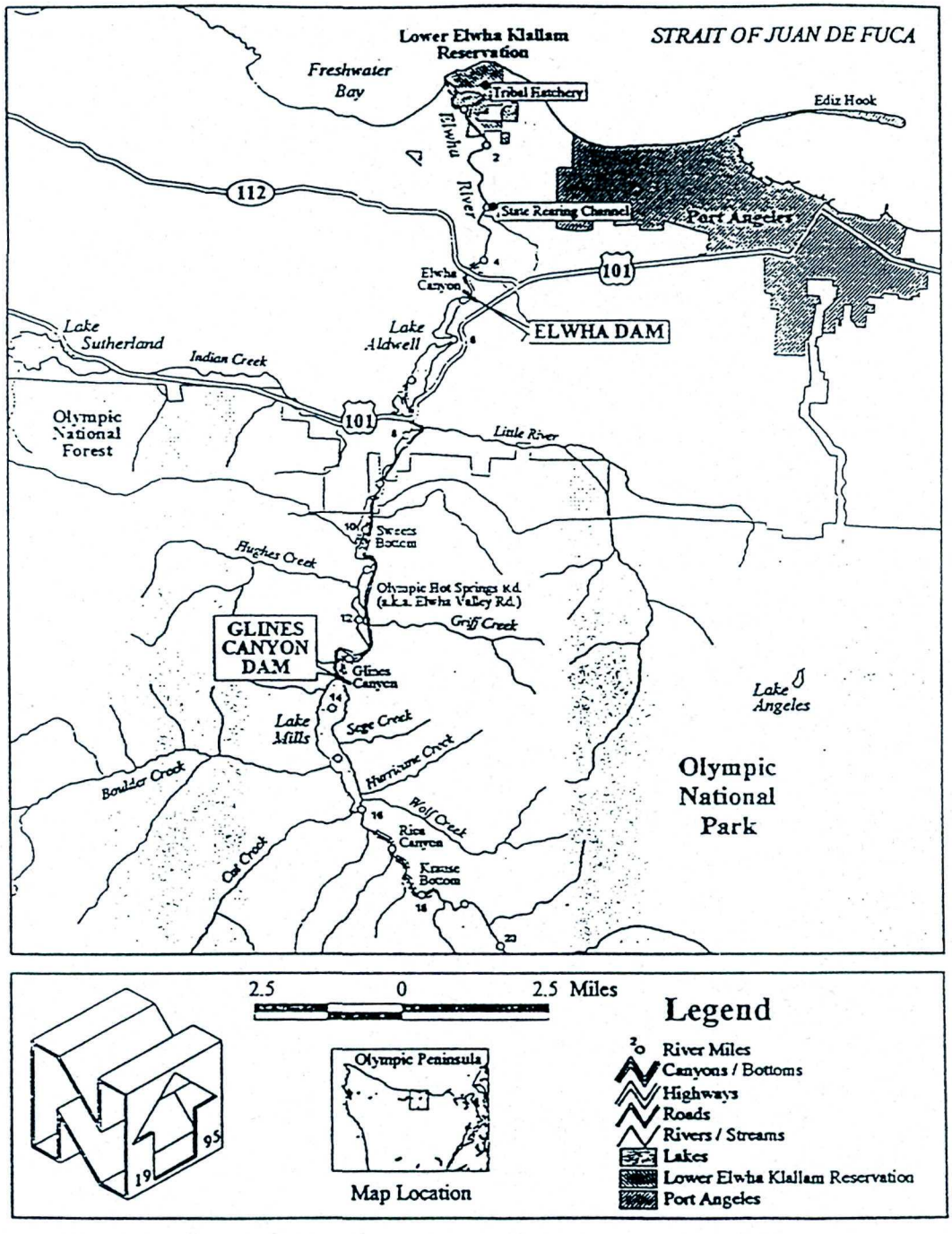


***Figure 2.*** *Elwha Dam Features*

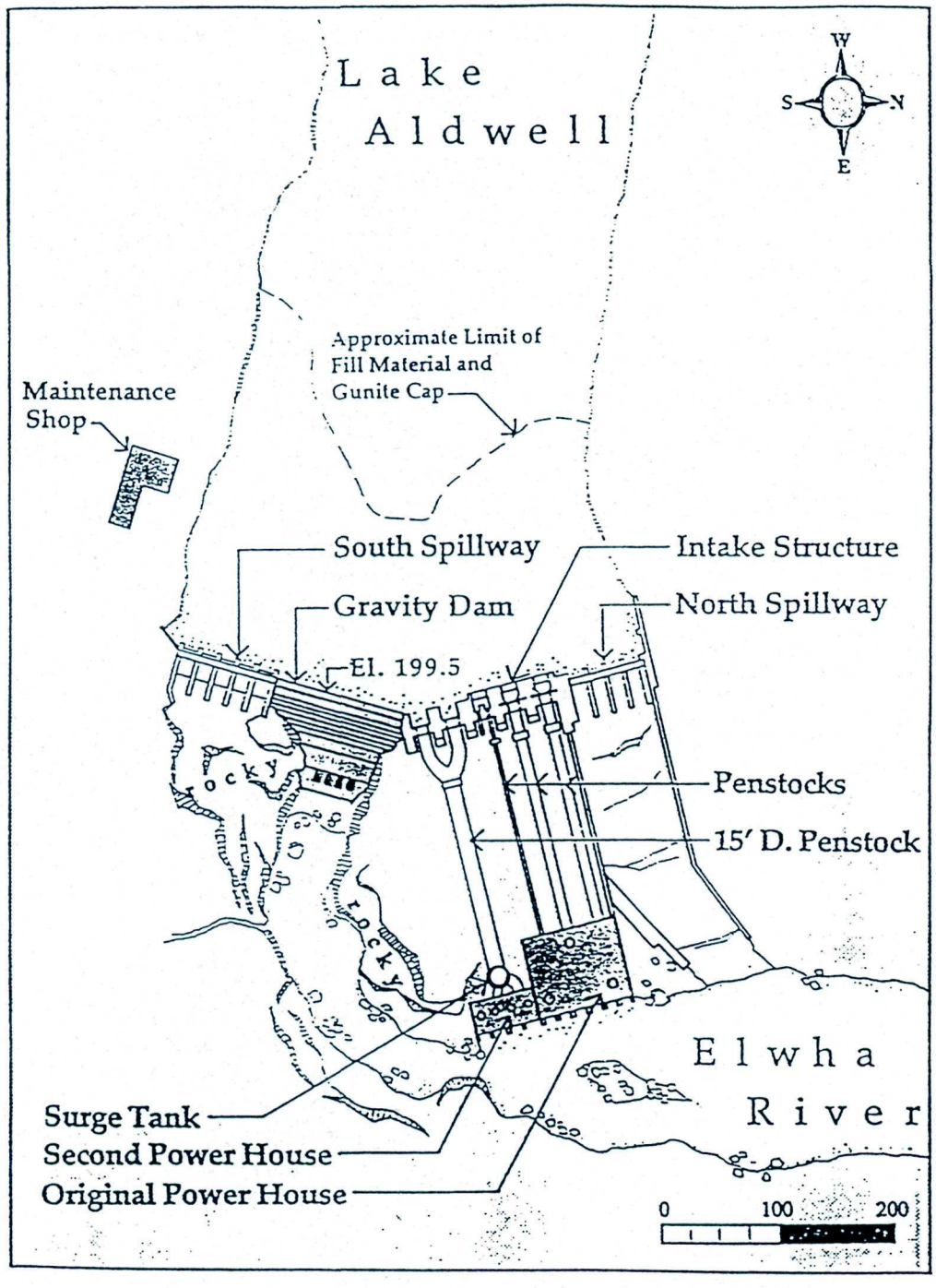


