Washington State Hydropower Development/ Resource Protection Plan

December 1992

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Notice: The Washington State Hydropower Development/Resource Protection Plan is constantly being updated to reflect new information concerning the river reaches classified in the Plan and new or revised hydropower license application proceedings. Readers seeking current information on any aspect of the plan should contact Kevin Kozak at the Information Systems Division (206) 945-2149, or Deborah Ross of the Policy Section (206) 945-2124, of the Washington State Energy Office.

Executive Summary

Background

The Washington State Hydropower Development/Resource Protection Plan is Washington State's first comprehensive hydropower plan. This plan has its roots in the Electric Consumers Protection Act of 1986 (ECPA), which amended the Federal Power Act.

Since 1920, the Federal Power Act has been the major governing legislation for the licensing, siting, and operation of non-federal hydroelectric projects. The body responsible for implementing the Act is the Federal Energy Regulatory Commission (FERC).

Section 10(a) of the Federal Power Act mandated FERC to ensure that hydroelectric projects:

> ...will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, and for other beneficial public uses, including recreational purposes.

In 1986, when Congress passed the Electric Consumers Protection Act, no state had yet prepared a comprehensive plan. ECPA clarified and expanded the scope of comprehensive plans.

Shortly after the passage of ECPA, the Washington State Legislature authorized the Washington State Institute of Public Policy to study the feasibility of a comprehensive state hydropower development and resource protection plan. The Institute convened a task force of representatives from state agencies, Indian tribes, environmental groups, utilities, and developers. The task force recommended that Washington State prepare a comprehensive hydropower plan.

To this end, an ad hoc Interagency Hydro Work Group was created. The group drafted a policy bill and a budget to submit to the Legislature. The Legislature subsequently enacted hydropower planning legislation (RCW 90.54.800), which appropriated money to the Washington State Energy Office (WSEO) to reconvene the Hydropower Development/Resource Conservation Task Force and to develop a comprehensive hydropower plan for Washington State.

After several months of work, the task force disbanded and in accordance with the legislation, a group of Washington State agencies (Energy, Ecology, Fisheries, Wildlife, Natural Resources, the Department of Community Development's Office of Archaeology and Historic Preservation, and the Washington State Parks and Recreation Commission) continued work on the plan using their existing statutory authority.

Scope of the Plan

The effective date of this plan is January 1, 1993. This plan applies to new hydropower development at sites that do not have existing hydropower generation. An existing dam that is not used for hydropower generation, but is the proposed site for hydropower development, is within the scope of this plan. This plan does not apply to facilities or projects that meet either of the following conditions at the time this plan takes effect:

1. Facilities generating power, including facilities undergoing relicensing

2. Projects where the applicant has completed, at a minimum, the first stage consultation requirements in the FERC licensing process, as defined in FERC Order 533 (18 CFR Parts 4, 16, 375, and 380) or subsequent amendments.

Facilities or projects that are not within the scope of this plan are not exempted from any state laws, regulations, and policies because of the existence of this plan.

Plan Development

Development of this plan involved two major tasks. The first was collecting data on the state's rivers, existing hydropower sites, potential hydropower sites currently active in the FERC licensing process, and significant resource values associated with the state's rivers. The plan considers significant natural resource values and public use factors to include: anadromous fish, cultural resources, natural heritage resources, recreation resources and wild and scenic rivers, resident fish, water resources, shoreline resources, and wildlife.

This information was integrated into the Washington State River Resource/Hydropower Database. The kinds and sources of data used in this plan are discussed in Chapter 3, Database Development and Content.

The second task involved designation of "resource agreement areas," in accordance with RCW 90.54.800. Resource agreement areas categorize the state's river reaches based on the degree of potential conflict between hydropower development and significant environmental values. Three categories of resource agreement areas have been designated, each based on existing state laws, regulations, and policies.

Sensitive/hydropower opportunity areas refer to stream reaches that contain natural resource or public use values that are highly valuable, but are compatible with new hydropower development provided special mitigation occurs. Less sensitive/hydropower opportunity areas refer to stream reaches where it is presumed, based on current knowledge, that hydropower development does not conflict with, or may enhance, natural resource or public use values.

The third category--resource protection areas--includes river reaches that have one or more significant natural resource or public use values that render them incompatible with hydropower development. These stream reaches have the highest probability for conflict between resource protection and hydropower development.

Some river reaches remain unclassified due to a lack of information. These are given a "no data" designation. The evaluation criteria used for each resource agreement area are discussed in Chapter 4, Evaluation of Environmental Values and Hydropower Development.

Exceptions to the Plan

This plan provides for several types of exceptions to resource agreement area designations. These can allow a project to be developed even though the river reach where it is located remains a resource protection area. Exceptions will be granted for:

- Projects where it can be demonstrated that the natural resource or public use factor for which a reach is designated does not exist in the project vicinity.

- Projects at existing dams where the natural resource value or public use factor will not be negatively affected.
- Projects that will provide an exceptional benefit for the resource in question.
- Projects that are needed to alleviate a known hazard or to confront an officially acknowledged emergency.

This plan does not affect facilities generating power prior to its adoption, or projects seeking renewal of their FERC licenses.

Effect of the Plan on Hydropower Development in Washington State

Statewide, a summary of Washington rivers by resource classification reflects the following breakdown:

Hydropower Opportunity Areas:
Sensitive -- 43,712 miles or 53.0 percent
Less sensitive -- 3,429 river miles or 4.0 percent

Resource Protection Areas: 23,302 river miles or 28.0 percent

No Data Area: 12,209 river miles or 15.0 percent

Predicting the impact of this plan on the amount of hydropower potential in the state presents some difficulties, but an analysis of active and inactive FERC sites indicates that a significant portion of the estimated hydropower potential in the Pacific Northwest may be developed in Washington. The Northwest Power Planning Council's 1991 Conservation and Electric Power Plan estimates that 410 average megawatts of small hydropower could be developed in the Pacific Northwest.

Of the 90 active FERC sites in Washington that were analyzed, this plan would not preclude development at 65 sites. Cumulatively, these sites amount to an estimated 282 average megawatts of energy. This assumes that state laws and regulations can be met and agreement on appropriate mitigation can be worked out.

Plan Implementation

The Washington Hydropower Development/Resource Protection Plan constitutes the state's principal plan under the provisions of Section 10(a) of the Federal Power Act, as amended by the Electric Consumers Protection Act of 1986. The effective date of this plan is January 1, 1993.

RCW 90.54.800 calls for the "recommendation to the legislature of a lead agency for implementation and management of the state comprehensive hydropower plan." Lead agency responsibilities for plan implementation were not prescribed in the enabling legislation, but they would include such activities as: representing the state before FERC and the Northwest Power Planning Council, coordinating state agency efforts, facilitating the plan amendment process, serving as liaison with the public, maintaining and enhancing the database, and evaluating the effectiveness of the plan. The Washington State Energy Office will serve as the lead agency.

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The types of amendments envisioned to keep this plan current include: 1) policy or process changes; 2) exceptions to resource agreement area designations; 3) technical or data corrections; and 4) regular database updates and maintenance.

Contents

Chapter 1

History and Concept of a State Comprehensive Hydropower Plan

This chapter describes federal and state laws and activities that led to the development of a comprehensive hydropower development/resource protection plan for the State of Washington. The chapter is divided into two sections. The first section highlights three pieces of federal legislation--the Federal Power Act, the Electric Consumers Protection Act of 1986, and the Northwest Power Act of 1980--that set the direction for a state plan. The second section outlines Washington State legislation and planning activities which contributed to the development of this plan.

Federal Context

The Federal Power Act

In the United States the concept of comprehensive planning for water resource and hydropower development can be traced back to at least 1910. The General Dam Act passed in that year provided "that there should be a comprehensive plan for the development of a river and waterway system; that each particular dam project should be given consideration not only with a view to the locality where constructed but with a reference to the entire water system of which it constituted a part." The Newlands Act of 1917 also made reference to comprehensive planning for river and river basin development.

The Federal Power Act of 1920 superseded previous water power development legislation and is the foundation for the current federal hydropower regulation system administered by the Federal Energy Regulatory Commission (FERC). As was the case with previous acts, the Federal Power Act reflected Congress' commitment to comprehensive planning. Including amendments made prior to the passage of the Electric Consumers Protection Act of 1986, the comprehensive planning provision of the Federal Power Act read as follows:

> Sec. 10. [As Amended August 26, 1935, September 7, 1962, and August 3, 1968.] "All licenses issued under this Part shall be on the following conditions:
> (a) That the project adopted, including the maps, plans and specifications, shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, and for other beneficial public uses, including recreational purposes."

The comprehensive plan provision was not a major factor in the federal licensing process prior to 1986 Up until then no state had prepared a comprehensive hydropower plan.

The Electric Consumers Protection Act of 1986

The Electric Consumers Protection Act of 1986 (ECPA) clarified the meaning of Section 10(a) of the Federal Power Act with regard to comprehensive plans and their effect on the FERC licensing process. The Act made explicit the right of states and federal resource agencies to prepare comprehensive plans for a "waterway or waterways" and to have these plans be given considerable weight in FERC's licensing process.

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As amended by ECPA, Section 10(a) now reads as follows:

> Sec. 10. [As Amended August 26, 1935, September 7, 1962, August 3, 1968, and October 16, 1986.] (Additions as a result of the Electric Consumers Protection Act of 1986 are underlined) "All licenses issued under this part shall be on the following conditions:
>
> (a) (1) That the project adopted, including the maps, plans and specifications, shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitats), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e); and if necessary in order to secure such plan the Commission shall have the authority to require the modification of any project and of the plans and specifications of the project works before approval."
>
> (2) In order to ensure that the project adopted will be best adapted to the comprehensive plan described in paragraph (1), the Commission shall consider each of the following:
>
> (A) The extent to which the project is consistent with a comprehensive plan (where one exists) for improving, developing, or conserving a waterway or waterways affected by the project that is prepared by
>
> (i) an agency established pursuant to federal law that has the authority to prepare such a plan; or
>
> (ii) the state in which the facility is or will be located.
>
> (B) The recommendations of federal and state agencies exercising administration over flood control, navigation, irrigation, recreation, cultural and other relevant resources of the state in which the project is located, and the recommendations (including fish and wildlife recommendations) of Indian tribes affected by the project."

As a result of a request made by FERC to the states and federal agencies in January 1987, several states and agencies submitted materials that they wished to be considered as components of comprehensive plans.

In October 1987, FERC issued an interpretive ruling regarding the contents of a comprehensive plan as envisioned in the Electric Consumers Protection Act. In the ruling, FERC identified two basic guidelines that a plan would need to meet to be within the scope of Section 10(a)(2)(A) of the Act. A plan must:

1. [Be] "prepared and adopted pursuant to a specific act of the state legislature and developed, implemented, and managed by the appropriate state agency

2. Reflect the preparers' own balancing of the competing uses of a waterway, based on their data and applicable policy considerations."

Further, according to the ruling:

> a comprehensive plan should contain the following: (1) a description of the waterway or waterways that are the subject of the plan, including pertinent maps detailing the geographic area of the plan; (2) a description of the significant resources of the waterway or waterways; (3) a description of the various existing and planned uses for these resources; and (4) a discussion of goals, objectives, and recommendations for improving, developing, or conserving the waterway or waterways in relation to these resources.

