Federal Defendant's Exhibit 7

The Elwha Report

Restoration of the Elwha River Ecosystem & Native Anadromous Fisheries

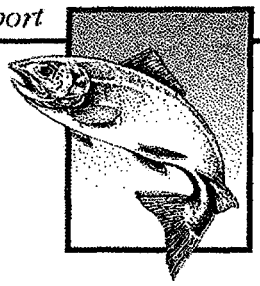
A Report Submitted Pursuant to Public Law 102-495

January 1994

Department of the Interior
National Park Service
U.S. Fish and Wildlife Service
Bureau of Reclamation
Bureau of Indian Affairs

Department of Commerce
National Marine Fisheries Service

Lower Elwha S'Klallam Tribe



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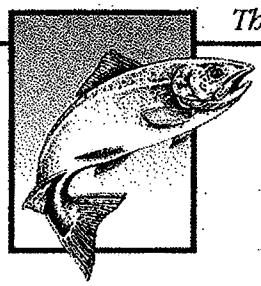
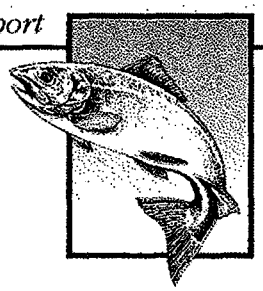
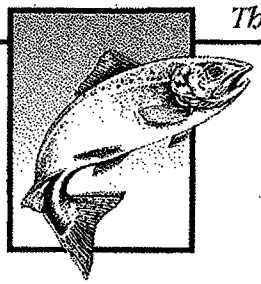
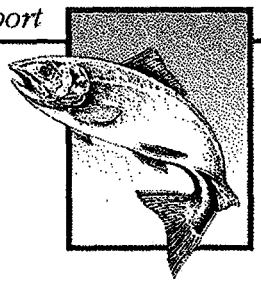
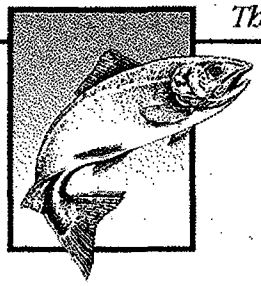
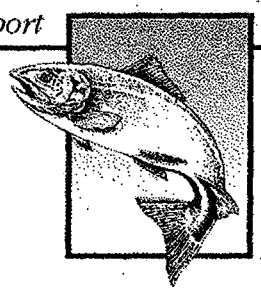








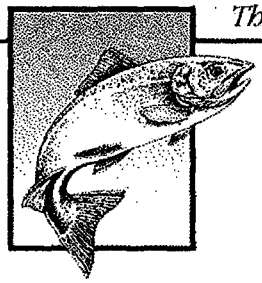




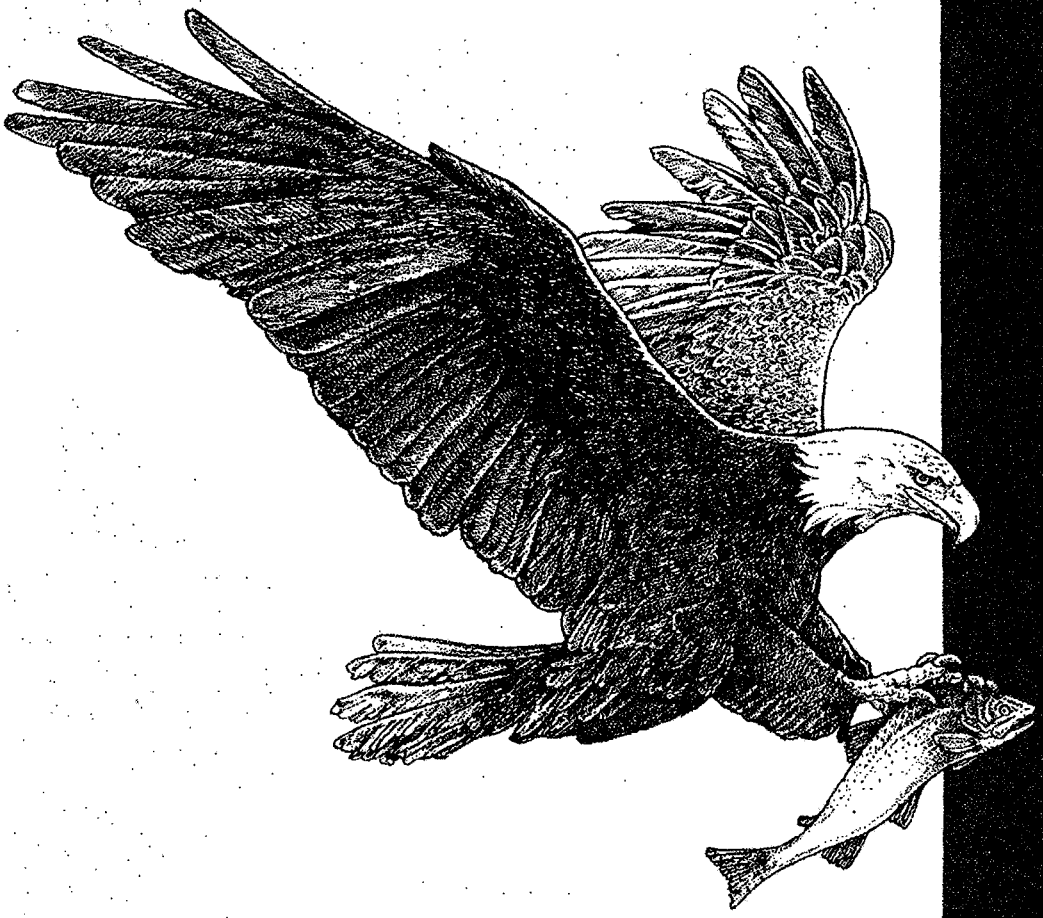
The following appendices are bound separately and expand upon specific sections of the report.

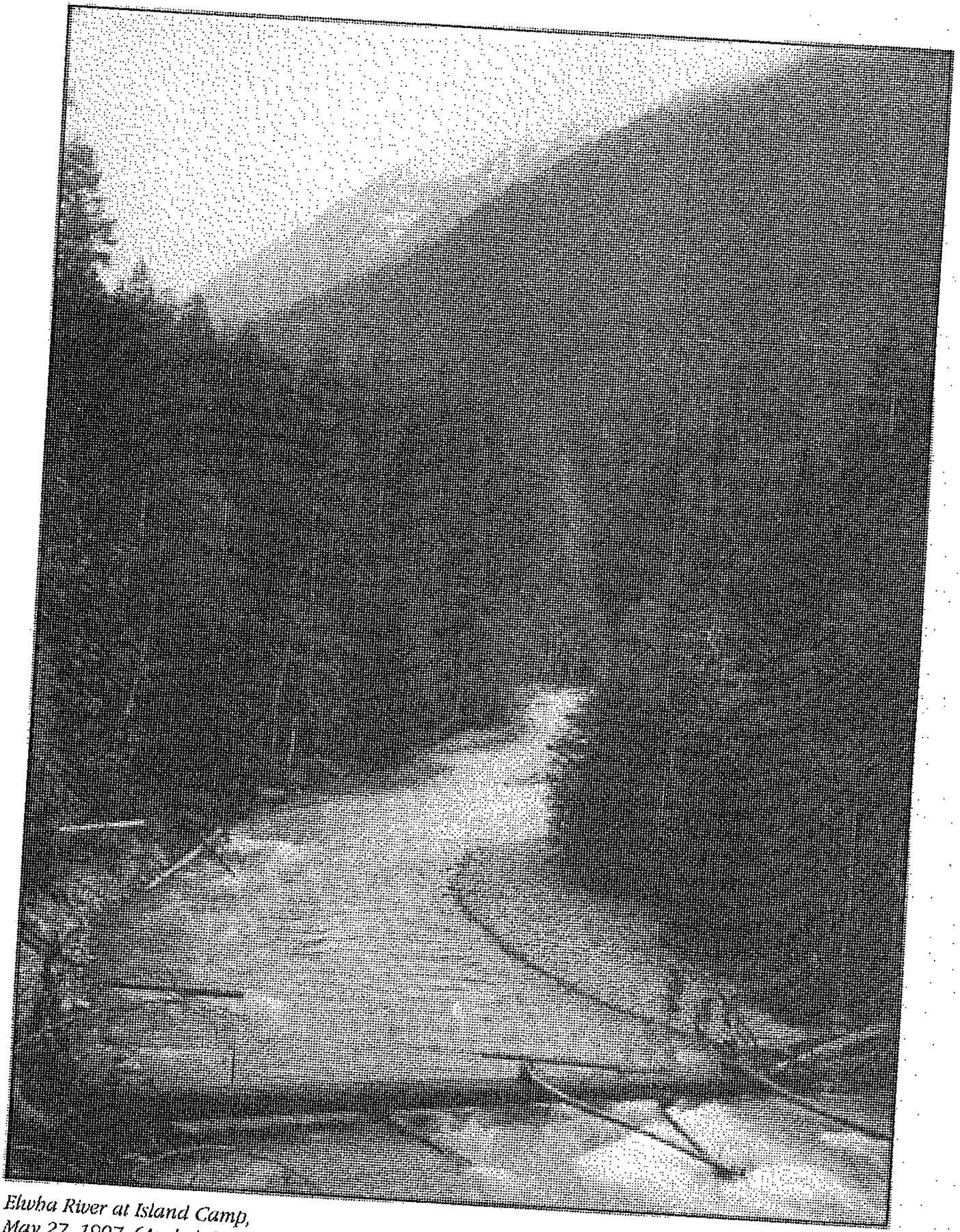
FIGURES

TABLES

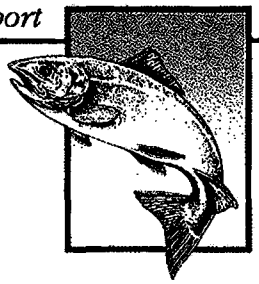


Executive Summary





Elwha River at Island Camp, May 27, 1907. (Asahel Curtis photo, Washington State Historical Society)