***Figure 3.*** *Glines Canyon Dam Features*

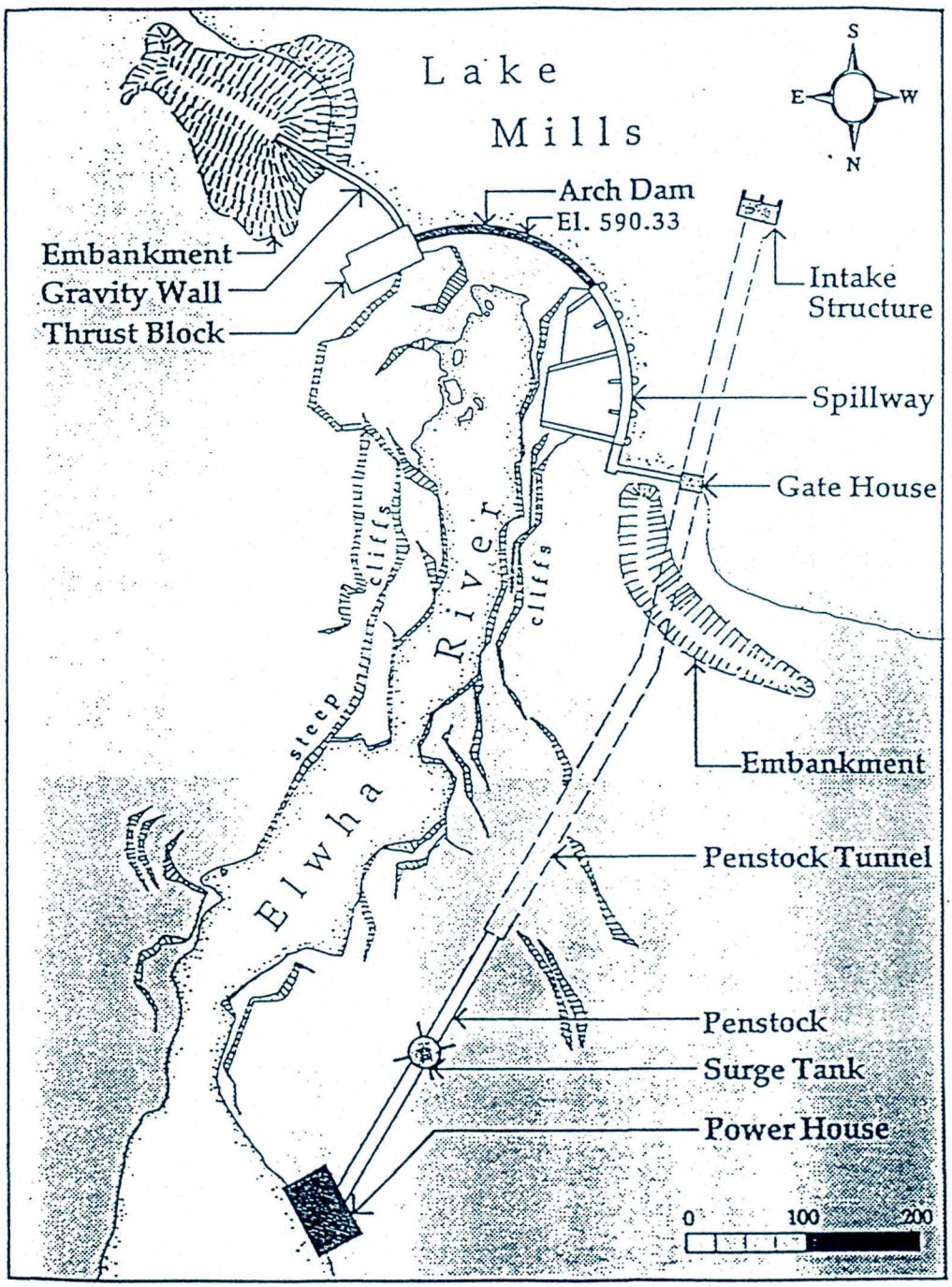