At that time, FERC indicated that it saw only two plans that met the intent of ECPA: the Northwest Power Planning Council's Plan (actually a combination of the Fish and Wildlife Program and the Northwest Conservation and Electric Power Plan), and the State of Maine Comprehensive Hydropower Plan. In May 1988, FERC released its regulations regarding comprehensive plans. Title 18 states that:

the Commission will treat as a comprehensive plan one that: is prepared by an agency established pursuant to Federal law that has the authority to prepare such a plan, or by a state agency, of the state in which the proposed hydroelectric project is or will be located, authorized to conduct such planning pursuant to state law; is a comprehensive study of one or more of the beneficial uses of a waterway or waterways; includes a description of the standards applied, the data relied upon, and the methodology used in preparing the plan; and is filed with the Secretary of the Commission {18 CFR 30,811 (1988)}.

To date FERC has interpreted these regulations broadly, giving comprehensive plan status to virtually any resource management plan prepared by a federal or state agency regardless of whether or not the plan addresses hydropower.

The Northwest Power Act of 1980

The Northwest Power Act of 1980 clearly indicated that Congress saw the need for energy development and resource conservation planning in the Pacific Northwest. That Act created the Northwest Power Planning Council (Council) and directed the Council to prepare: 1) a regional energy plan, and 2) a program to "protect, mitigate, and enhance" the fish and wildlife of the Columbia River Basin.

The Council initiative that relates directly to comprehensive hydropower planning is the "protected areas" designation included in the 1984 and 1987 versions of the Council's Fish and Wildlife Program. The rationale underlying the concept was that certain areas should be protected from new hydropower development because of their significant fish and/or wildlife values.

In 1985, the Council initiated the Hydropower Assessment Study to identify streams eligible for protected areas designation. The state of Washington participated in this study as did federal resource agencies and Indian tribes with reservations and ceded lands within the state. The study assigned a rating to each stream in the four-state area according to its relative significance for several environmental factors. Using this information and a set of agreed upon criteria, the states each identified a list of streams that were eligible for protected area status. The Washington list was prepared through a collective effort of the State Energy Office and the Departments of Ecology, Fisheries, and Wildlife.

Based on state recommendations, the Council prepared an Issue Paper that outlined a proposed protected areas ruling. The Issue Paper discussed: 1) the criteria proposed for identifying streams that would be included, 2) the effect of designating protected areas on energy production, and 3) how the Council would propose to implement the protected areas designation. Following public hearings, the Council adopted its official protected areas designation in 1988 and petitioned FERC to recognize protected areas as a comprehensive plan under Section 10(a) of the Federal Power Act.

The Bonneville Power Administration promotes implementation of the Columbia River Basin portion of the program by placing limitations on access to federal transmission lines from projects in protected areas and on acquisition of power from such projects.

Washington State Context

During the 1987 Washington State legislative session, an appropriation was provided to the Washington State Institute for Public Policy to study the feasibility of a comprehensive state hydropower development and resource protection plan. The impetus for the state appropriation bill was new federal legislation, the Electric Consumers Protection Act of 1986 (discussed above). The appropriations bill directed that the study: 1) be developed in consultation with other state agencies; 2) be completed by December 1, 1987; and 3) result in recommendations concerning a state hydropower plan for balanced protection and development of the state's waterways.

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1987 Task Force

In 1987, the Institute for Public Policy invited representatives from state agencies, Indian tribes, environmental groups, utilities, developers, and other interested parties to serve on a task force. The task force provided a forum to identify issues of concern and areas of consensus. The objective was to reach consensus on the direction the state of Washington might take regarding hydropower development and resource protection. The task force met in a series of five day-long workshops that focused on specific topics relevant to state hydropower development and resource protection. It developed a set of recommendations, which the task force forwarded to the Washington State Legislature in its **Final Report Hydroelectric Development/Resource Protection Study** in December 1987. This report recommended that "the State of Washington, in concert with appropriate interests, should prepare a state comprehensive hydropower plan."

The report suggested that the following basic concepts should be considered in developing a comprehensive plan:

1. A comprehensive hydropower plan is in essence a clear delineation of policy regarding future hydropower development coupled with an action program for implementing this policy.

2. It is comprehensive in that it addresses an entire river, watershed, state, or region and considers a variety of beneficial uses for the waterway or waterways, including natural resource and hydropower values.

3. A comprehensive hydropower plan is not a comprehensive water plan. It need not, and indeed should not, resolve all issues pertaining to flowing surface waters.

4. The emphasis of the plan should be on making "strategic" choices, setting long-term policies, and creating the context within which "operational" planning may take place. The plan sets direction and identifies priorities; it does not resolve every site-specific issue. It is amendable and should be updated to respond to changing conditions.

Interim Agency and Task Force Activities

Following submission of the 1987 Task Force Report, an ad hoc Interagency Hydro Work Group was created consisting of representatives from the following state agencies, offices, and legislative committees: Ecology, Energy, Fisheries, Wildlife, Natural Resources, Archaeology and Historic Preservation, Social and Health Services, Parks and Recreation Commission, the House and Senate Energy and Utilities Committees, and the Office of the Governor. The work group addressed the task force recommendations: 1) to improve and formalize interagency communications in hydropower-related issues; 2) to improve the tracking of FERC permits, licenses, and rule-making procedures; and 3) to develop a hydropower database that would provide a common database for all state agencies. The Department of Ecology coordinated these efforts.

The task force also continued to meet periodically to lay the groundwork for a comprehensive state hydropower plan. At the task force's recommendation, the agencies drafted a policy bill and a budget to submit to the Washington State Legislature for developing the comprehensive hydropower plan. The State Energy Office served as the liaison for these two groups in the 1989 legislative session.

RCW 90.54.800 Comprehensive State Hydropower Plan

In the 1989 session, the Washington State Legislature passed hydropower planning legislation (Second Substitute Senate Bill 5174), which became RCW 90.54.800. The Washington State Legislature provided an appropriation to the State Energy Office to reconvene the Hydropower Development/Resource

Protection Task Force and to develop a comprehensive hydropower plan for Washington State. The Legislature specified that the plan's goal would be to serve the broad public interest regarding development of cost-effective electricity and conservation of river-related environmental values.

In the 1989 hydropower planning legislation, the Legislature directed that the Comprehensive State Hydropower Development/Resource Protection Plan, at a minimum:

a) List applicable laws, rules, and policies

b) Describe the waterways or basins covered by the plan

c) Designate the categories of resource agreement areas for each waterway or basin

d) Describe, for each waterway, where hydropower is to be affected and the significant resources that cause the waterway or basin to be so designated

e) Identify goals, objectives, and recommendations for improving, developing, or conserving affected waterways

f) Describe how the plan is to be integrated with other planning activities and policy initiatives and how the plan will be implemented and amended

g) Assess the anticipated effect of the plan on hydropower development and resource protection

h) Describe the plan development process.

In 1989, a task force was re-convened with representatives from state agencies, Indian tribes, environmental groups, utilities, developers, legislative committees, and other interested parties. The task force met in a series of four day-long workshops which focused on specific topics related to developing a comprehensive hydropower plan.

The legislation directed the task force to appraise its progress by December 15, 1989: "If, in the opinion of the participants, a consensus to continue as a task force cannot be achieved, the executive agencies shall use their existing statutory authority to develop a plan, with the assistance of all affected parties and participating agencies, building upon the work that has been done by the task force." In December 1989, the task force agreed to continue working and reported its progress to the Legislature. By late January 1990, there was not a consensus of the task force to continue.

As set forth in the legislation, the Washington State agencies--Energy, Ecology, Fisheries, Wildlife, Natural Resources, the Department of Community Development's Office of Archaeology and Historic Preservation, and the Washington State Parks and Recreation Commission--continued work on the plan using their existing statutory authority. The agencies have met regularly to develop the plan and coordinate activities. They have also provided the information and technical support necessary to develop the Washington State River Resource/Hydropower Database, the computerized basis for this plan.

A draft plan was published in July 1991, and public comments were taken through September 1991. The agencies also met several times with interested parties to discuss the issues in the draft plan. Based on comments received on the draft, the agencies revised the plan, resulting in a second draft published in January 1992. Based on a second round of comments on the January 1992 draft, the agencies developed this final plan.

Chapter 2

Plan Development

This chapter discusses three aspects of plan development. First, the purpose of the plan is described, based on the legislative mandate that directed its development. Second, the scope of the plan is set forth. Finally, the methodology used to develop the plan is generally described, including the associated database and Geographic Information System.

Purpose

In the comprehensive hydropower planning legislation, RCW 90.54.800, the 1989 Washington State Legislature directed that future development of hydropower and protection of river-related resources shall be guided by policies and programs that:

1. Create opportunities for balanced development of cost-effective and environmentally sound hydropower projects by a range of development interests.

2. Protect significant values associated with the state's rivers, including fish and wildlife populations and habitats, water quality and quantity, unique physical and botanical features, archaeological sites, and scenic and recreational resources.

3. Protect the interests of the citizens of the state regarding river-related economic development, municipal water supply, supply of electric energy, flood control, recreational opportunity, and environmental integrity.

4. Fully utilize the state's authority in the federal licensing process.

The Legislature directed the development of a comprehensive state hydropower plan to serve the broad public interest regarding: 1) development of cost-effective electricity and 2) conservation of river-related environmental values. The plan will do this by guiding new hydropower development towards locations where environmental impacts can be minimized and away from areas where development might be incompatible with continued protection of significant natural or recreational resources.

Scope of the Plan

The effective date of this plan is January 1, 1993. This plan applies to new hydropower development at sites that do not have existing hydropower generation. An existing dam that is not used for hydropower generation, but is the proposed site for hydropower development, is within the scope of this plan. This plan does not apply to facilities or projects that meet either of the following conditions at the time this plan takes effect:

1. Facilities generating power, including facilities undergoing relicensing.

2. Projects where the applicant has completed, at a minimum, the first stage consultation requirements in the FERC licensing process, as defined in FERC Order 533 (18 CFR Parts 4, 16, 375, and 380) or subsequent amendments.

Facilities or projects that are not within the scope of this plan are not exempted from any state laws, regulations, and policies because of the existence of this plan.

Methodology

The first major task was collecting data on the state's rivers, existing hydropower sites, potential hydropower sites that are active in the FERC licensing process, and significant resource values associated with the state's rivers. Significant resource values include: anadromous fish, cultural resources, natural heritage resources, recreation resources and wild and scenic rivers, resident fish, water resources, shoreline resources, and wildlife. This information was integrated into a database, the Washington State River Resource/Hydropower Database. The data were analyzed and displayed using a Geographic Information System. Chapter 3 contains more information about the sources for the data and the development of the database.

The next step in plan development was to designate categories of resource agreement areas, as directed by the Legislature. RCW 90.54.800 directs that at a minimum, two resource agreement areas be designated. This plan includes three categories. There are two different categories for hydropower development opportunity areas; they differ in the degree of potential conflict between hydropower development and significant environmental values. The third category includes areas that are incompatible with hydropower development because their environmental values are considered to be high, based on existing state laws, regulations, and policies.