Executive Summary

Background

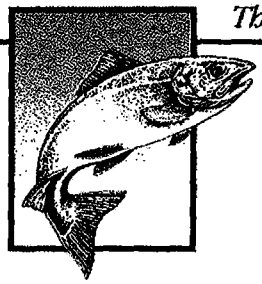
The Elwha and Glines Canyon dams were constructed on the Elwha River. Elwha Dam was constructed from 1910 to 1913 without fish passage facilities and does not have a Federal license to operate. The Glines Canyon Project was constructed from 1925 to 1927, was licensed by the Federal Power Commission for a period of 50 years in 1926, and has received annual licenses since 1976. The privately-owned projects' combined average annual generation of 18.7 megawatts of energy serves Daishowa America's Pulp and Paper Mill in Port Angeles, Washington supplying about 38% of the mill's power needs. The contemporary Federal licensing process began when the Crown Zellerbach Corporation (previous owner) submitted license applications to the Federal Power Commission (precursor to the Federal Energy Regulatory Commission (FERC)) for the Elwha Project in 1968 and the Glines Canyon Project in 1973 (Projects).

Since 1911, the Elwha and Glines Canyon dams have blocked anadromous fish passage to more than 70 miles of the Elwha River and its tributaries . . .

Since 1911, the Elwha and Glines Canyon dams have blocked anadromous fish passage to more than 70 miles of the Elwha River and its tributaries, limiting anadromous salmon and trout production to the lower 4.9 miles of the river below Elwha Dam. As a result, all 10 native Elwha River anadromous fish runs (i.e., spring and summer/fall chinook, coho, pink, chum, and sockeye salmon, winter and summer runs of steelhead, sea-run cutthroat trout, and native char) have been severely diminished and the ecosystem disrupted, especially within a large portion (19%) of Olympic National Park. Numerous wildlife populations within the basin are suspected to have declined.

During the 1980's, the FERC licensing process became extremely contentious and drawn out, due primarily to national policy implications of licensing a project within a National Park, the inability to design fish and wildlife mitigation measures capable of meeting Federal, State, and Indian Tribe resource goals, and legal challenges by conservation groups (i.e., Seattle Audubon Society, Sierra Club, Friends of the Earth, and Olympic Park Associates). Continued attempts to resolve FERC licensing issues were certain to result in protracted litigation, and considerable delay and expense for all parties, including the Federal Government. Failure to reach consensus would lead to the courts deciding vital issues without the opportunity for rational compromise. Verdicts would be narrowly defined by the issues taken before the courts, resulting in a piecemeal approach to the problem when a comprehensive solution is needed.

To resolve these conflicts, Congress enacted a legislative settlement of the issue. The Elwha River Ecosystem and Fisheries Restoration Act was signed into law as Public Law 102-495 by President Bush on October 24, 1992. P.L. 102-495 represents a negotiated solution that provides an avenue to negate lengthy and costly litigation, protect 300 jobs at the Daishowa America Mill, contribute to numerous jobs throughout the region through restoration activities and increased commercial and recreational fishing and tourism, support economic development for the Lower Elwha S'Klallam Tribe, restore a national park ecosystem, contribute to the understanding and improvement of restoration techniques, and assure the protection of



municipal and industrial water supplies. Removal of the dams and restoration of the ecosystem and native anadromous fisheries would also promote tribal fisheries and the Federal trust responsibility to affected Indian Tribes.

Public Law 102-495

The goal of the Elwha River Ecosystem and Fisheries Restoration Act is the "full restoration of the Elwha River ecosystem and native anadromous fisheries" (Section 3(c)). The Act authorized the Secretary of the Interior to acquire the Projects and remove the dams if he determined that their removal was necessary to meet this goal. The Secretary was to develop a report documenting his conclusion and provide it to the Congress no later than January 31, 1994. Additionally, the Secretary was directed to include in the report information on dam retention alternatives that would provide less than full restoration.

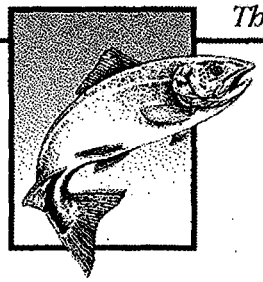
The goal of the Elwha River Ecosystem and Fisheries Restoration Act is the "full restoration of the Elwha River ecosystem and native anadromous fisheries."

The Secretary's Determination

Objectives of Elwha River restoration will be to emulate a natural functioning, self-regulating ecosystem. To evaluate ways to meet these objectives, Department of the Interior bureaus (including the National Park Service, Fish and Wildlife Service, Bureau of Reclamation, and Bureau of Indian Affairs) and cooperating entities, including the Lower Elwha S'Klallam Tribe and the Department of Commerce's National Marine Fisheries Service, developed additional information on dam removal, water quality protection, and fisheries and habitat restoration. As a result of these investigations, the Secretary has determined that removal of both the Elwha and Glines Canyon dams is the only alternative that would achieve the goal of full restoration of the Elwha River ecosystem and native anadromous fisheries. Although some anadromous fish stocks are extinct (sockeye salmon) or are only present in very small numbers (spring chinook and pink salmon), other stocks of fish that are physically and/or genetically close to Elwha River fish could be substituted.

The Secretary has 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. Therefore, this report also contains details regarding acquisition of the Projects including an analysis of responsibilities and liabilities, alternatives for dam removal and sediment management, plans for fish and habitat restoration and the protection of existing municipal and industrial water supplies, analyses of impacts to historic properties and the regional power supply, and a discussion of alternatives for disposition of project property.

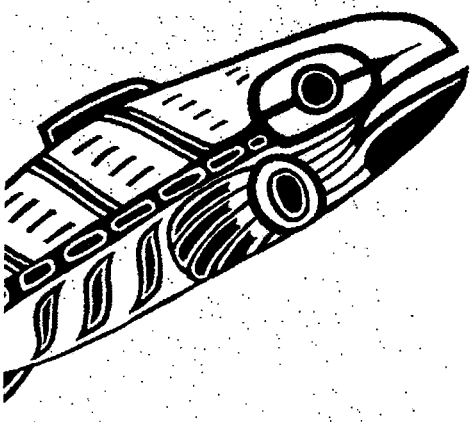
Public Law 102-495 directed the Secretary to include in his report a "definite plan" for removal of the Elwha and Glines Canyon dams. Removal of the dams would constitute a major Federal action, thereby requiring compliance with the National Environmental Policy Act (NEPA). The Secretary's report demonstrates that dam removal is feasible and is necessary for full restoration of the ecosystem and native anadromous fisheries. The report describes plans consisting of four options for removal of the dams, nine scenarios for managing the accumulated sediments, and



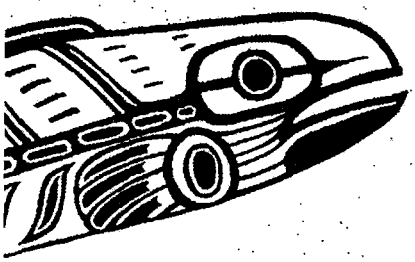
methods of fish and habitat restoration. The preliminary cost estimate for removal of the projects is $66.7 to $80.0 million (in 1992 dollars). However, additional costs for water user protection, fish and habitat restoration, flood control measures, and the acquisition of the projects ($29.5 million) increase the total cost to $147.59 to $203.28 million, to be incurred over the 20 year restoration period. If all accumulated sediments were completely removed, the total cost would be $307.36 million. Although this option is not recommended at this time, it would be included with an analysis of all sediment management options in the EIS/advanced planning report.

A restoration schedule is depicted in Figure 7. Illustrations of project costs associated with the retention or removal of the accumulated sediments within the reservoirs are contained in Figures 8 and 9. Project cost summaries for four sediment management options can be found in Tables 13 to 16.

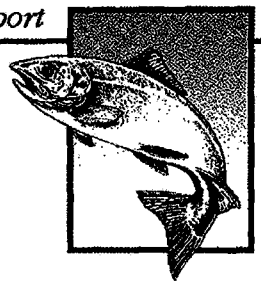
Conclusions



The removal of the Elwha and Glines Canyon dams is the only alternative that would result in the "full restoration of the Elwha River ecosystem and native anadromous fisheries" as prescribed by the Elwha River Ecosystem and Fisheries Restoration Act (Section 3(c)). A synopsis of the consequences of each restoration alternative is provided in Table 3. Retention of either or both dams, even with the provision of fish passage facilities and other measures, would not allow for the full restoration of native anadromous fisheries, in particular chinook, pink, and chum salmon. Additionally, retention of either or both dams would prevent the restoration of natural sediment transport processes, resulting in continued degradation of the river below the dams, the estuary, and near coastal areas. Retention of either or both reservoirs would prevent the restoration of important bottom land and riverine habitat for wildlife and anadromous fish, as well as prevent full nutrient transport, thus impacting freshwater organisms.