***Figure 4.*** *Impact Area and Species Occurrence*

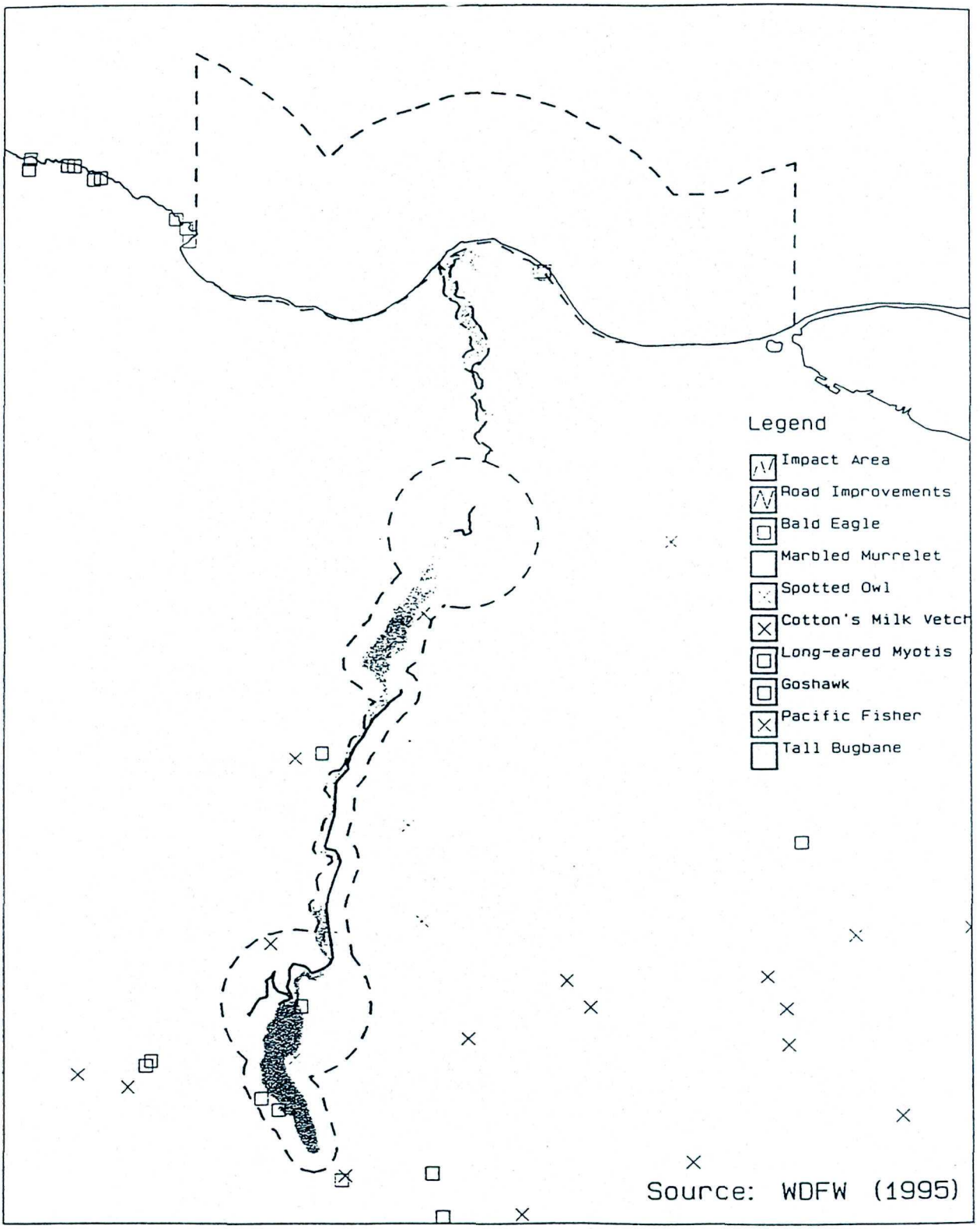