Without the third category, this plan would lack critical information for hydropower developers and the public. Its presence in the plan does not add new prohibitions for hydropower development, but rather it explains why a large portion (28 percent) of the state's rivers are not designated in either of the two hydropower development opportunity areas. As noted in the legislation, this plan must be integrated with existing state laws and programs, and all three categories achieve this. In addition to the three categories of resource agreement areas, there are river reaches that remain unclassified due to a lack of information; they are given a "no data" designation.

After defining the categories of resource agreement areas, criteria were developed for evaluating the eight resource values. These evaluation criteria were used to categorize each of the almost 77,000 stream reaches in the state into one of the three resource agreement areas, based on the value of resources. In other words, using these criteria, each stream reach was evaluated for each of the eight resources and assigned eight different resource agreement area designations. Based on those eight designations, the reach was given an overall designation, which placed it into one of the resource agreement area categories. The evaluation criteria and the stream reach classification process are further described in Chapter 4.

After all stream reaches were classified into one of the three resource agreement area categories or the no data designation, two sets of potential hydropower sites were analyzed: 1) active FERC sites and 2) sites that have at one time or another been filed with FERC. The purpose of the analysis was to estimate the approximate amount of potential hydropower development allowed under the plan, either because particular projects are grandfathered from the plan, or because general locations of sites previously considered by developers fall into hydropower opportunity areas. The resolution of FERC site data compared to the plan database created a complication in the analysis. To avoid any misinterpretation, this is explained before providing aggregate level assessments of the impact the hydropower plan resource agreement areas might have on statewide hydropower potential. This analysis can be found in Chapter 4.

The Geographic Information System was used to integrate all of the raw data, evaluation criteria, and classification results. Information on any stream reach, river basin, or the entire state can be displayed in data reports and maps. This information is available from the Washington State Energy Office.

Chapter 3

Database Development and Content

This chapter has two sections: the first describes the development and content of the Washington State River Resource/Hydropower Database; the second describes data sources for each of the natural resource and public use factors used in analyzing stream reaches in this plan.

Development of Washington State River Resource/Hydropower Database

Over the past five years, several state agencies have been developing the Washington State River Resource/Hydropower Database. The agencies involved and the information they supplied include: the Washington State Energy Office (existing and potential hydropower sites as extracted from the Pacific Northwest Hydropower Database); the Washington Department of Ecology (shoreline master plans database and the Instream Resources Protection Program); the Washington Department of Fisheries (anadromous fish); the Washington Department of Natural Resources (Natural Heritage features); the Washington Department of Wildlife (resident and anadromous fish, wildlife, and natural features); the Washington Parks and Recreation Commission (recreation and scenic rivers); the Washington Department of Community Development's Office of Archaeology and Historic Preservation (cultural resources); and the Water Resources Division of the U.S. Geological Survey in Portland (U.S. Environmental Protection Agency River Reach files).

Information is available for all of the state's streams at 1:100,000 scale resolution. Streams are subdivided into reaches--increments that are defined, where possible, so that a tributary enters at one end of the reach. On average, a reach extends 1.2 river miles. However, reach lengths can be greater or less than this distance. The system also includes information on most of the state's existing and potential hydropower sites, as well as institutional constraints to hydropower development.

Maps of this information can be created using the Washington State Energy Office's Geographic Information System (GIS). This system provides an efficient and accurate means to create maps depicting the locations of resource features, hydropower sites, or a combination. Maps can be created for the entire state or for one or more basins within the state. The GIS provides future capability to merge these data with other information appropriate to water and energy planning--for example, county and public land boundaries, and transmission line locations. Data tables and maps may be generated from the database in a variety of formats.

State Energy Office

The Washington State Energy Office (WSEO) has been the lead agency in preparing the comprehensive hydropower plan. WSEO has worked closely with other participating state agencies to make the interagency communication and coordination improvements recommended in the first task force report to the Legislature (December 1987).

WSEO integrated data from participating agencies into the River Resource/Hydropower Database and analyzed and displayed this information using GIS capabilities. It has also served as contract manager for agency and consultant services in preparing this plan.

Department of Ecology

The Washington Department of Ecology (Ecology) has compiled several types of data used in this plan. These data include:

1. Dam Inventory (existing impoundments)
2. Washington Administrative Code (WAC) minimum stream flow information
3. Shorelines environmental designations
4. Water quality information
5. Municipal water supply reservations

Data have been compiled and transferred in coded form to WSEO.

The State Dam Inventory of 1,018 dams was made available to the project in October 1989. The WAC minimum flow data (Nooksack and Wenatchee basins) have coded reaches as: closed to further consumptive appropriations, having partial year closures, or having minimum flows established and open to further appropriation. Shorelines environmental designations are included. This information is in ARC-INFO coverage and contains the designations Natural, Conservancy, Rural, Urban, and Aquatic format. Efforts were made to link the information from Ecology's Water Body Tracking System (Water Quality database) with the ARC-INFO stream reach coverage to allow the water quality information to be easily mapped. It is important to know where there are non-point source pollution problems (especially turbidity and temperature) when siting a hydropower project. The U.S. Environmental Protection Agency (EPA) is working to create an index to relate EPA stream reach number to Water Body number since both are EPA numbering systems. When completed, Ecology will pursue linking the two systems. Information regarding subbasins with municipal water supply reservations will be coded to the EPA system in the near future.

Department of Fisheries

The Washington Department of Fisheries' (WDF) contributions to the hydropower plan have focused on compiling existing, up-to-date salmon use information for rivers throughout Washington State.

Using outside funding sources, WDF, the Department of Wildlife, and the Northwest Indian Fisheries Commission have updated existing salmon use information and transferred the data onto coded mylar map overlays. The information was gathered through a series of interviews with knowledgeable authorities throughout the state and through reviews of existing information bases. The maps document the uppermost extent of known salmon utilization by species, anadromous fish barriers, fish passage facilities, and the location of fish production facilities. The information has been digitized by the Washington Department of Wildlife for use in the GIS and the hydropower planning process.

Department of Natural Resources

The Washington Department of Natural Resources' (DNR) Natural Heritage Program has provided information from its database on endangered, threatened, and sensitive plant species, high-quality native terrestrial ecosystems, and high-quality native wetland and aquatic ecosystems. Information on other natural features originally collected by the Natural Heritage Program as part of the Pacific Northwest Rivers Study is not currently being updated. These include geologic features, special botanical areas, potential national Natural Landmarks, potential Research Natural Areas, and undeveloped stream reaches.

Department of Wildlife

The Washington Department of Wildlife (WDW) developed the resident fish, steelhead, and wildlife criteria. In addition, it has undertaken an extensive effort to refine and expand resident fish data. These data are incorporated into the Washington Rivers Information System database. WDW reviewed and refined the wildlife portion of the Washington Rivers Information System, especially regarding threatened, endangered, sensitive, and priority species.

Parks and Recreation Commission

The Washington Parks and Recreation Commission sorted the recreational use and scenic rivers data from a variety of sources:

1. River Recreation Study, An Initial Assessment
2. Statewide Scenic Rivers Assessment, 1988
3. Pacific Northwest Rivers Study
4. National Park Service Wild and Scenic Rivers Inventory
5. Interagency Committee for Outdoor Recreation's Inventory of Recreation Sites and Facilities.

Data have been compiled and transferred in river reach identification areas to the State Energy Office.

From the River Recreation Study, boating use was prioritized with the concurrence of recreation interest groups and river recreation experts during the course of the hydropower plan study period. The Scenic Rivers Assessment offers cumulative recreation and natural value analysis to determine eligibility for the State Scenic Rivers System. Other studies located recreation sites and facilities and identified nationally recognized river systems. Information on recreational use of rivers and a determination of the scarcity of river recreation areas will continue to be updated.

Sources of Data in the Washington State River Resource/Hydropower Database

Anadromous Fish

Information concerning accessibility, outplanting, water sources for hatcheries, and species with unique characteristics came from the anadromous fish component of the Washington Rivers Information System, a computerized database and geographic analysis system maintained by WDW. The original information came from the Northwest Power Planning Council's Anadromous Fish Study and was substantially refined in 1989-1990 through a cooperative field survey effort involving fisheries biologists from WDF, WDW, the Northwest Indian Fisheries Commission, and individual Indian tribes. The enhanced data system is now accurate to a scale of 1:100,000. See Attachment C for further details.

Cultural Resources

Information concerning cultural resources came from the cultural resource component of WDW's Washington Rivers Information System. Data in this system were originally collected through the Pacific Northwest Rivers Study. Information was assembled from the Washington State Department of Community Development's Office of Archaeology and Historic Preservation files. This information was updated with new sites. Information concerning sacred areas for any of Washington's 26 federally recognized Indian tribes is not included. See Attachment C for further details.

Wildlife and Natural Heritage Features

Wildlife information came from the wildlife portion of WDW's Washington Rivers Information System. Information in that system was originally collected for the Pacific Northwest Rivers Study and has been substantially enhanced through the addition of information collected by WDW for its Priority Habitats and Species Program. Information on Natural Heritage features comes from DNR's Natural Heritage Program. See Attachment C for further details.

Water and Shoreline Resources

Information on water quality, water quantity, and shoreline management comes from the Department of Ecology. While this plan does not use water quality standards to derive environmental designations for stream reaches, all hydroelectric projects must be able to abide by the water quality standards for the appropriate water quality class for the project area (i.e., Class AA, A, B, C, or Lake). These standards are contained in Chapter 173-201 WAC. Additional non-point pollution information is being gathered as part of watershed planning activities occurring throughout the state. Initial data management requirements have been identified for these non-point source data, but have not been further developed as part of this plan development process.

Water quantity information for this plan is based on instream flow regulations contained in the Instream Resources Protection Programs that exist for certain Water Resource Inventory Areas (WRIA) in the state. Instream flow programs stipulate minimum flows that are to be maintained for streams in the applicable basin, subject to existing rights. The programs are contained within separate sections of the Washington Administrative Code. As part of these programs, some streams are subject to a partial or complete closure on new water rights and diversionary uses.

Information used to classify shoreline areas in this plan for hydroelectric development suitability is derived directly from language contained within local Shoreline Management Programs developed under the Shoreline Management Act with approval by the Department of Ecology.

Resident Fish

Information on critical habitats, species of special concern, fish distribution, and the environmental factors used to derive summary values are all contained in the resident fish component of WDW's Washington Rivers Information System. Information was originally collected for the Pacific Northwest Rivers Study at a resolution of 1:250,000. It has been significantly refined through an inventory of river habitat quality and fish resources conducted by WDW's research and regional fisheries biologists. The refined data were collected at a 1:100,000 scale. See Attachment C for further details.

Recreation Resources

Information on river recreation came from the Pacific Northwest Rivers Study; the River Recreation Study, An Initial Assessment; the Statewide Scenic Rivers Assessment; the National Park Service Wild and Scenic Rivers Inventory; and the Interagency Committee for Outdoor Recreation's Inventory of Recreation Sites and Facilities.

Chapter 4

Evaluation of Environmental Values and Hydropower Development

This chapter is divided into four sections. The first describes the three resource agreement areas and possible exceptions to those categories, the second explains the stream rating system, and the third describes the evaluation process agencies use for eight natural resource and public use factors. The fourth section provides a statewide summary of the resource agreement areas as applied to Washington rivers and discusses the potential impact of the plan on hydropower development in the state.