Removal of the Elwha and Glines Canyon dams, while protecting water users and accomplishing fish and habitat restoration, is feasible. The costs to fully restore the Elwha River ecosystem and native anadromous fisheries are generally on a par with restoration activities elsewhere in the region. However, it is important to note that restoration of the Elwha River would be essentially complete following removal of the Elwha and Glines Canyon dams and the completion of associated activities, whereas habitat impacts in other Pacific Northwest basins are likely to continue. Also, implementation of P.L. 102-495 would negate lengthy and costly litigation and provide significant benefits to an economically depressed region. Full restoration of the ecosystem and native anadromous fisheries would promote tribal fisheries and the Federal trust responsibility to affected Indian Tribes. Because it is a negotiated solution rather than a litigated decision, P.L. 102-495 provides a rare "win-win" opportunity for all affected parties.



survey and an ethnographic survey would be needed to document resources in the Project area. Following this work, the recommended course of action to protect archeological sites during and after dam removal would be to monitor the reservoir as sediments are moved. Recommended mitigation for removal of the dams is documentation of the structures according to standards set for the Historic American Engineering Record.

Impacts on Regional Power Supply

Recent economic growth, early shutdown of the Trojan nuclear plant, and reductions in the generating capability of the Columbia River hydropower system to support fisheries mitigation have produced a need to secure new electric power resources in the Northwest. Because of cost-effectiveness and environmental attributes, acquisition of conservation has been accorded the highest priority by the Northwest Power Planning Council (Council). The Council's goal for regionwide acquisition of at least 1,500 average megawatts of conservation over a 10 year period has been adopted by the Bonneville Power Administration, the state utility commissions, and the principal regional utilities. Current evidence indicates that actual rates of conservation are consistent with this goal. However, the acquisition of a mix of projects would probably be advanced to cover the small size of the Elwha and Glines Canyon projects (18.7 average megawatts).

Cost-Sharing

Restoration of the Elwha River ecosystem and native anadromous fisheries would result in benefits to a broad spectrum of public and private interests. However, certain parties (i.e., tribes) would be excluded from cost-sharing.

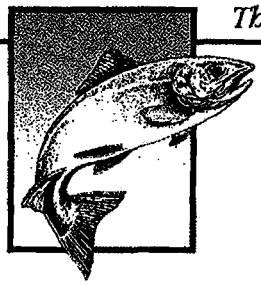
There are a number of Federal statutes -- both generic and project-specific -- that address the issue of cost-sharing for fish and wildlife mitigation, enhancement, or restoration at Federal water resources development projects of the Army Corps of Engineers, Interior's Bureau of Reclamation, and the Department of Agriculture's Soil Conservation Service.

While these statutes do not apply directly to the removal of the Elwha and Glines Canyon dams, there is certainly precedent to require as much as 25 percent non-Federal cost-sharing for certain fish and wildlife resource activities.

Appropriate cost-sharing terms will be explored during development of the advanced planning report and NEPA compliance process. Based on the results of this review, a formal cost-sharing agreement would be negotiated prior to initiation of the selected alternative.

Restoration Costs

Additional investigations are necessary to identify the preferred dam removal and sediment management option. This would in turn allow the further identification of the measures that are necessary to protect existing water users and the best



restoration. Plantings of native vegetation in the area would be undertaken to mimic the pre-dam landscape while measures to control the invasion of exotic plants would be implemented. Over time, the drained reservoir areas would attain characteristics of the surrounding lands.

Disposition of Project Lands

Pursuant to the Act, the lands associated with the Glines Canyon Project would be managed in accordance with National Park Service authorities upon acquisition. The lands associated with the Elwha Project could be included in the Olympic National Park or National Wildlife Refuge System (NWRS), held in trust for the Lower Elwha S'Klallam Tribe (Tribe), or provided for use by the State, as long as such use supports the Federal investment in restoration.

The National Park Service has determined that Elwha Project lands qualify for inclusion into Olympic National Park. The U.S. Fish and Wildlife Service (FWS) has preliminarily recommended against establishing a National Fish and Wildlife Refuge administered solely by the FWS but is interested in cooperative management of the area. The Tribe has developed a land use proposal that would protect restoration while supporting needed housing and economic opportunities for the Tribe. The State of Washington has not expressed an interest in the lands. The potential for cooperative management of the Elwha Projects lands, for example the NPS, FWS, Tribe, and/or State, needs further analysis.

Interpretation of Dam Removal

Removal of the Elwha and Glines Canyon dams would be of national interest resulting in wide publicity. For many years, interest would increase visitation to Olympic National Park and Clallam County by people desiring a firsthand view and the inside story of this historic event. A range of options are available to provide an interagency/intergovernment presentation of dam removal efforts and ecosystem restoration. Such efforts would provide an important boost to the local economy and enhance regional partnerships.

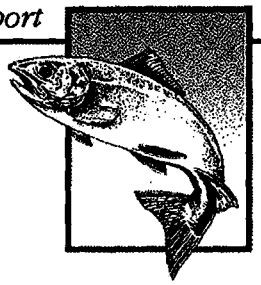
Devi Sharp, Department of Natural Resources, studies radio-tagged carcasses in Olympic National Park. (Janis Burger)

Living Laboratory

There is great interest in making use of the Elwha River basin as a "Living Laboratory." To fully explore this concept, a panel consisting of fish and wildlife biologists, ecologists, silviculturists, hydrologists, soil scientists, tribal representatives and other specialists would be convened to develop a study plan to monitor changes to the ecosystem resulting from dam removal. Federal funds may be secured to act as seed money to initiate and/or cost-share identified research investigations.

Impacts to Cultural Resources

If the dams are removed, the cultural resource that is the Elwha River can be restored, with benefits to both Indians and non-Indians. An initial archeological



anadromous fisheries. The definite plan includes a number of dam removal and sediment management options that would result in full restoration. However, additional studies in support of an EIS/advanced planning report will be required to select a preferred alternative.

Water Quality Protection

Several options (e.g., new wells, new inlet and settling basin, modification of existing systems) have been identified to protect the major Elwha River water users from the impacts of dam removal. Additional work would be required during the EIS/advanced planning stage to confirm the viability of each option, to identify any additional options, and to work with the affected entities to develop consensus regarding a preferred option for each diversion.

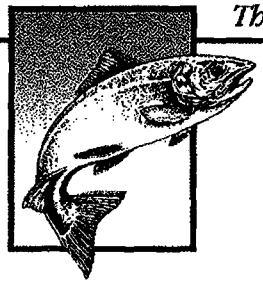
Fish Restoration

For most of the Elwha River stocks, the fish restoration plan recommends accelerating the recovery process through the outplanting of juvenile fish into the upper river. Although indigenous stocks would receive first priority in brood development and restoration, some salmon stocks are extinct or are only present in very small numbers. Other salmon stocks that are physically or genetically close to Elwha River salmon could be substituted. Sea-run cutthroat trout and native char would be allowed to recover naturally. To ensure that fish are available for outplanting when access to the upper river is restored, stock assessment and brood development has already begun. Stock status assessments will continue and will be expanded to identify the most promising sources of broodstock for restoration.

Hatchery support would be required to develop and maintain broodstock for outplanting. The two existing fish production facilities in the lower river (those of the Washington Department of Fisheries and the Lower Elwha S'Klallam Tribe) would be modified to produce juvenile fish for outplanting. Use of these facilities would reduce logistical costs and limit the possibility of future transfer restrictions due to fish disease concerns. Modifications to support this effort would include improvements to water supplies and the expansion of incubation and support capabilities. Juvenile outplanting would take place when safe downstream passage at the dam sites is assured and would occur for up to two fish generations (8 to 10 years) at levels consistent with the carrying capacity of the habitat and the ability to effectively reintroduce each stock to the upper river at its target time and size of release.

Habitat Restoration

The primary objective of habitat restoration in the areas inundated by Lake Mills and Lake Aldwell is the restoration of the ecosystem and native anadromous fisheries. The plan includes measures to restore the biological, hydrological, and physical processes that occurred prior to construction of the Projects. Although a precise replication of past conditions is impossible, historic photographs of the reservoir areas prior to inundation and other information provide a guide for



impounds 2.8 mile long Lake Mills. Fish passage facilities also were not provided at Glines Canyon Dam.

Measures to restore anadromous fish with the retention of either or both dams would include upstream and downstream fish passage facilities and operational changes. To pass fish at Elwha Dam, the necessary facilities would include an adult fish ladder, juvenile fish screen system, and spillway improvements. To pass fish past Glines Canyon Dam, a trap-and-haul operation would be necessary for adult fish and continuous spill and a facility for screening fish away from the turbine intake would be necessary for juvenile fish.

Spillway bridge, Glines Canyon Dam. (Pat O'Hara)

Dam Removal

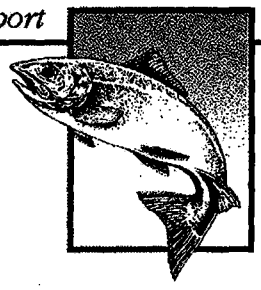
The removal of both dams would involve decommissioning the Elwha and Glines Canyon projects, removing most if not all of the existing auxiliary structures, returning the river to a free-flowing condition, and implementing habitat and fish restoration plans. The electrical energy produced by the Projects and consumed by the mill would be replaced by power provided by the Bonneville Power Administration. Measures to protect water users would be implemented.

The primary steps involved in removing the projects would include diverting the river around the dam structures, removing the structures, and managing the sediments that have accumulated in each reservoir. Four plans for diverting the river and demolishing the dam structures have been investigated, including diverting the river (1) in tunnels, (2) around the dams in a surface channel, (3) through the dam structures, and (4) over the dams by creating a notch through the structures.

For nearly 80 years the reservoirs have acted as large settling basins, slowing the river flow and trapping material behind the dams. Most of this material has been trapped in the upstream reservoir, Lake Mills. The trapped material can be roughly divided into two categories. Coarse material ranging in size from small sand to large gravel has been deposited at the heads of the reservoirs to form deltas. Fine material consisting of smaller clay and silt sized particles is fairly evenly deposited throughout the beds of the reservoirs.