***Figure 5.*** *Base Map*

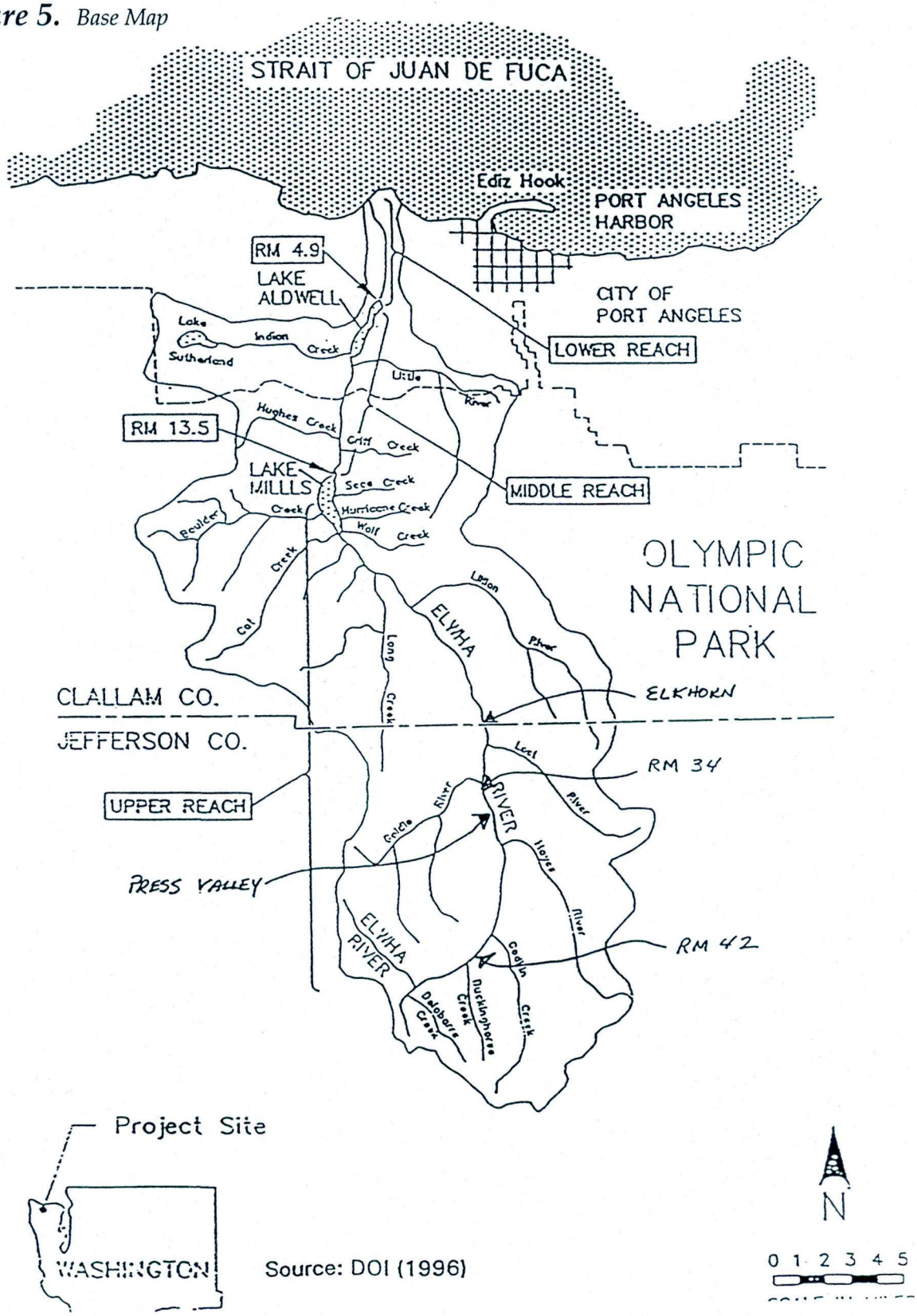


***Figure 6.