Resource Agreement Areas

As directed by RCW 90.54.800, the plan designates categories of resource agreement areas. The legislation directs that at a minimum, two resource agreement areas be designated. This plan includes three categories, each of which integrates existing state laws and programs. These resource agreement areas are used to categorize each of the state's almost 70,000 river reaches based on the degree of potential conflict between hydropower development and significant environmental values. The resource evaluation criteria associated with the three categories for each natural resource and public use factor are covered later in this chapter.

The three resource agreement areas are described below:

Resource Protection Areas

Resource protection areas refer to stream reaches with one or more significant natural resource or public use values that render them incompatible with hydropower development based on existing state laws, regulations, and policies. These stream reaches have the highest probability for conflict between resource protection and hydropower development. Hydropower development proposals in these areas will be opposed by the state unless they are granted an exception. Possible exceptions are listed later in this section.

Sensitive/Hydropower Opportunity Areas

Sensitive/hydropower opportunity areas refer to stream reaches that contain natural resource or public use values that are highly valuable, but are compatible with new hydropower development provided special mitigation occurs. When considering any hydropower development in these stream reaches, the state will make a concerted effort to review and evaluate the results of studies, conducted by the developer, which were designed to assess the effects of such projects on the resources of concern. Provided that the relevant state agencies can identify mitigation and procedures to ensure achievement of such mitigation, and the developer agrees to implement these actions, the state will support hydropower in these areas.

Less Sensitive/Hydropower Opportunity Areas

Less sensitive/hydropower opportunity areas refer to stream reaches where, based upon current knowledge, it is presumed that hydropower development does not conflict with, or may enhance, natural resource or public use values. Projects proposed for such reaches have a high probability that all required state permits will be granted and that the state will support these projects. Existing standards will need to be met and mitigation may be required.

No Data Designation

In addition to the three categories of resource agreement areas, there are river reaches that remain unclassified due to a lack of information. These unclassified reaches are given a "no data" designation.

Projects proposed for these areas must meet existing standards. Mitigation will be required. Studies conducted for these projects may result in placement of the stream reach into one of the other resource agreement areas.

"Mitigation" as Used in this Plan

As used in resource management, the term "mitigation" may mean avoiding the impact altogether, reducing or eliminating the impact now or over the life of the project, compensating for the impact, and/or monitoring the impact and taking corrective actions. For the purposes of this plan, the definition adopted in Executive Order 90-04 will be used by each agency in its consideration of hydropower projects. The following definition lists mitigation measures in order of preference. Mitigation may include a combination of the following measures:

1. Avoiding the impact altogether by not taking a certain action or part of an action.

2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts.

3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

5. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments.

6. Monitoring the impact and taking appropriate corrective measures.

Exceptions to Resource Agreement Areas

There are situations where an exception to a resource agreement area category will be granted for a specific hydropower project. An exception to a designation of resource protection area allows a project to be developed even though the river reach remains a resource protection area. See Chapter 5 for information on the process for granting exceptions.

Exceptions will be granted, where warranted, as follows:

- Projects where it can be demonstrated that the natural resource or public use factor for which a reach is designated does not exist in the vicinity of the project (e.g., a designated anadromous fish reach where an existing structural blockage restricts migration to an upstream area of the reach where project development is proposed).

- Projects at existing dams where the identified resource or public use factor will not be negatively affected (note: the only dams that are affected by this plan are those not currently used for hydropower generation).

- Projects that will provide an exceptional benefit for the resource in question.

- Projects that are needed to alleviate a known hazard or to confront an officially acknowledged emergency.

Stream Rating

Eight natural resource and public use factors (anadromous fish, cultural resources, natural heritage resources, recreation resources and wild and scenic rivers, resident fish, water resources, shoreline resources, and wildlife) are analyzed in this plan. The state's streams are evaluated with respect to these eight factors. Each factor is rated separately based on the evaluation criteria discussed later in this chapter.

The rating process can be visualized as a matrix, with all of the stream reaches being evaluated on the left side and all eight factors along the top. For each reach, the eight factors are classified in one of four ways: (1) as a resource protection area, (2) as a sensitive/hydropower opportunity area, (3) as a less sensitive/hydropower opportunity area, or 4) as a no data area. An overall stream rating is also given.

Table 1 is an example that displays five stream reaches and the eight natural resource and public use factors. The numbers in the matrix refer to the classifications discussed above: 1 = resource protection area, 2 = sensitive/hydropower opportunity area, 3 = less sensitive/hydropower opportunity area, and 4 = no data.

Table 1
River Reach Rating

River Reach	Anad. Fish	Res. Fish	Wild-life	Nat. Her.	Eco. Flow	Cultural Res.	Rec. Res.	Eco. Shor.	Overall Rating
A	1	1	2	4	3	4	2	2	1
B	4	4	4	4	3	4	2	2	2
C	2	2	4	2	3	4	4	3	2
D	4	3	3	4	3	4	4	4	3
E	4	4	4	4	4	4	4	4	4

The classification for each natural resource and public use factor stands on its own. The criteria used to evaluate each factor are based on existing state laws, regulations, and policies and are considered by the state to be minimum protection for each resource. There is no attempt to derive a composite ranking for a stream reach. The final rating for a given reach is the highest rating for any natural resource or public use factor (1 is the highest and 4 is the lowest). Hence, a rating of 1 for any factor will result in an overall hydropower rating of 1, "resource protection."

Criteria for Establishing Resource Classification

This section describes the evaluation process agencies use for each of eight natural resource and public use factors. The following information is provided for each factor:

- Responsible Agency: agency responsible for managing the resource and for conducting the evaluation.
- Description: a summary of significant resource characteristics.
- Evaluation Criteria: criteria used to classify streams as resource protection areas, sensitive/hydropower opportunity areas, or less sensitive/hydropower opportunity areas.

- Authority: list of legal and administrative authorities that justify the evaluation criteria.

Anadromous Fish

Responsible Agency

Washington Department of Fisheries, Washington Department of Wildlife, in cooperation with the state's 26 federally-recognized Indian tribes

Description

Anadromous fish include species that live much of their life cycle in the ocean but ascend rivers and streams to spawn. In Washington, the major anadromous species are sea-run cutthroat, steelhead, smelt, green sturgeon, white sturgeon, dolly varden, and five species of Pacific salmon, including pink, chum, sockeye, coho, and chinook. Accessibility is a principal concern in the management of anadromous fish. For the purposes of this plan, "accessible" refers to all areas downstream of a known impassable blockage (either natural or man-made), and, where there is no confirmed blockage, all areas downstream of the point identified by state, federal, or tribal fisheries agencies as the uppermost extent of anadromous fish migration. Accessible areas are referred to as the anadromous fish zone.

Evaluation Criteria

Resource Protection Areas

A stream reach is classified as "resource protection" when any of the following conditions exists:

1. Stream habitat is accessible to anadromous fish within the range of anticipated environmental conditions.

2. Stream habitat will be made accessible to adult anadromous fish through a restoration or enhancement activity or program. For purposes of this plan, this criterion is limited to the following listed locations unless amended:

   a. In the Columbia Basin, those areas presently identified for future accessibility in the Northwest Power Planning Council's Fish and Wildlife Program.

   b. Those waters accessible to adult anadromous fish with the removal of the Elwha River dams.

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" when any of the following conditions exists:

1. Any reach located in an area presently not accessible to adult anadromous fish, but where a hydropower project may potentially have a detrimental effect on anadromous fish, including areas that:

   a. Are presently outplanted with anadromous fish, but are inaccessible to adults.

   b. Provide water sources for anadromous fish culture facilities.

c. Are within the historical range of adult anadromous fish, though presently inaccessible, and can again become accessible to adult anadromous fish through passage restoration and/or restoration of existing fishways. See Attachment D.

d. Are upstream of the known upper extent of a race or population of anadromous fish of special management concern or unique characteristics.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity" when information exists for the reach and it does not qualify for either of the above classifications. This includes areas outside of known anadromous fish zones where there is no plan for future access and where there is no direct effect on anadromous fish.

Authority

1. Washington Department of Fisheries habitat management policy POL-410.

2. SALMON 2000, Chapter 214, Laws of 1988, Regular Session; direction to increase salmon harvest in Washington.

3. The Northwest Power Planning Council's protected areas designation, which derives its legitimacy from the Pacific Northwest Electric Power Planning and Energy Conservation Act (16 USC 839); also other provisions of this act.

4. United States-Canada Pacific Salmon Interception Treaty (requires that both nations conduct fisheries and enhancement programs for conservation and optimum production).

5. Treaties between the United States of America and Puget Sound and Columbia Basin Indian tribes (1854-55), which, among other things, guaranteed reserved fishing rights to treaty Indians (provisions of these treaties were later strengthened by court decisions).

6. Chapter 75.08 RCW, the basic Washington Department of Fisheries mandate.

7. RCW 77.04.055, Wildlife Commission objectives.

8. RCW 77.12.010. which says wildlife is the property of the state and that WDW shall preserve, protect, and perpetuate wildlife.

9. RCW 75.20.060, WDF's authority to require fishways and fish protection devices at dams or diversions; RCW 77.16.210, similar authority for WDW; RCW 75.20.040 (WDF authority) and RCW 77.16.220 (WDW authority) requires water diversion devices to be equipped with fish screens.

10. RCW 75.20.110, Columbia River Fish Sanctuary (for specified tributaries of the Columbia) prohibits dams over 25 feet or diversions beyond annual average low flow levels.

11. Magnuson Fishery Conservation and Management Act, (16 USC 1801 et. seq.).

12. Endangered Species Act, (16 USC 1531 et. seq.).

Cultural Resources

Responsible Agency

Washington State Office of Archaeology and Historic Preservation; Advisory Council on Historic Preservation; Indian tribes

Description

Cultural resources refers to resources and areas that are significant to the interpretation of pre-historic cultures or the evolution of present-day civilization. There are both state and federal registers containing a wide range of historic property types. To be eligible for either register, a site must meet pre-established criteria. Registered historical sites may include buildings, bridges, and other features that are readily visible. They may also include features, such as pre-historic settlements, that can only be revealed through archaeologic excavation. Registered traditional cultural properties may include areas, such as Indian quest sites, that encompass specific geographic areas or landscape features. Information regarding historic resources, archaeologic resources, or traditional cultural properties is incomplete. However, this information base is improving over time as field studies are conducted, in part as a result of hydroelectric project proposals.

Whatever the stream reach classification, developers will need to: 1) conduct studies to determine the impacts of proposed projects according to the requirements of Section 106 administered by the State Historic Preservation Office, and 2) consult with state and federal land managers, and affected tribal governments. Upon review, if a cultural resource is assigned inventory status by the Washington State Office of Archaeology and Historic Preservation, determined to be a candidate for the state or national registers, or is listed on state or national registers, its corresponding stream reach classification may be changed.

Evaluation Criteria

Resource Protection Areas

This category is not applicable. Laws protecting cultural resources do not strictly prohibit activities, but do require cooperative mitigation where cultural resources may be negatively affected by development

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" when the stream reach is within approximately 1,000 feet of a known archaeological, historic, or traditional cultural property that is included in either the federal or state registers of historic places.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity" when information exists for the reach and it does not qualify for either of the above classifications. Section 106 of the National Historic Preservation Act applies to proposed development in these areas.