Three major options for managing the sediments have been identified: (1) the material could be removed from the inundated regions and relocated to a terrestrial or saltwater site; (2) the river could be allowed to erode a new channel through the trapped material with subsequent deposition in saltwater; and (3) only the material in the path of the river would be relocated and stabilized adjacent to the new channel leaving the remaining material in place for revegetation. Nine different scenarios involving combinations of each of the sediment management options described above have been recommended for further review during the EIS/ advanced planning stage.

The information developed for this report demonstrates that it is feasible to remove the dams, protect existing water users, and fully restore the ecosystem and native

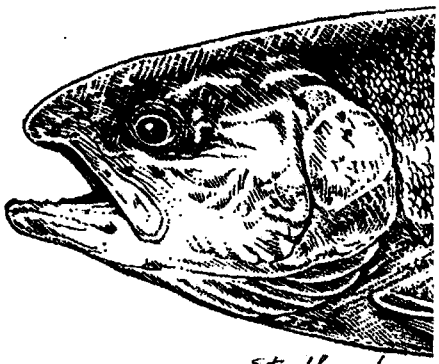


a process for analysis of these alternatives consistent with full restoration of the ecosystem and native anadromous fisheries. A preferred alternative would be selected during the Environmental Impact Statement (EIS)/advanced planning stage. The EIS/advanced planning report would be initiated following submittal of The Elwha Report to the Congress.

Affected Environment

The Elwha River, 45 miles long, is located on the Olympic Peninsula in northwest Washington. With a drainage area of 321 square miles, of which 83% is located within Olympic National Park, the Elwha River is the fourth largest river by drainage area on the peninsula. The maritime climate of the area is characterized by mild, wet winters and relatively cool, dry summers. Rainfall averages 60 to 80 inches per year. The average instantaneous discharge of the Elwha River is 1,507 cfs. Water is withdrawn from the river for private, municipal, industrial, and fish propagation purposes.

Although historical quantitative records of pre-dam run sizes of Elwha River anadromous fish are limited, the Elwha River was historically noted as one of the largest producers of salmon and steelhead on the Olympic Peninsula. Anadromous fish included stocks of spring and summer/fall run chinook, coho, pink, chum, and sockeye salmon, summer and winter runs of steelhead, sea-run cutthroat trout, and native char (Dolly Varden and bull trout). Current runs are only a small portion of their former size. At least one Elwha River salmon stock (sockeye salmon) may be extinct while two stocks (spring chinook and pink salmon) may only be present in extremely small numbers.



Steelhead

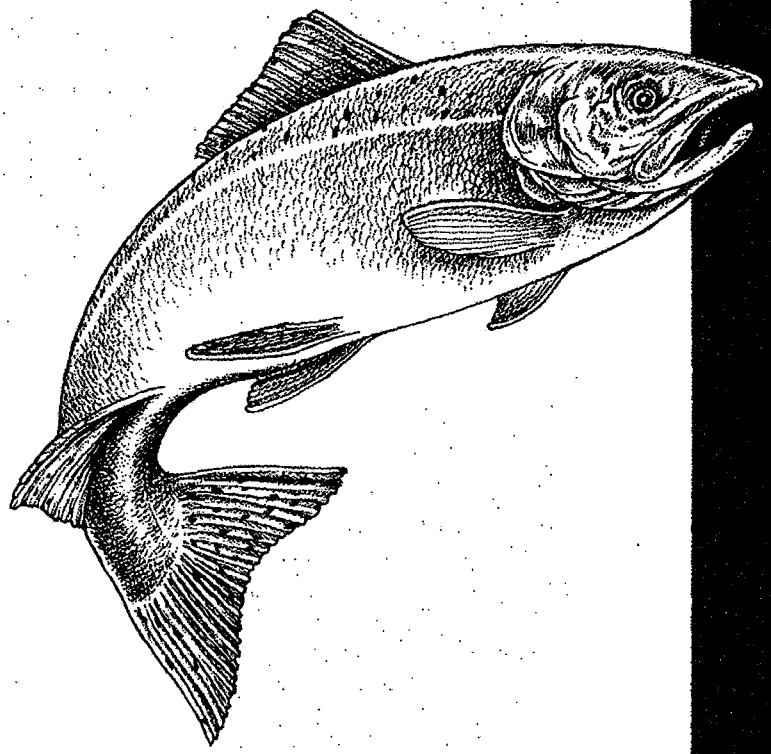
Because most of the valley lies within Olympic National Park, the Elwha River basin is primarily pristine. The Projects have, however, dramatically altered the landscape by inundating about 5.3 miles of river and 684 acres of lowland habitat. About 11.3 million cubic yards of sediment are trapped in Lake Mills and from 2.6 to 4 million cubic yards are trapped in Lake Aldwell. With the interception of bedload (cobbles, gravel, and sand) by Lake Mills and Lake Aldwell, the spawning habitat downstream from both dams has been badly eroded such that much of the former spawning area now consists of substrate that is too large to be used by spawning fish. The trapping of bedload in the reservoirs has also contributed to the erosion of estuarine and near-shore marine habitat, including Ediz Hook at Port Angeles Harbor.

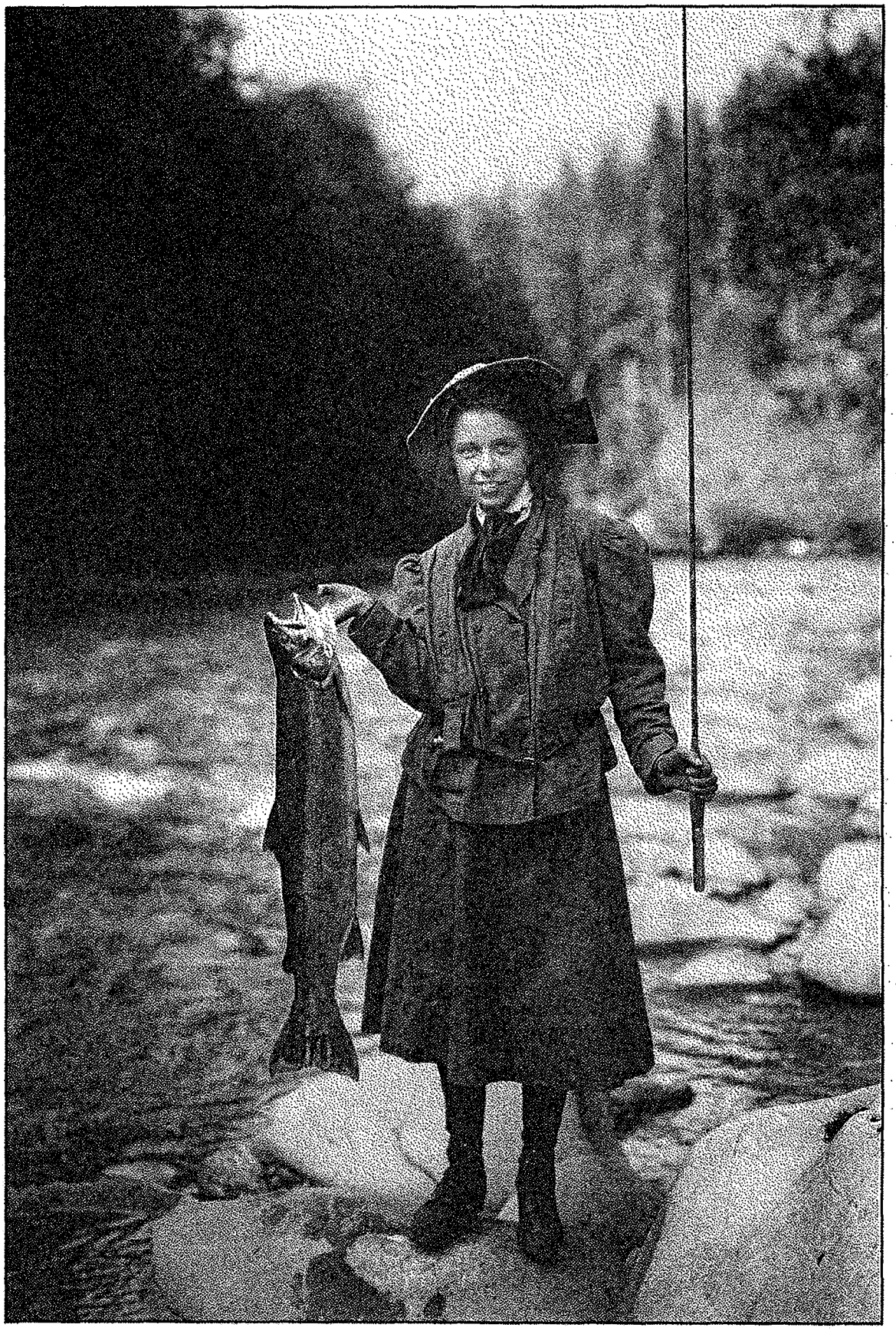
Dam Retention Alternatives

Elwha Dam is a concrete and earth-fill structure that is about 450 feet long at its crest and 105 feet high. The impoundment created by the dam, Lake Aldwell, is 2.5 miles in length. Elwha Dam was constructed without fish passage facilities.