*** *1994 Marbled Murrelet Observations*

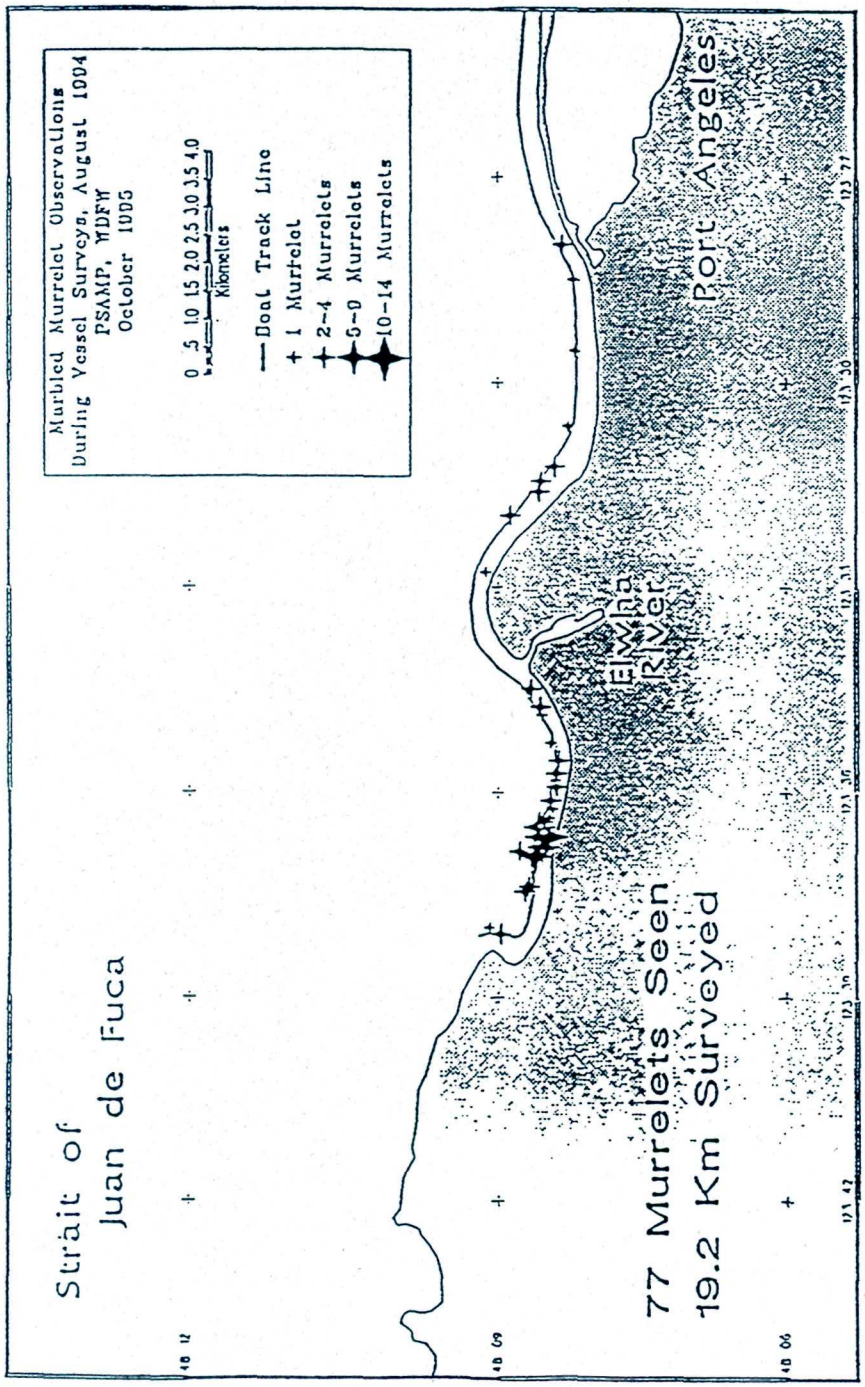
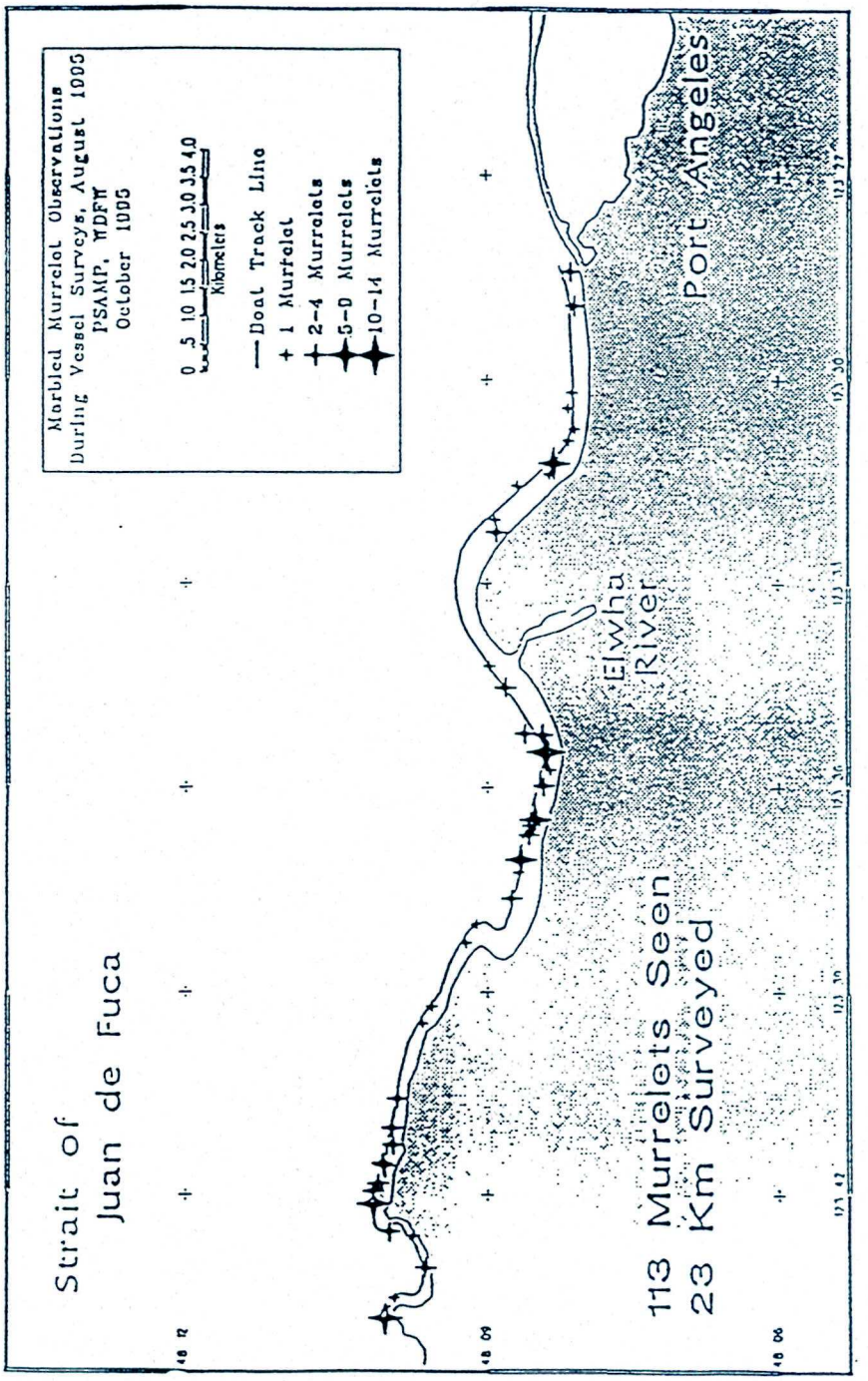


***Figure 7.*** *1995 Marbled Murrelet Observations*





As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS D-271A, November, 1996

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