Authority

1. National Historic Preservation Act (16 USC 470).
2. Chapter 27.34 RCW, Washington State Historic Preservation Act.
3. Chapter 27.53 RCW, Washington Archaeological Sites and Records Act.

4. Chapter 27.44 RCW, Washington Indian Graves and Records Act.

Natural Heritage Resources

Responsible Agency

Washington Department of Natural Resources

Description

Natural Heritage features are state-listed endangered, threatened, or sensitive special plant species; high-quality native terrestrial ecosystems; and high-quality native wetland and aquatic ecosystems. Natural Heritage features are monitored by the Washington Natural Heritage Program within the Division of Land and Water Conservation located in the Department of Natural Resources (DNR). Elements are listed and defined in the State of Washington Natural Heritage Plan. Although Natural Heritage information is continually updated, not all locations have been identified. For those locations that are known, often the extent of the population or feature is yet to be determined. Plants and plant communities are dynamic and change over time. Site-specific field studies are needed to precisely define a feature's location and boundaries at the time of interest.

The Natural Heritage Plan provides direction for development of the Natural Area System by presenting the criteria for selection and approval of natural areas, and by listing the natural heritage resources to be considered for protection. In addition, the plan identifies priorities for protection, outlines methods of protection, and identifies the roles of various agencies and groups in natural area protection. The publication is produced biennially by DNR's Natural Heritage Program.

Natural Resource Conservation Areas are administered by DNR in order to protect: (1) lands identified as having high priority for conservation, natural systems, wildlife, and dispersed recreational values; (2) prime natural features of the Washington landscape or portions thereof, inland or coastal wetlands, important geological features, or significant littoral, estuarine, or aquatic sites; (3) examples of native ecological communities; and (4) environmentally significant sites threatened with conversion to incompatible or ecologically irreversible uses.

Natural Area Preserves are administered by DNR, the State Parks and Recreation Commission, and WDW in order to: (1) protect examples of undisturbed terrestrial and aquatic ecosystems, rare plant and animal species, and unique geologic features; (2) serve as gene pool reserves; (3) serve as baselines against which the influences of human activities in similar, disturbed ecosystems may be compared; and (4) provide outdoor laboratories for scientific research and education (RCW 79.70.010).

Research Natural Areas are administered by various federal agencies in order to: (1) preserve examples of all significant natural ecosystems for comparison with those influenced by humans; (2) provide educational and research areas for ecological and environmental studies; and (3) preserve gene pools of typical and endangered plants and animals.

Evaluation Criteria

Resource Protection Areas

A stream reach is classified as "resource protection" if any of the following pertains:

1. Flows through or abuts a DNR Natural Resource Conservation Area.

2. Flows through or abuts a Natural Area Preserve owned and/or managed by the State of Washington.

3. Flows through or abuts a Natural Area Preserve owned and managed by the Nature Conservancy or a Research Natural Area owned and managed by the federal government.

4. Is located in an area that would jeopardize any individual occurrence of a federally designated endangered or threatened plant species (none currently designated in Washington).

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" if any of the following pertain:

1. Flows through or abuts a buffer area of a state designated endangered, threatened, or sensitive plant species.

2. Flows through or abuts a buffer area of a Natural Heritage Plan-designated high-value native wetland.

3. Flows through or abuts a buffer area of a Natural Heritage Plan-designated high-value plant community.

4. Flows through or abuts a candidate State Natural Resource Conservation Area or Natural Preserve.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity" when information exists for the reach and it does not qualify for either of the above classifications.

Authority

1. Chapter 79.70 RCW, Natural Area Preserves; Chapter 332.60 WAC, Rules for Washington Register of Natural Area Preserves.

2. Chapter 79.71 RCW, Washington Natural Resources Conservation Areas.

3. Endangered Species Act (16 USC 1531 et. seq.).

Recreation Resources/Wild and Scenic Rivers

Responsible Agency

Washington State Parks and Recreation Commission

Description

River-related recreation resources activities include: flat water boating; white water boating (rafting, kayaking, and canoeing); spot fishing, hiking and backpacking; picnicking; and general recreation. Reaches may be based on scenic and natural qualities recognized by law or on specific recreational opportunities determined to be significant by consensus among people who use the river for recreation. Included are state and national designations for special protection of river systems included in National Parks, National Wilderness Areas, the National Wild and Scenic Rivers Program, and the State Scenic Rivers System. Federal and state laws prohibit dams or impoundments in river areas included in these designations, including State Parks properties.

Evaluation Criteria

Resource Protection Areas

A stream reach is classified as "resource protection" if any of the following pertain:

1. Flows through a State Park.
2. Has been designated as a component of the Washington State Scenic Rivers System.
3. Flows through or abuts a National Park or federally designated wilderness area.
4. Has been designated as a component of the federal Wild and Scenic Rivers System or is being studied for potential designation. This provision would no longer apply if a study river is not designated within the time frame set by Congress.

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" if any of the following pertain:

1. Has been determined to be of statewide or regional significance for recreation based on agency policy and review; (includes but is not limited to reaches identified as significant in *River Recreation in Washington, An Initial Inventory and Assessment*, prepared by the National Park Service, May 1986).
2. Is a candidate for designation as a component of the Washington State Scenic Rivers System.
3. Flows through or abuts a Washington State Parks Conservation Area.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity" when information exists for the reach and it does not qualify for either of the above classifications. This includes:

1. Reaches known to provide recreation opportunities that have been reviewed by the Washington State Parks and Recreation Commission and found not to be of statewide or regional significance.
2. Reaches thought to provide recreation opportunities as reported by other parties but not reviewed by the Washington State Parks and Recreation Commission.

Authority

1. Chapter 43.51 RCW, Washington State Parks and Recreation Commission mandate to manage recreation resources.
2. RCW 79.72.080, Washington State Parks mandate to protect and preserve the natural character of rivers with outstanding values through the Washington State Scenic Rivers System.
3. Federal Wild and Scenic Rivers Act (16 USC 1271 - 1287).

Resident Fish

Responsible Agency

Washington Department of Wildlife and the state's 26 Indian tribes

Description

Resident fish refers to species that inhabit fresh water throughout all or most of their life cycle. Resident fish are distinguished as cold water or warm water species and as game or non-game species. Of special concern are fish species that have been designated as endangered, threatened, or special concern under either federal or state law. The Washington Rivers Information System is used to evaluate the value of resident species and habitat. A stream reach is evaluated based on the sum of its ratings for a variety of habitat and species characteristics. See Attachment C for information on the Washington Rivers Information System.

Evaluation Criteria

Resource Protection Areas

A stream reach is classified as "resource protection" when any of the following conditions exists:

1. Contains critical spawning habitat because of a limited supply in a basin or exceptional quality (critical spawning habitat is defined as "key reaches of known spawning habitat").
2. Occupied by a WDW species of special concern, e.g., pygmy whitefish, Olympic mud minnow, or dolly varden/bull trout.
3. Has a resident fish summary value of 1 (outstanding), as determined in WDW's Washington Rivers Information System.

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" when the reach has a resident fish summary value of 2 or 3, as determined in the Washington Rivers Information System.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity" when information exists for the reach and it does not qualify for either of the above classifications.

Authority

1. RCW 77.04.055, Wildlife Commission objectives.
2. RCW 77.12.010, which says that wildlife is the property of the state and that WDW shall preserve, protect, and perpetuate wildlife.
3. Endangered Species Act (16 USC 1531 et. seq.).
4. RCW 77.12.660, endangered species; WAC 232.12.014, wildlife classified as endangered species.

5. The Northwest Power Planning Council's protected areas designation, which derives its legitimacy from the Pacific Northwest Electric Power Planning and Energy Conservation Act (16 USC 839); also other provisions of this act.

Water and Shoreline Resources

These two factors have been combined for the description below.

Responsible Agency

Washington Department of Ecology

Description

The Washington Department of Ecology is the state agency with principal responsibility for administering state laws governing use of water resources. Of particular concern for the hydropower plan are laws governing water quality, water quantity, and shorelines land use. Each of these has a direct bearing on the ecological balance and public enjoyment of the state's streams.

Hydropower projects involving the diversion of water away from the natural confines of the stream channel, and the return of the water to the stream downstream from the diversion point, are considered consumptive uses of water for the affected bypass reach. Bypass reach is defined as the stream reach between the point of withdrawal (diversion) and point of discharge (return). To be considered non-consumptive, a hydropower project must not involve the diverting of water away from the river or stream, or must immediately return the water undiminished in quantity and quality to the point of diversion. This would apply only to run-of-the-river projects with no diversion or no storage capacity. Diminishment is defined as: to make smaller or less in quantity, quality, rate of flow, or availability.

Evaluation Criteria

Resource Protection Areas

A stream reach is classified as "resource protection" if any of the following pertain:

1. An area designated under a local Shoreline Master Program where the plan specifically prohibits hydropower projects or hydropower-related activity, or the plan contains other language that would prohibit this use.

2. Is subject to a partial or complete closure on new water rights and where the closure does not provide for any diversionary uses.

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" if it:

1. Abuts a shoreline area under the jurisdiction of a local Shoreline Master Program with a designation (e.g., natural) that emphasizes protection of the natural character of the stream reach, but where hydropower projects and hydropower-related activity may be allowable with appropriate mitigation.

2. Is subject to a partial or complete closure on new water rights and where diversionary but non-consumptive uses may be allowed.

3. Has not had minimum instream flows established.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity" when information exists for the reach and it does not qualify for either of the above classifications. This includes:

1. Reaches designated under a local Shoreline Master Program where hydropower is an approved use or in other ways compatible with the language of the local Shoreline Master Program.

2. Reaches that have established instream or low flows.

Authority

1. Chapter 90.58 RCW, Shoreline Management Act of 1972.

2. Chapter 90.54 RCW and Chapter 173-500 WAC, Water Resources Act of 1971.

3. Chapter 173-201 WAC, state water quality standards.

4. Coastal Zone Management Act of 1972 (306 USC 1455).

5. Federal Water Pollution Control Act (33 USC 1281 et seq.).

6. Chapter 90.48 RCW, Water Pollution Control Account.

Wildlife

Responsible Agency

Washington Department of Wildlife and the state's 26 Indian tribes

Description

The hydropower plan considers a wide variety of mammals, birds, reptiles, and amphibians that make use of the state's riparian areas and the uplands that adjoin these riparian areas. Of special concern are species identified in WDW's Priority Habitats and Species database and program. For additional detail, see Attachment C.

Evaluation Criteria

Resource Protection Areas

A stream reach is classified as "resource protection" when either of the following conditions exists:

1. Flows through the 1,000-foot buffer area of any individual occurrence of federal or state threatened or endangered species.

2. Flows through a mapped habitat area (Priority Habitats and Species Program) used by any federal or state threatened or endangered species.

Sensitive/Hydropower Opportunity Areas

A stream reach is classified as a "sensitive/hydropower opportunity" when any of the following conditions exists:

1. Flows through or abuts a priority habitat area that is mapped in WDW's Priority Habitats and Species Program (excluding areas for threatened and endangered species).

2. Is within a recommended buffer distance of an individual occurrence of a priority species (excluding those threatened and endangered species included in the resource protection classification, but including threatened and endangered species occurrences between 1,000 feet and the recommended buffer distance from the reach).

3. Flows through or abuts a Habitat Conservation Area (HCA) designated for spotted owls (Strix occidentalis) as identified by the Interagency Scientific Committee.