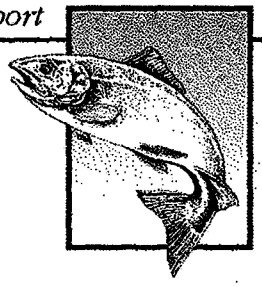
Glines Canyon Dam is a varied radius, single arch concrete dam that is 210 feet high and varies in width from 55 feet at its base to 270 feet at its crest. The dam

I. Introduction





Elinor Chittenden displays a steelhead caught in 1907, before the Elwha Dam was constructed. (Asahel Curtis photo, Washington State Historical Society)



I. Introduction

The Elwha and Glines Canyon dams were constructed on the Elwha River to provide hydroelectric power for local consumption. Elwha Dam was constructed from 1910 to 1913 without fish passage facilities and does not have a Federal license to operate. The Glines Canyon Project was constructed from 1925 to 1927, was licensed by the Federal Power Commission for a period of 50 years in 1926, and has received annual licenses since 1976. The privately-owned projects' combined average annual generation of 18.7 megawatts (MW) of energy serves Daishowa America's Pulp and Paper Mill in Port Angeles, Washington, supplying about 38% of the Mill's power needs.

The contemporary Federal licensing process began when the Crown Zellerbach Corporation (previous owner) submitted license applications to the Federal Power Commission (precursor to the Federal Energy Regulatory Commission (FERC)) for the Elwha Project in 1968 and the Glines Canyon Project in 1973 (Projects).

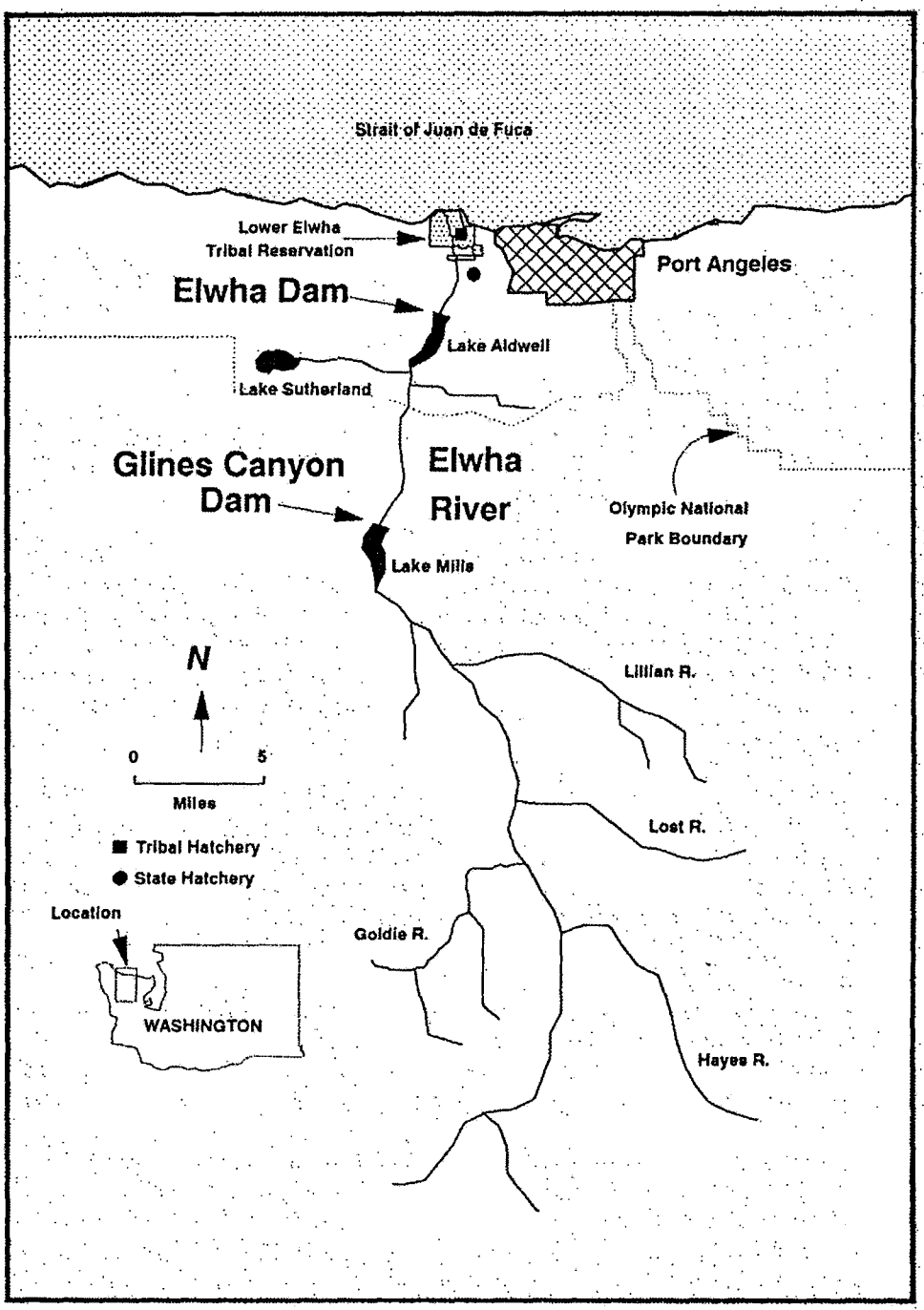
Since 1911, the Elwha and Glines Canyon dams have blocked anadromous fish passage to more than 70 miles of the Elwha River and its tributaries, limiting salmon production to the lower 4.9 miles of the river below Elwha Dam (Figure 1). As a result, all native Elwha River anadromous fish runs have been severely diminished and the ecosystem disrupted, especially within a large portion (about 19%) of Olympic National Park. At least one Elwha River salmon stock[1] (sockeye salmon) may be extinct while two stocks (spring chinook and pink salmon) may only be present in extremely small numbers. Numerous wildlife populations within the basin are suspected to have declined. In addition to ecological damage, the Projects have dramatically reduced the treaty fisheries of at least four federally recognized Indian Tribes (including the Lower Elwha S'Klallam, the Port Gamble Klallam, the Jamestown Klallam, and the Makah) and blocked access to many traditional fishing sites and other traditional cultural properties.

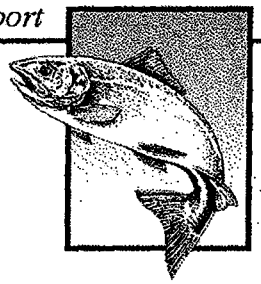
During the 1980's, the FERC licensing process became extremely contentious and drawn out, due primarily to national policy implications of licensing a project within a National Park, the inability to design fish and wildlife mitigation measures capable of meeting Federal, State, and Indian Tribe resource goals, and legal challenges by conservation groups (i.e., Seattle Audubon Society, Sierra Club, Friends of the Earth, and Olympic Park Associates). Continued attempts to resolve FERC licensing issues were certain to result in protracted litigation, and considerable delay and expense for all parties, including the Federal Government. Failure to reach consensus would lead to the courts deciding vital issues without the opportunity for rational compromise. Verdicts would be narrowly defined by the issues taken before the courts, resulting in a piecemeal approach to the problem when a comprehensive solution is needed.

To resolve these conflicts, Congress enacted a legislative settlement of the issue. The Elwha River Ecosystem and Fisheries Restoration Act was signed into law as Public Law 102-495 by President Bush on October 24, 1992 (Appendix A). P.L. 102-495 represents a negotiated solution that provides an avenue to negate lengthy and costly litigation, protect 300 jobs at the Daishowa America Mill, contribute to numerous jobs throughout the region through restoration activities and increased commercial and recreational fishing and tourism, support economic development for an impoverished

[1] *A fish stock refers to "the fish spawning in a particular lake or stream (or portion of it) at a particular season, which fish to a substantial degree do not interbreed with any group spawning in a different place, or in the same place at a different season" (Ricker 1972).*

Figure 1. *Location map for the Elwha and Glines Canyon dams.*





Indian Tribe, restore a national park ecosystem and native anadromous fisheries, contribute to the understanding and improvement of restoration techniques, and assure the protection of municipal and industrial water supplies. In addition, removal of the dams and restoration of the ecosystem and native anadromous fisheries would promote tribal fisheries and the Federal trust responsibility to affected Indian Tribes.

The goal of the Elwha River Ecosystem and Fisheries Restoration Act is the "full restoration of the Elwha River ecosystem and native anadromous fisheries" (Section 3(c)). The Act authorized the Secretary of the Interior to acquire the Projects and remove the dams if he determined that their removal was necessary to meet this goal. The Secretary was to develop a report documenting his conclusion and provide it to the Congress no later than January 31, 1994. Additionally, the Secretary was directed to include in the report information on dam retention alternatives that would provide less than full restoration. FERC had analyzed the dam retention alternatives in detail in a March 1993 "Draft Staff Report for the Glines Canyon (FERC No. 588) and Elwha (FERC No. 2683) Hydroelectric Projects, Washington." FERC's findings have been summarized herein[2].

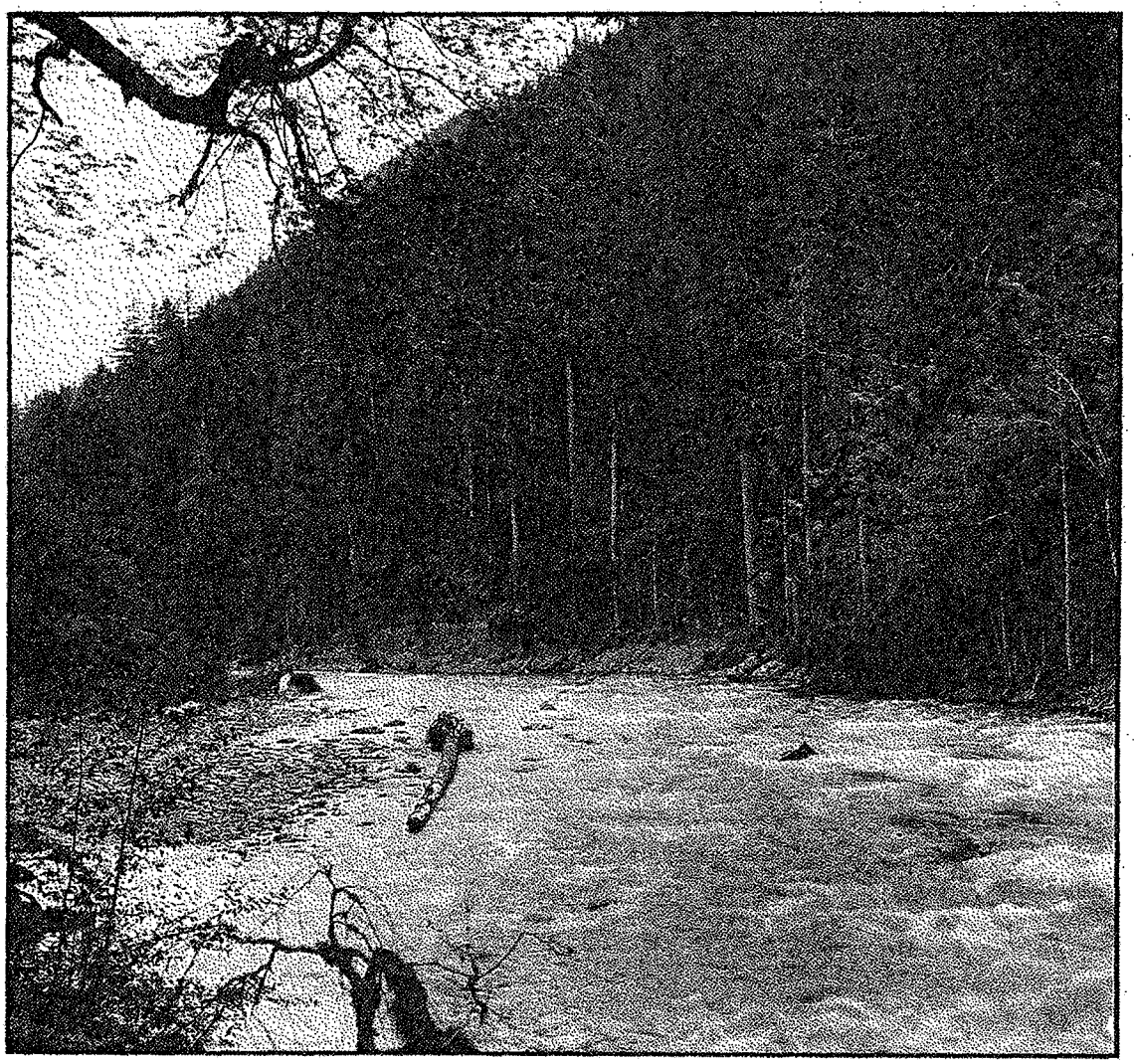
Objectives of this restoration will be to emulate a natural functioning, self-regulating ecosystem. To evaluate ways to meet these objectives, Department of the Interior bureaus (including the National Park Service, Fish and Wildlife Service, Bureau of Reclamation, and Bureau of Indian Affairs) and cooperating entities, including the Lower Elwha S'Klallam Tribe and the Department of Commerce's National Marine Fisheries Service, developed additional information on dam removal, water quality protection, and fisheries and habitat restoration. As a result of these investigations, the Secretary has determined that removal of both the Elwha and Glines Canyon dams is the only alternative that would achieve the goal of full restoration of the Elwha River ecosystem and native anadromous fisheries. Although some anadromous fish stocks are extinct (sockeye salmon) or are only present in very small numbers (spring chinook and pink salmon), other stocks of fish that are physically and/or genetically close to Elwha River fish could be substituted.

The Secretary has 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. Therefore, this report also contains details regarding acquisition of the Projects including an analysis of responsibilities and liabilities, alternatives for dam removal and sediment management, plans for fish and habitat restoration and the protection of existing municipal and industrial water supplies, analyses of impacts to historic properties and the regional power supply, and a discussion of alternatives for disposition of project property.

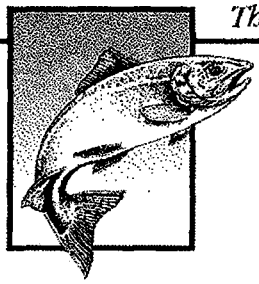
Public Law 102-495 directed the Secretary of the Interior to include in his report a "definite plan" for removal of the Elwha and Glines Canyon dams. Removal of the dams would constitute a major Federal action, thereby requiring compliance with the National Environmental Policy Act (NEPA). The Secretary's report demonstrates that dam removal is feasible and is necessary for the full restoration of the ecosystem and native anadromous fisheries. The report describes plans consisting of four options

[2]Reference to the Draft Staff Report does not denote Department of the Interior concurrence with specific FERC findings. Rather, FERC text and analyses incorporated in this report have been adjusted based on the standard of "full restoration" as specified in P.L. 102-495 and errors have been corrected.

for removal of the dams, nine scenarios for managing the accumulated sediments, and a process for analysis of these alternatives consistent with full restoration of the ecosystem and native anadromous fisheries. A preferred alternative would be selected during the Environmental Impact Statement (EIS)/advanced planning stage, to be initiated in fiscal year 1994. Acquisition of the projects could occur either prior to or following the EIS/advanced planning report.



Elwha River, May 27, 1907. (Asahel Curtis photo, Washington State Historical Society)



of these improvements would total $220,000 (April 1992 price level). The OMR&P costs for this alternative are expected to be comparable to current costs.

Elwha Place Homeowners Association - Representatives of the Homeowners Association have expressed concerns that river channel changes would imperil their well field and subject them to flooding. Potential impacts and the capital and annual costs of any justified mitigation measures would be identified and evaluated during the advanced planning stage.

WDF Rearing Channel - Two measures are needed to protect the rearing channel. First, the diversion facilities at the river would be reconstructed to facilitate fish passage and downstream sediment transport.[3] The anticipated cost of this measure would be $1.01 million (April 1992 price level). An estimate of annual costs for this measure has not been prepared. Second, a flood protection barrier would be constructed between the channel and the river. The estimated cost of this measure is $280,000 (April 1992 price level). An estimate of annual costs for the flood protection measure has not been prepared.

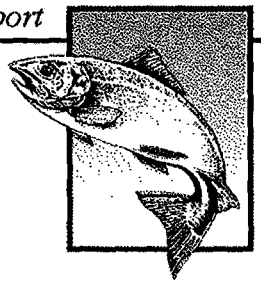
Dry Creek Water Association - The initial mitigation proposal for the Water Association involves drilling two new wells to replace the two wells closest to the river. The well houses would be located on built-up pads to place them above the 100-year flood level. The estimated cost of replacement wells is $350,000 (April 1992 price level). The total anticipated annual costs for this measure would be $13,000 (April 1992 price level).

Lower Elwha Levee - Initial estimates indicate that the levee should be raised 4 feet to maintain the existing flood control protection if the dams are removed. In addition, the quarry spalls protecting the face of the levee would need to be augmented with larger diameter riprap. Initial estimates suggest that at least 18 inches of large diameter riprap should be added to the existing quarry spalls. Preliminary evaluations suggest that the capital cost of these levee improvements would total $2.1 million (April 1992 price level). Annual operation and maintenance costs associated with the levee enhancements are likely to be comparable to those for the current levee.

F. Fish Restoration

This plan provides a description, timeline, and cost estimate to achieve full restoration of the native anadromous fisheries of the Elwha River following the removal of both dams. Upon Congressional approval, the Elwha River fish restoration process would begin in 1994 and continue for an estimated 18 years to complete stock assessment, brood development, juvenile outplanting, and evaluation of adult salmon returns. Within this time period, fish restoration would be expected to be completed. However, it is recognized that anadromous fish released in currently inaccessible habitat may require varying amounts of time and variable levels of outplanting before full utilization of the habitat occurs. Estimated capital costs for improvements to existing fish facilities to support fish restoration total $4.1 million, and operational

[3] *This measure is the same as the inlet reconstruction element in the first and third municipal water supply mitigation alternatives.*



costs for fish restoration activities over the entire 18-year restoration period total $5.3 million. For further details on these cost estimates, see Appendix G.

Key assumptions in the restoration plan are as follows (1) fish passage through the dam sites would be hazardous until dam removal is completed; (2) the viability of lower river fish habitat and fish facilities during dam removal depends on the sediment management scenario employed, although there are some potential measures (i.e., the development of "clean" water sources for the fish facilities, captive broodstock collection for affected species) to mitigate temporary impacts (e.g., high turbidity, sediment deposition); and (3) juvenile outplanting would significantly speed fish restoration and allow reintroduction of fish stocks best adapted to the Elwha River's unique environment.

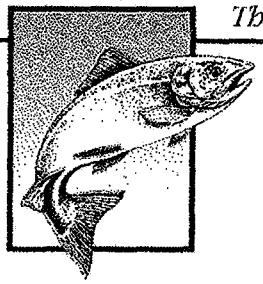
Stock assessment and brood development has already begun to ensure that fish are available for outplanting at the first opportunity when access to the upper river is restored. Stock status assessments will continue and will be expanded to identify the most promising sources of broodstock for restoration. Indigenous stocks would receive first priority in brood development and restoration because they are best adapted to the river's natural environment and would provide the maximum sustained adult return. However, alternative fish stocks would be developed if necessary.

Hatchery support will be required to develop and maintain broodstock for outplanting. For this purpose, the two existing fish production facilities in the lower river (those of the Washington Department of Fisheries and the Lower Elwha S'Klallam Tribe) would be modified to produce juvenile fish for outplanting. Use of these facilities would reduce logistical costs in fish transfer and limit the possibility of future transfer restrictions due to fish health concerns. Facility modifications would include improvements to water supplies and upgrades in incubation and support capabilities. Specific modifications for each facility would be identified during the EIS/advanced planning stage.