Less Sensitive/Hydropower Opportunity Areas

A stream reach is classified "less sensitive/hydropower opportunity area" when information exists for the reach and it does not qualify for either of the above classifications.

Authority

1. RCW 77.04.055, Wildlife Commission objectives.

2. RCW 77.12.010, which says that wildlife is the property of the state and that WDW shall preserve, protect, and perpetuate wildlife.

3. RCW 77.12.650, bald eagle protection; RCW 77.12.655, habitat buffer zones for bald eagles; WAC 232-12-292, bald eagle protection rules.

4 Endangered Species Act (16 USC 1531 et. seq.).

5. RCW 77.12 660, endangered species; WAC 232-12-014, wildlife classified as endangered species.

6. The Northwest Power Planning Council's protected areas designation, which derives its legitimacy from the Pacific Northwest Electric Power Planning and Energy Conservation Act (16 USC 839); also other provisions of this act.

River Resource and Hydropower Analysis

Washington State's Existing Hydropower Resources

Washington State obtains approximately 60 percent of its electricity from hydropower (the remainder comes from coal and nuclear both inside and outside the state's boundaries). Currently, there are 92 hydroelectric projects operating in the state. The total installed generating capacity of these projects is 26,272 megawatts (MW). Washington and Oregon share 6,023 MW of this capacity from four projects on the mainstem of the Columbia River along the border shared by the two states.

The majority of Washington's hydroelectric capacity is located on the Columbia River System, which includes portions of both the Columbia and Snake rivers. These two rivers support a total of 16 hydroelectric dams in Washington. The combined generating capacity of these projects is 22,430 MW, representing 85 percent of Washington's total hydropower capacity. The remaining 76 hydroelectric facilities operating in Washington account for 3,842 MW of hydropower capacity. Over 65 percent of this capacity, or approximately 2,525 MW, is represented by 11 projects located on the Cowlitz, Skagit, Lewis, and Pend Oreille rivers.

Most of the hydroelectric facilities in Washington State were built prior to 1960. While a half dozen large, utility-sponsored projects came on-line between 1960 and the mid-1970s, it was not until passage of the Public Utility Regulatory Policies Act (PURPA) in 1978 that interest in smaller, privately built hydroelectric projects began to grow. In 1982, more than 250 federal preliminary permit applications were filed on Washington rivers. By the mid-1980s, most of these hydro development applications were abandoned as a result of low utility avoided costs (i.e., the cost an electric utility would pay for additional energy); poor project features; and/or high environmental costs.

Since the passage of PURPA, 25 small-scale (less than 30 MW) hydropower projects have come on-line in Washington. The total installed generating capacity of these projects is 127 MW, an amount equal to approximately one-half of one percent of the total hydroelectric capacity in Washington. These projects are of several distinct types: seven are on irrigation facilities, eight are run-of-river projects requiring new dam construction, five are at existing dams, and five are located on municipal or industrial water supply lines.

In addition to the small-scale projects, at least 13 micro-scale (less than 100 kilowatts) projects have been built during this same period of time, as have four large-scale projects. The large-scale projects include Snohomish County PUD's 112 MW Sultan River project; the 92 MW Summer Falls project, which was constructed on the Columbia Basin Irrigation System; the 40.5 MW Mayfield Dam addition on the Cowlitz River; and the 365 MW Boundary Dam expansion on the Pend Oreille River.

Summary of Resource Agreement Area Classifications

The Hydropower Development/Resource Protection Plan examined 69,716 river reaches and irrigation canals in Washington State covering a total of 82,652 river miles. Resource values and public use factors were assembled for each of the 69,716 river reaches, and a resource agreement classification was determined for each reach based on resource evaluation criteria.

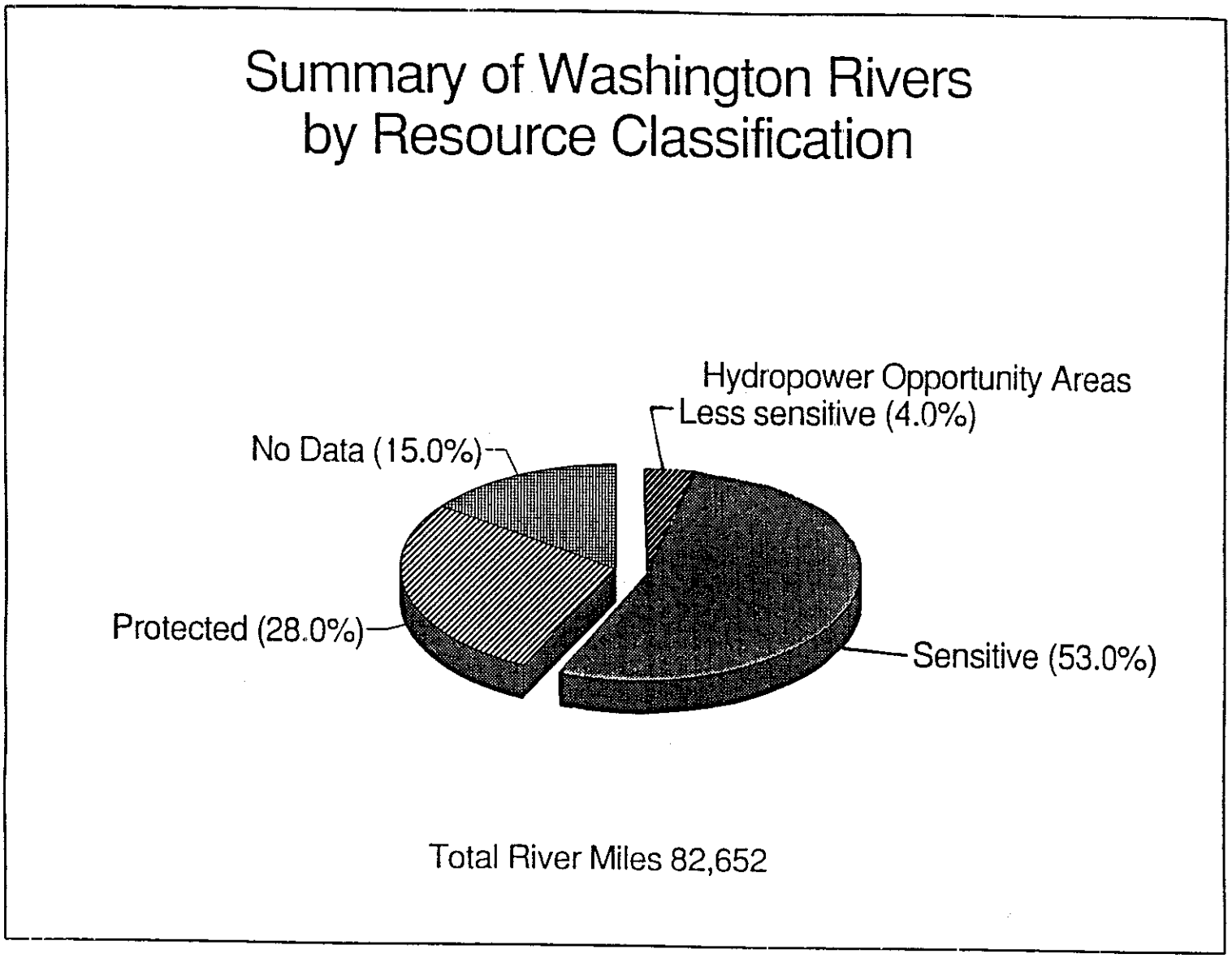
When these ratings are applied statewide, 19,197 river reaches totaling 23,302 miles, or 28 percent, fall into resource protection areas. Of the remaining 50,519 river reaches evaluated, 37,048 reaches are classified as sensitive/hydropower opportunity areas, and 2,851 reaches fall under the less sensitive/hydropower opportunity classification. This breakout is equivalent to 43,712 or 53 percent, and 3,429 or 4 percent, river miles, respectively, for the sensitive and less sensitive hydropower opportunity classifications. There are 10,620 reaches totaling 12,209 miles, or 15 percent, that are classified as no data areas (see Figure 1). Individual river reach classification data are contained within the database and are available on request.

Balancing Resource Protection and Hydropower Development

While the above breakout shows the overall balance of resource protection proposed for Washington rivers, the plan's impact on new hydroelectric development is uncertain. Over the past few years, resource management agencies have assembled a substantial information base on fish, wildlife, recreation, and other resource and public use values for Washington rivers. However, a similar, comprehensive base of information on the hydroelectric potential of Washington rivers is not available. Without this information, it is not known whether all reaches classified as opportunity areas could support a hydroelectric project. Similarly, reaches classified as protected may or may not possess the physical attributes necessary for hydroelectric development.

In the absence of reach-specific developability information, some general statements regarding the plan's impact on hydroelectric development can be made. For example, one of the primary criteria for assigning a protected classification to a river reach is the presence of anadromous fish. Most all of the hydroelectric projects in Washington were constructed on anadromous fish-supporting rivers, so many of the rivers listed as protected already have a hydroelectric project. While the plan does not change the status of these projects, it is important to recognize that these river reaches have already been affected by hydroelectric development and its associated impacts.

Figure 1


Summary of Washington Rivers
by Resource Classification
Hydropower Opportunity Areas
Less sensitive (4.0%)
No Data (15.0%)
Protected (28.0%)
Sensitive (53.0%)
Total River Miles 82,652

Additionally, a significant portion of the reaches proposed for resource protection is comprised of lower elevation streams and rivers that are accessible to anadromous fish. Since many of these rivers do not have the physical features necessary to support a hydroelectric project, classifying these rivers as resource protection areas should have little effect on proposed hydroelectric development activities in Washington.

By far the majority of proposed hydroelectric projects in Washington are located: at existing dams, on high gradient streams above the anadromous zone, on irrigation canals, or on municipal or industrial water transmission lines. Of these four project types, only the high gradient streams and existing dams could be classified as resource protection areas. The only existing dams that are affected by this plan are those not currently used for hydropower generation. With respect to those projects located at existing dams, an exception to a protected rating can be made, and the project can go ahead provided that the identified special resource is not negatively affected. There are numerous existing dams in Washington where hydroelectric generation has not been installed. These sites could provide an opportunity to develop hydropower without incurring the high construction and environmental costs of building a new dam.

Similarly, although in limited cases, projects located on streams listed as resource protection areas may also be allowed, provided that the resource requiring protection does not exist in the vicinity of the project. This exception was included to account for the scaling or resolution of the database. The resource database, which provides the basis for classification, is reach-specific and typically covers one or more river miles. Project development is site-specific and may only affect a short length of the river reach. As a result, there may be instances where the resource value requiring protection is not in the vicinity of the project. An example would be a project sited upstream of an existing anadromous barrier located on the same river reach.

Aggregate Impact of the Hydropower Plan on State Hydropower Potential

The hydropower plan provides a resource agreement area classification for 69,716 stream reaches across Washington. It is important to recognize that the plan classifies stream reaches rather than specific potential hydropower sites. The classification of individual stream reaches (maintained at a map resolution of 1:100,000) allows for identification of natural resource characteristics on these reaches and a rating based on the degree to which hydropower development would conflict with the existing resource characteristics on a stream reach. This rating provides an indication of the site characteristics for a potential hydropower project that is located within the stream reach, but may not provide a comprehensive classification of development opportunity for a specific project. This is because a project may involve multiple stream reaches, or may be located in a portion of a stream reach where resource conflicts would not occur. A comprehensive evaluation of individual projects requires more detailed information about the specific location and design of the project than is maintained in the hydropower plan or the FERC data base on which it relies (e.g., water intake locations, diversion locations, penstock routes, powerhouse location).