Juvenile outplanting would occur when safe downstream passage at the dam sites is assured. Outplanting would occur up to two generations at levels consistent with the carrying capacity of the habitat and the ability to effectively reintroduce each stock to the upper river at its target time and size of release.

For outplanting purposes, the Carlson Canyon Falls at RM 34 would separate spring and summer/fall chinook salmon and summer and winter steelhead introductions (spring chinook and summer steelhead above RM 34 with other stocks below), while the entrance to Rica Canyon (RM 16) would be used as the upper limit of chum and pink salmon introductions (Figure 5). Helicopter transport would be used to outplant above RM 16, the limit of road access in the basin.

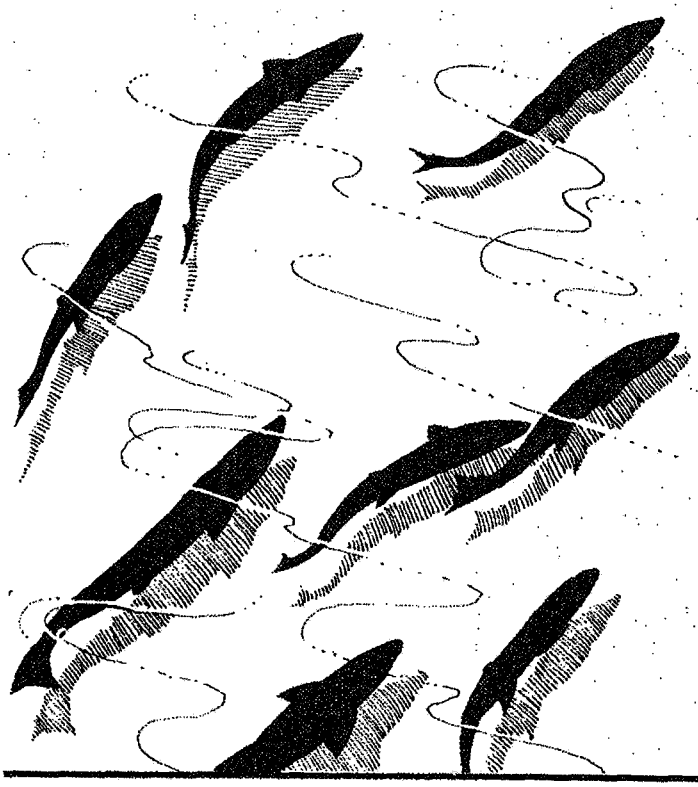
Conditioning ponds would be used, where feasible, to acclimate presmolt outplants and increase survival and adult returns. Conditioning ponds would consist of side channels fitted with temporary water control structures to allow short-term holding and rearing before downstream migration. Adult salmon returns to the upper river



and harvests would be evaluated throughout the restoration period to ensure that restoration objectives are met.

Although not considered a primary restoration option for most Elwha stocks, natural recolonization would be expected to significantly contribute to fish restoration. Once access is reestablished, adult fish could be expected to penetrate the upper river and establish themselves over an indefinite time. In the South Fork of the Skykomish River, adult chinook and pink salmon were provided access to 90 stream miles of new habitat above Sunset Falls (a natural barrier) with peak returns about 10 years later for chinook and 25 years later for pink salmon.

This plan is expected to restore the 10 anadromous fish stocks historically present in the Elwha River basin: winter and summer steelhead, sea-run cutthroat trout and native char (Dolly Varden and bull trout), spring and summer/fall chinook, coho, pink, chum, and sockeye salmon. The primary options for restoring these stocks are described below and in Appendix G.



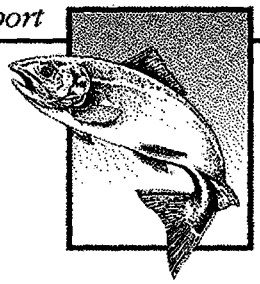
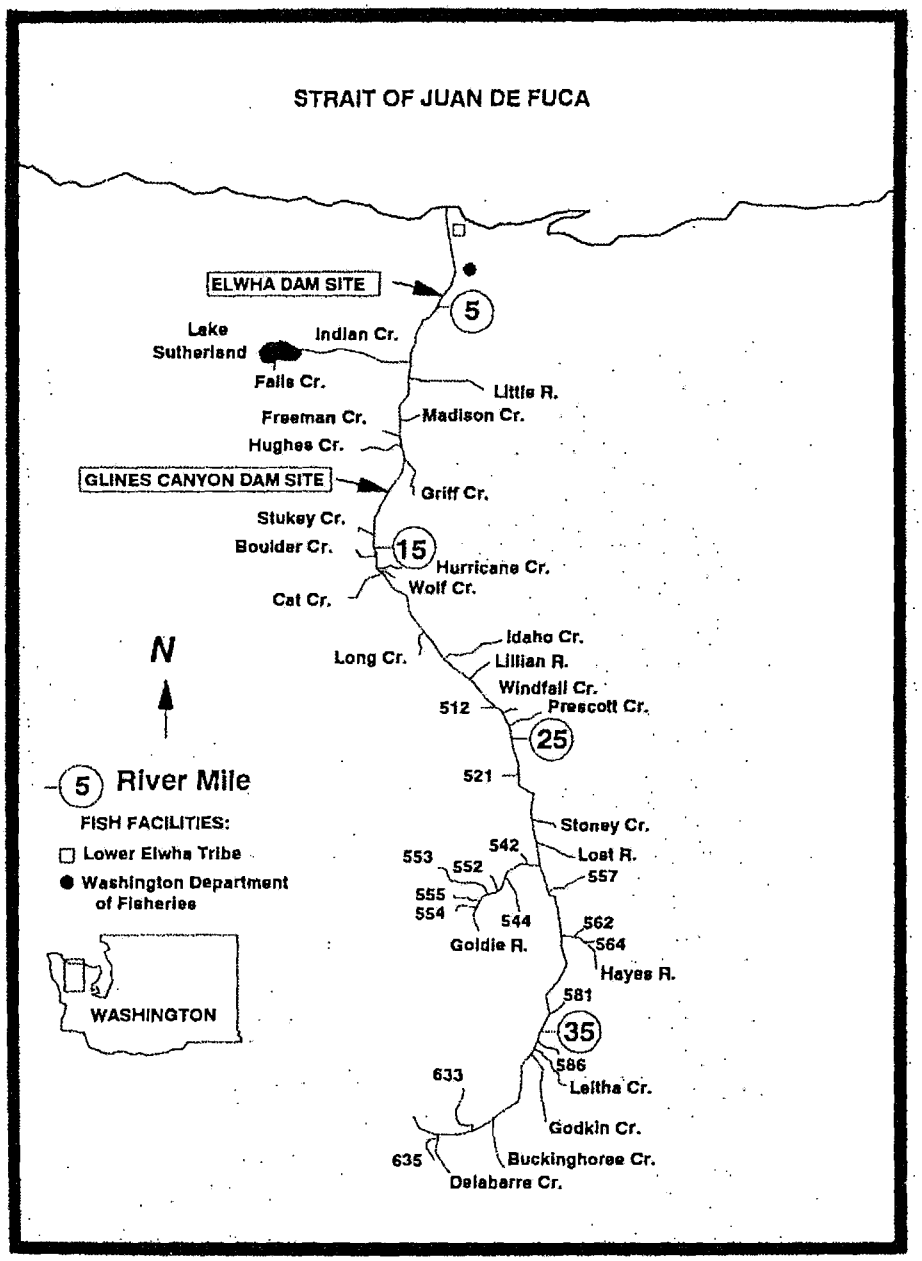
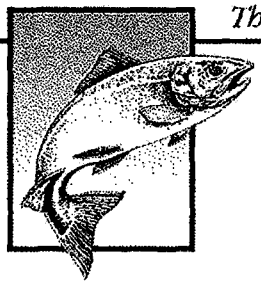


Figure 5. *Lineal extent of anadromous salmonid habitat in the Elwha River basin following removal of the Elwha and Glines Canyon dams.*





1. Summer/Fall Chinook Salmon Restoration. The native Elwha River summer/fall chinook population is healthy, being sustained by both wild and hatchery production in the lower Elwha River. As planned for spring chinook, summer/fall chinook restoration would involve collecting eggs across the range of Elwha spawning timing, then outplanting presmolts during the spring. However, outplanting would occur below RM 34 (the assumed historic range of Elwha summer/fall chinook). Given the healthy condition of this stock and the existence of the lower river hatchery program, brood should be readily available for this program.

2. Spring Chinook Salmon Restoration. Elwha spring chinook salmon, if present, are undoubtedly few in number. Loss of access to upriver habitat due to the dams, coupled with possible spawning with other chinook in the lower river, have likely reduced their numbers and perhaps their genetic distinction from summer/fall chinook. Limited numbers of nonnative chinook stock have also been released in the lower Elwha River.

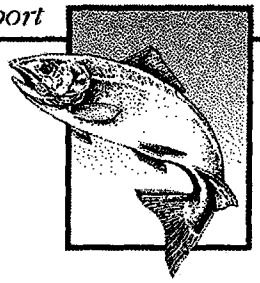
Spring chinook restoration would involve collecting eggs across the range of the existing Elwha chinook spawning timing, then outplanting presmolts in the upper basin in early spring within their assumed historic range (above RM 34). Over time, this approach would be expected to stimulate earlier return among Elwha chinook exposed to the upper river environment. Presmolt outplanting would minimize interference with natural emigration (which can negatively affect marine migration and survival) and promote imprinting on the upper river.