Information on the general location and capacity of potential hydropower sites is contained in the Pacific Northwest Hydropower Site Data Base (PNHSD), maintained by the Bonneville Power Administration and the Northwest Power Planning Council. River reaches are maintained in this database at a resolution of 1:250,000 (less precise than the hydropower plan database), and map coordinate locations for individual hydropower sites are, in most cases, based on a scale of 1:24,000 (more precise than the hydropower plan database). As a consequence of these differing map resolutions, output based on combining hydropower site locations from the PNHSD with the hydropower plan database of stream reaches and resource agreement area categories is subject to error. The mix of resolutions means that it is possible for sites in PNHSD to be erroneously assigned to the wrong hydropower plan stream reach.

This is only a complication for interpreting aggregate level assessments of the impact the hydropower plan resource agreement area categories might have on statewide hydropower potential. It does not detract from the value of the hydropower plan resource agreement area categories for screening projects

for potential resource conflicts, or for evaluating individual projects where precise locations and project descriptions are established.

With the above qualifications in mind, an indication of the impact of the hydropower plan on hydropower potential can be obtained by considering two sets of potential hydropower sites:

1. The 90 sites with current active FERC applications. These have been updated from the 82 sites with active applications at the time the January 1992 draft was issued. Some new filings have occurred and some filings have expired. This number will continue to change, but for this analysis, 90 sites were examined.

2. The 492 sites across the state that have at one time or another been filed with FERC. These sites were taken from the PNHSD and have been filtered to remove redundant or dependent sites. With the exception of the 90 sites above, none of these sites has active FERC applications.

Since the publication of the January 1992 draft, the locations of the 90 sites with active FERC applications have been carefully reviewed to ensure that each FERC location is classified in the proper stream reach. This level of accuracy checking helps minimize the map resolution problems described above and ensures that each of these potential projects is categorized correctly, based on its FERC-supplied location. The total of 90 potential projects represents 812 MW of capacity. Forty-four of these sites fall in stream reaches categorized as "opportunity reaches." These sites represent 357 MW of capacity, 44 percent of the total. At least another 28 sites are far enough along in the FERC licensing process that they would be exempted from the hydropower plan. These sites comprise an additional 253 MW of capacity. Consequently, the hydropower plan would not preclude development at 65 of the 90 sites comprising 610 MW of capacity. This assumes that state laws and regulations can be met and appropriate mitigation can be worked out. Based on a typical capacity factor of 50 percent, this amounts to an estimated 305 aMW of energy.

Of the 492 potential sites statewide, 224 are classified in "opportunity" reaches (again subject to the resolution error discussed above). These sites comprise a total capacity of 1,884 MW and an estimated annual energy output of 940 aMW. Again, with the exception of the 90 sites described above, these sites do not currently have active FERC applications. Whether applications will be filed on them again in the future is unknown. Their use here is only to provide an example of the application of the hydropower plan resource agreement area classifications to screen a large set of potential hydropower sites.

The Northwest Power Planning Council's 1991 Conservation and Electric Power Plan estimates that 410 aMW of small-scale hydropower is available and developable in the Pacific Northwest. The assessments above suggest that a significant portion of that potential may be developable in Washington, given appropriate and sufficient mitigation actions.

Chapter 5

Plan Implementation

In adopting the 1989 comprehensive hydropower planning legislation, the Washington State Legislature directed that the final plan include a description of how the plan will be implemented and amended. The legislation also directed that future development of hydropower and protection of river-related resources be guided by policies and programs that fully use the state's authority in the federal hydropower licensing process.

This chapter provides a recommended implementation strategy, divided into three sections: relationship to the FERC licensing process, relationship to the Northwest Power Planning Council protected areas designation, and implementation at the state level. The state implementation section includes discussions of plan administration and agency roles, plan amendment processes, and future options.

Federal Energy Regulatory Commission

As described in Chapter 1, the Electric Consumers Protection Act of 1986 clarifies the meaning of Section 10(a) of the Federal Power Act concerning comprehensive plans and their effect on the FERC licensing process. The Act makes explicit the right of a state or state resource agency to prepare a comprehensive plan for a "waterway or waterways" and to have this plan be given due consideration by FERC. To date the State of Washington has filed several river basin, water quality, and recreational plans with FERC. FERC has notified the state that these plans have been accepted as meeting its standards for comprehensive plans. None of the plans previously submitted by the state of Washington responds directly to statewide hydropower development and resource conservation needs.

The Washington Hydropower Development/Resource Protection Plan constitutes the state's principal plan under the provisions of Section 10(a) of the Federal Power Act, as amended by the Electric Consumers Protection Act of 1986. Under this scenario, plans submitted previously would continue to have standing but would be subservient to the new state plan. Previous plans may pertain to resources not covered by this plan and should continue to receive consideration by FERC. When the plan is submitted, the state agencies will work with FERC to reach an agreement regarding the steps that each entity would take to implement the plan and discuss other measures to bring more consistency between state and federal licensing procedures.

Northwest Power Planning Council

The state was an active participant in the development of the Northwest Power Planning Council's protected areas designation, which is incorporated into both its Columbia River Basin Fish and Wildlife Program and Northwest Conservation and Electric Power Plan (see Chapter 1 for more on protected areas). Both of these documents have been accepted as comprehensive plans by FERC. Indications are that the Council's plans carry considerable weight with FERC and in its hydropower decision process. The Bonneville Power Administration promotes implementation of the Columbia River Basin portion of the plan by placing limitations on access to federal transmission lines from projects in protected areas and on acquisition of power from such projects.

When the Council adopted its protected areas designation, it specifically made allowance for amendments, including amendments to account for new data and, more importantly, state comprehensive plans:

> Upon submission to the Council of a state or tribal comprehensive plan or state or tribal river, river basin or watershed plan, the Council will promptly and carefully consider amending this appendix, or the Protected Areas List, to reflect relevant portions of a state or tribal plan. With regards to resident fish and wildlife, the Council recognizes that individual state and tribal interests are particularly strong. (Northwest Power Planning Council, Protected Areas Amendments and Response to Comments, September 14, 1988.)

The above provision was prompted in part by the Council's recognition of efforts in Idaho, Oregon, and Washington to develop state comprehensive plans. A Washington initiative to amend the program is therefore appropriate and anticipated.

The Council's protected areas designation focuses on fish and wildlife resources only. The state plan, which covers other resources as well, significantly overlaps with protected areas for fish and wildlife. It will be critical to coordinate the two plans to avoid conflict or confusion in the FERC licensing process regarding the interaction of these resource values with hydropower development. In addition, this plan goes beyond fish and wildlife to consider cultural resources, natural heritage resources, recreation resources and wild and scenic rivers, water resources, and shoreline resources. It is possible that the consideration of these resources can also be coordinated with the Council.

The state agencies will discuss with the Council the options for coordinating the two efforts. The objective of these discussions will be to integrate the two efforts as much as possible without compromising either. The state could petition the Council to amend protected areas to incorporate the entire state plan. Less comprehensive options would be to incorporate only the fish and wildlife portions, or only the resource protection area designations for some or all resources, into the Council's protected areas.

State Implementation

Plan Administration

RCW 90.54.800 called for the "recommendation to the legislature of a lead agency for implementation and management of the state comprehensive hydropower plan." WSEO has served as lead agency for plan development purposes only. Lead agency responsibilities for plan implementation were not prescribed in the enabling legislation. They would include:

1. Representing the state before FERC and the Council
2. Coordinating state agency efforts
3. Facilitating the plan amendment process
4. Serving as liaison with the public
5. Maintaining and enhancing the database
6. Evaluating the effectiveness of the plan.

WSEO will continue to serve as the lead agency for implementing and managing this plan, if resources are available. Among the existing state agencies, WSEO's mandate best reflects the balance sought in RCW 90.54.800 between energy resource development and environmental protection. WSEO has a broader mandate relative to this balance than the other agencies, does not have any hydropower permitting responsibilities, and would not require additional legislation to perform the duties.

Based on the above recommendations to submit the final plan to FERC and work with the Council to integrate the plan with protected areas, agency efforts will focus on these two activities as top priorities for plan implementation. Interagency coordination efforts will be guided by discussions with FERC and the Council to meet their requirements for managing the plan.

It is important that the resource information that serves as the foundation of the plan, the Washington State River Resource/Hydropower Database, be kept current and be made available to the public. The database resides at WSEO as a component of its Geographic Information System. Data reports and maps relating to the hydropower plan are available from WSEO. Inquiries about specific resource data will be referred by WSEO to the agency or agencies most directly involved with a particular resource and responsible for the data.

Plan Amendment

There are several types of amendments that will be necessary to keep this plan current:

1. Policy or process changes
2. Exceptions to the resource agreement area designations
3. Technical or data corrections
4. Regular database updates and maintenance.

The process for the first two types of amendments--policy or process changes and exceptions to resource agreement areas--will be different than for the last two types. The first two will likely involve substantial changes that will require a public decisionmaking process where differing opinions can be heard and a final decision reached. Amendments of this type may include changes to: the resource evaluation criteria, the descriptions of the three categories of resource agreement areas, or the amendment process. Also covered here would be any disputed proposal to make an exception to the resource agreement area designation for a specific hydropower project proposal. (See Chapter 4 for more on exceptions.)

The process for considering these amendments will be conducted by an interagency committee composed of agency directors, or their designees, from the agencies involved with hydropower licensing. These most likely would be the same entities that have been involved with the development of the hydropower plan. WSEO will be responsible for scheduling the amendment process, and with the assistance of the other agencies, for preparing proposed amendments and background information for the committee. The committee will set ground rules for receiving information from the public regarding amendments.

This amendment process is designed to take place annually. WSEO, with the assistance of the other agencies, will receive amendment proposals throughout the year and prepare information for the annual amendment process. After some experience, the committee may find it necessary to consider amendments more often than annually.

The last two types of amendments listed above--technical or data corrections and database updates and maintenance--and noncontroversial proposals for an exception to a resource agreement area designation, will be handled by agency staff. Corrections may be made as a result of agency work, public input, or information from developers as they study a particular hydropower site. These changes will be made by the state agency responsible for collecting that specific resource data; that agency will notify WSEO. These changes will be incorporated into the main database at WSEO during the process described below.

WSEO will schedule an annual database update. This will require each agency that collects resource data for the Washington State River Resource/Hydropower Database to submit to WSEO any updates made over the year. WSEO will incorporate data changes and make new data reports and maps available to the public. The one part of the database that will be updated at least quarterly is the FERC data showing the status of all active FERC sites. This information changes rapidly, and WSEO will update it as often as resources permit.

Future Options

Mechanisms will need to be identified for coordinating the plan with other state water planning initiatives. Several water planning efforts are currently underway in the state. Much of the natural

resource and public use data collected for this plan are also used in other water planning efforts in the state. Those involved with planning efforts will be apprised of the availability of the Washington State Hydropower Database and encouraged to make use of it. Where appropriate, mechanisms will be sought for integrating the plan's policy concepts into other water planning programs. See Chapter 6 for more information on other water planning programs.