Prior to dam removal, efforts would also be made to identify and enhance any remnant spring chinook stock in the lower river. A live capture gill-net sampling program is currently being conducted to assess run strength and potential brood collection techniques. If brood is collected during spring entry, specific measures would be taken to reduce prespawning mortality at the hatchery by improving water quality and brood holding facilities. Outplanting would occur as noted previously.

3. Coho Salmon Restoration. Elwha coho salmon have Dungeness River and Elwha River parentage and are sustained by both wild and hatchery production. Coho restoration would use existing Elwha stock. Outplants would occur above RM 16 to reduce predation on pink and chum salmon (which will be introduced below that point). Because all outplanting would be by helicopter, fingerling releases would be more cost effective than smolt releases. Based on prior experience in the Puget Sound region, a fingerling outplant program can be an effective reintroduction measure. The existing Elwha stock should be readily available in the future given its healthy status and the existing hatchery program.

4. Winter Steelhead Restoration. The early portion of the Elwha River winter steelhead run is heavily supported by hatchery production of nonnative stock. The late portion of the run is wild, but its status is unknown and the population is considered depressed due to habitat loss related to the two dams.

Restoration of winter-run steelhead would primarily focus on use of Elwha wild stock



from one or more possible sources. Genetic research has revealed that the existing rainbow trout population in the upper river may be descendant from native Elwha steelhead trapped in the upper river since construction of Elwha Dam. Supporting this view is the recent capture of steelhead smolts at Elwha Dam, which apparently originated from the upper river rainbow trout population. In addition, analogous rainbow/steelhead populations are now reported to exist above man-made barriers in the mid-Columbia River, where headwater rainbow trout populations are also believed to produce steelhead smolts.

To develop a native Elwha run from the upper river rainbow population, adult trout in the headwaters of the Elwha are being captured and transferred to the tribal hatchery for one or more cycles. These trout will be spawned at the hatchery and their progeny coded-wire-tagged and released as smolts. If returns are adequate, progeny of these fish would be used to outplant the upper river.

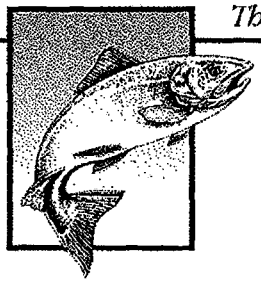
Concurrently with resident trout brood development, smolt output from the upper river will be assessed to determine potential for reestablishing a native winter run without enhancement. Smolts will be trapped at (or above) Elwha Dam, examined for migratory readiness, and compared to the upper river rainbow trout population by means of electrophoretic analysis. If smolts appear to be native Elwha and sufficient numbers are available, subsequent collections will be coded-wire-tagged to determine survival and return timing. Depending on smolt output and return timing, natural recolonization may be relied upon to establish a winter run following dam removal.

The status of the late-run stock in the lower river will also be evaluated to determine whether its enhancement could meet restoration objectives. A live capture gill-net sampling program will assess run strength, and nonlethal electrophoretic sampling will be used to assess genetic makeup. If the stock is suitable, an enhancement effort will be undertaken, dependent on the outcome of the resident fish investigations.

5. Summer Steelhead Restoration. Although their number are unknown, Elwha River summer run steelhead are considered depressed due to habitat loss related to the dams. Restoration of summer steelhead would emphasize use of wild stock, if possible. Efforts directed at winter steelhead restoration using the upper river rainbow trout population could also address native summer-run restoration if a component of the upper river rainbow trout population displays summer return timing.

Natural recolonization by lower river stock would occur after dam removal. To reduce nonnative hatchery influence in the lower river stock prior to dam removal, nonnative hatchery releases would be discontinued beginning in 1994.

6. Pink Salmon Restoration. Elwha pink salmon are a native, wild stock whose status is critical, as evidenced by chronically low escapements. Only four individuals were observed in extensive surveys in 1989 compared to estimates of over a thousand in the early 1970s. Pink restoration would entail either rebuilding the existing Elwha population (if feasible) or importation of an outside stock. Enhance-



ment of Elwha stock could be difficult due to its critical status, but further evaluation is necessary.

Despite low escapements, pink salmon can rebound quickly given their 2-year life cycle. For example, when access to new habitat was made available in the upper Skykomish River above Sunset Falls in 1959, the initial pink spawning escapement was only 150 individuals. Escapements remained low until 1981, when over 2,000 fish returned. Pink numbers then trebled over each of the next two cycles and escapement exceeded 20,000 by 1985.

If use of Elwha stock is not feasible, Dungeness River stock would be obtained from either the Dungeness River or from a hatchery egg bank (Finch Creek) in Hood Canal. The Dungeness River pink run has several desirable traits as a donor in that it has an "upper river" component that returns early and penetrates high in the system. Importing this stock would encourage colonization throughout available habitat in the Elwha and minimize risk of adversely affecting any remnant Elwha pink in the lower river.

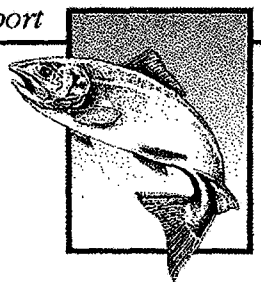
Unfortunately, the Dungeness River stock is chronically underescaped, so importing pink salmon from the WDF Finch Creek Hatchery program in Hood Canal may be necessary if Dungeness pinks do not rebound. The Finch Creek stock is desirable because it originated from the Dungeness River in the 1950s and hatchery egg takes approach 2 million.

Under any brood development program, initial incubation and rearing would occur at the tribal hatchery, but final incubation and rearing would occur at satellite facilities below RM 16. Smolts would be mass planted to reduce predation loss.

7. Chum Salmon Restoration. Elwha chum salmon are a native, wild stock whose status is unknown. Nonnative chum were cultured at the tribal hatchery, but the program was discontinued about 1987 due to limited hatchery returns.

Chum salmon restoration would focus on stabilization and rebuilding of the Elwha stock, followed by outplanting after dam removal. Additional surveys of Elwha spawner abundance will determine availability of chum for brood development. Emphasis would be placed on identification of any significant remaining native component through spawner surveys and electrophoretic analysis. Brood collection would focus on any identifiable native component as a first priority. Initial incubation and rearing would occur at the tribal hatchery with final incubation and rearing at satellite facilities below RM 16, or in appropriate locations for remote site incubation. Lower river habitat surveys would be conducted to develop habitat modification measures to stabilize and increase the existing stock prior to the dam removal period.

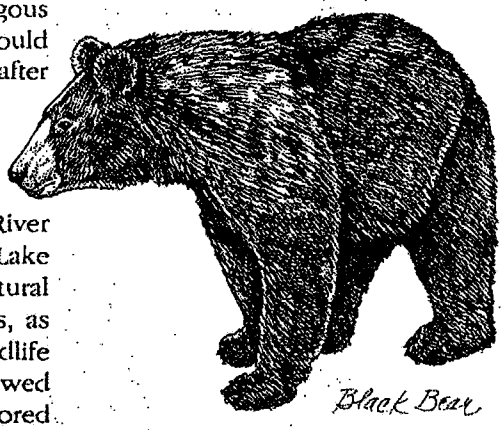
8. Sockeye Salmon Restoration. The native lower river sockeye salmon stock no longer exists because Elwha Dam blocks access to Lake Sutherland (Figure 1), which is needed to complete the freshwater phase of the sockeye life cycle. Sockeye restoration would involve either enhancing the anadromous component of Lake



Sutherland kokanee (assuming it retains a significant genetic element of the original Elwha sockeye) or importing a suitable outside stock. Kokanee, even though landlocked for many generations, may produce anadromous offspring which, through captive rearing, might be used to restore depleted sockeye stocks (as is proposed for recovery of endangered Snake River sockeye). Following this strategy, smolts would be trapped at the outlet weir of Lake Sutherland, captive reared to maturity, and their offspring returned to Lake Sutherland over one or more cycles prior to removal of Elwha Dam.

Concurrently, potential sockeye donor stocks would be screened. If use of Lake Sutherland kokanee is not feasible, sockeye fingerlings from a suitable donor stock would be introduced in Lake Sutherland beginning one year prior to Elwha Dam removal.

9. Sea-run Cutthroat Trout and Native Char Restoration. The status of Elwha sea-run cutthroat and native char (Dolly Varden and bull trout) is unknown, although no past enhancement has occurred. Restoration of these species would occur by natural recolonization from lower river stocks. However, remnant landlocked forms of both species may exist in the upper watershed in an analogous manner to rainbow/steelhead as noted above. These resident populations could significantly contribute to reestablishment of native anadromous populations after dam removal.



G. Wildlife Restoration

It is expected that the restoration of native anadromous fish runs to the Elwha River basin and the restoration of terrestrial and riverine habitat currently inundated by Lake Mills and Lake Aldwell would provide the conditions necessary for the natural recovery of wildlife populations. However, the preservation of project lands, as identified in Section VI(I), is also necessary for the full restoration of wildlife populations. If the surrounding habitat around Lake Aldwell (project lands) is allowed to be significantly developed or degraded, the full habitat potential in the restored reservoir area would not be achieved. No other activities would occur to achieve full wildlife restoration.

H. Habitat Restoration

1. Restoration Objectives for the Glines Canyon Project Area. Unlike other management agencies in the Elwha watershed, the National Park Service (NPS) is mandated to conserve and protect native species of plants and animals and to perpetuate natural processes. Consequently, NPS restoration objectives for the Glines Canyon Project involve unique issues or concerns in addition to those shared by other planning agencies. Consistent with NPS mandates and policies, design standards and methodologies for restoration of the Glines Canyon Project (including the Lake Mills reservoir) will be determined based on landscape- or ecosystem-level principles.