Chapter 6

Hydropower Planning and Regulation in the State of Washington

This chapter is divided into two sections. The first describes state agency permitting processes for hydropower development and resource protection in Washington, grouped under the agency generally responsible for implementation. The second section outlines other planning efforts in the state that affect hydropower planning.

Washington State Regulation of Hydropower Projects

Washington State does not require a single hydropower licensing permit. It does, however, require a number of individual permits relating to specific hydropower development factors.

Department of Ecology

Water Quality Certification

Under Section 401 of the Federal Water Pollution Control Act (FWPCA), states are required to certify that an applicant for a federal permit that may result in a discharge into navigable waters will comply with the Act and with "any other appropriate requirement of State law" (33 USC 1341). Any such requirement "shall become a condition on any Federal license or permit" (33 USC 1341d). Chapter 173-225 WAC establishes public notice and public hearings procedures for water quality certification.

Under RCW 90.48.260, the Department of Ecology (Ecology) is established as the State Water Pollution Control Agency for all purposes of the FWPCA. Water quality standards enacted by Ecology are set out in Chapter 173-201 WAC.

Because most new hydropower construction activities will unavoidably violate state water quality criteria (turbidity) on a short-term basis, such projects also will require a Short-Term Modification of Water Quality Permit. This modification may be required before Ecology can issue a water quality certification Regulations governing this permit can be found at WAC 173-201-035(8e) and WAC 173-201-100(2).

Water Right Permit

Under RCW 90.03.250, any person desiring to appropriate water must apply to Ecology for a permit. Before a water right can be issued, four criteria must be satisfied. First, the use must be declared as beneficial under the Water Resources Act of 1971 (RCW 90.54.020). Second, the water must be available. Third, existing water rights must not be affected. Fourth, the use must be in the public interest.

Ecology has exclusive authority to set instream flows (RCW 90.03.247 and 90.54). The Water Resources Act requires that "perennial rivers and streams of the state shall be retained with base flows necessary to provide for the preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values." Water rights and water quality certificates are issued with instream flows as a condition. Chapter 173-500 WAC establishes general standards for the implementation of the Act, and programs for specific areas are found in the succeeding chapters. Ecology is authorized by RCW 90.54.040 to develop a comprehensive state water resources program to address water issues in specific areas and special problems of water allocation or use.

Under RCW 90.54.170, Ecology is authorized to conduct a comprehensive analysis of proposed hydropower facilities combined with new water supplies. The state is charged to "vigorously represent" its interest before federal agencies such as FERC with regard to licensing and permit proposals (RCW 90.53.080).

State Environmental Policy Act

The Washington State Environmental Policy Act (SEPA) is codified in Chapter 43.21 RCW. It requires state and local agencies to evaluate proposed projects for their environmental impact before permits or other approvals are issued. For example, SEPA compliance is required before a water right permit can be issued. Regulations for SEPA are located in Chapter 197-11 WAC.

When SEPA compliance is required, the developer must complete an Environmental Checklist (set out in WAC 197-11-960), unless the developer and the lead agency (either a state agency or local governmental entity) agree that an Environmental Impact Statement (EIS) will be required. When the agency receives the completed checklist, it makes a Threshold Determination to determine whether an EIS is needed. If the lead agency determines the project will not have a probable significant adverse impact on the environment, it issues a Determination of Non-Significance. Whenever the lead agency determines there is a probable significant adverse impact, it must prepare an EIS. EIS procedures are set out in WAC 197-11-400, et seq.

Shoreline Management Act

The Shoreline Management Act of 1971, Chapter 90.58 RCW, requires that permits be issued by local governments for most activities taking place in the shoreline zone of rivers with a minimum annual flow of 20 cubic feet per second (cfs). The shoreline zone generally consists of bodies of water, associated wetlands, floodplains, and the uplands to 200 feet inland from the ordinary high water mark.

The Act's basic regulatory device is the prohibition of any development on the shorelines of the state not consistent with the Act's policies and the applicable shoreline management master programs established by local governments. In addition, no "substantial development" can be undertaken without first obtaining a permit from the locality in which the shoreline zone is located. Development includes dredging, filling, and projects of a temporary or permanent nature. Substantial development is any development exceeding $2,500 in value. Any person or entity "aggrieved" by the granting, denying, or rescinding of a shoreline permit may appeal to the Shorelines Hearings Board, created in RCW 90.58.170.

Coastal Zone Management Act

The Coastal Zone Management Act (16 USC Section 1456) requires applicants for FERC permits to certify to the State of Washington Department of Ecology that their projects comply with Washington's federally approved Coastal Zone Management Program. Before FERC can approve a preliminary license, operating license, or exemption, Ecology must concur with the applicant's certification. Washington's Coastal Zone Management Program includes the Shoreline Management Act, local shoreline master programs approved under the Shoreline Management Act, SEPA, the Clean Water Act, and the Clean Air Act. Ecology concurrence usually requires approval of a Shoreline Management Act permit. This requirement applies to projects within or affecting the coastal zone. The coastal zone includes the creeks and rivers in Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Whatcom, and Wahkiakum counties.

Power Production License Fee

RCW 90.16.050-60 contains provisions for annual license fees for hydropower projects. Fees are payable to Ecology.

Wastewater Facilities Plan Approval

If the project includes a sewage treatment or disposal system, then engineering reports and plans and specifications for construction must be submitted for review and approval by Ecology. This is governed by RCW 90.48.110 and Chapter 173-240 WAC.

Dam Safety Approval

Under RCW 90.030.350, any person intending to construct a dam for the storage of 10 acre-feet or more of water shall submit plans and specifications for the project to Ecology for examination and approval as to safety. Follow-up inspections can also occur. Implementing regulations are found at WAC 508-12-300-380.

Reservoir permits are established in RCW 90 03 370 for the construction of barriers across streams to retain water. Implementing regulations are located at WAC 508-12-260-70.

Flood Control Zone Permit

RCW 86.16.080 establishes a system of permits for projects affecting flood waters within any flood control zone. A number of counties administer flood control permit systems within their boundaries.

Air Pollution

Pursuant to WAC 173-400-110 and WAC 173-403-050, a notice of construction must be filed with and approved by Ecology or the local Air Pollution Control Authority prior to the construction of a new source of emissions into the air.

Departments of Fisheries and Wildlife

Hydraulic Project Approval

Under RCW 75.20.100, any person constructing any form of hydraulic project or other work that will affect or change the natural flow of a stream must seek approval from either the Department of Fisheries or the Department of Wildlife as to the adequacy of the means proposed for the protection of fish life. Protection of fish is the only grounds upon which approval may be conditioned or denied. Regulations that have been adopted by both agencies to implement this statute are located at Chapter 220-110 WAC.

Department of Health

Public Water Safety Approval

If the project will affect drinking water supplies, compliance with Chapter 248-54 WAC is required. These regulations were adopted to implement the federal Safe Drinking Water Act of 1974 (42 USC 300f et. seq)

Washington Office of Archaeology and Historic Preservation

Archaeological Approval

The National Historic Preservation Act (16 USC 470 et seq.) requires that applications for licensing or exemptions from licensing must be reviewed by the State Historic Preservation Officer to determine the presence of resources either listed or eligible for inclusion in the National Register of Historic Places. The applicable Washington agency is the Office of Archaeology and Historic Preservation, created in RCW 27.34.210.

Department of Natural Resources

Under the Congressional Enabling Act of 1889, the Washington State Constitution, and other relevant legislation, the Washington State Department of Natural Resources (DNR) manages a variety of land and water resources for the benefit of the state's citizens. Of particular interest are state trust lands and aquatic lands. State trust lands are typically, but not exclusively, forest lands and are managed mainly to generate income for public schools and other trust beneficiaries. Any reduction of this income-producing capacity needs to be compensated, based on fair market values. Aquatic lands are the state-owned tidelands, shorelands, and all the beds of navigable waters. These lands are managed to provide a balance of public benefits, including income generation. Preserves and conservation areas managed by DNR are described under the Natural Heritage Resource section of the plan in Chapter 4.

Leases, Easements, and Rights of Way

Title 79 RCW, Public Lands, requires leases, easements, or rights of way for any projects proposed anywhere on the 5 million acres of DNR-managed upland and aquatic properties. Specifically, RCW 79.01.242 and Title 332-22 WAC regulate leasing of state lands. RCW 79.01.384, 79.01.388, and 79.01.392 allow the state to grant rights of way to permit construction related to generating or transmitting electricity. Chapter 79.90 RCW and Title 332-30 regulate management of aquatic lands.

Forest Practices Act

For projects located on non-federal forest land, notifications and/or applications must be filed with DNR. The Forest Practices Act is found at Chapter RCW 76.09. Regulations are located in Chapter 222-20 WAC.

Burning Permit

A permit for burning refuse or waste forest material is required from DNR pursuant to RCW 76.04.150 and 76.04.170.

Dumping Permit

A DNR permit to dump forest debris is required pursuant to RCW 76.04.242.

Application to Purchase Valuable Materials

Procedures for the purchase of valuable materials (which refer to any product or material on state lands) are found in Chapter 79.01 RCW.

Survey Monuments

Any person desiring to temporarily remove or destroy a section corner or any land boundary mark or monument is required to submit an application to DNR. Procedures are set out in Chapter 332-120 WAC.

Surface Mining Permit

Compliance with Chapter 78.44 RCW and Chapter 332-18 WAC may be necessary for a surface mining permit. A reclamation bond may be required pursuant to RCW 78.44.120 and WAC 332-18-120.

Other Laws

There are other laws (state and federal), as well as treaties, that affect hydropower planning and development. Important examples include the Endangered Species Act of 1973, as amended (USC 1531

et seq.); RCW 77.12.660 endangered species; and the Federal Wild and Scenic Rivers Act (16 USC 1271-1287).

Washington State Planning Related to Hydropower Development/Resource Protection

Water Resources Planning

The Chelan Agreement is named for the place where the agreement was reached in the fall of 1990. It is an agreement among groups involved in water allocation issues to establish procedures to cooperatively plan for the management of water resources in Washington State to best meet the goals and needs of all its citizens. The Agreement recommended creation of the Water Resources Forum. The Forum is composed of representatives from Tribes, state and local governments, business, sport and commercial fisheries, recreational interests, environmental interests, and agricultural interests. The general function of the Forum is to clarify existing terms and policies, recommend statutory changes as needed, and provide policy guidance, if necessary, in addressing critical issues.

The Chelan Agreement explicitly states that other federal, state, and local programs that affect water resource use and availability should be integrated with the water resource planning process. Among those programs is a "comprehensive hydroelectric planning process." The Chelan Agreement provides no formal decisionmaking authority to the Water Resources Forum regarding water allocation and water resources planning and management. The Forum is mandated to recommend statutory changes as needed and provide policy guidance. The final version of this plan will be presented to the Forum for integration into its planning efforts.

Basin Planning

Ecology is involved in the preparation of basin management plans. Ecology's involvement in basin planning stems from the Water Resources Act of 1971 and the Water Resources Management Program Regulation (1976).

Plans developed between 1975 and 1979 were relatively comprehensive. They incorporated a number of elements including: identifying and fostering of water resources projects, declaring preferences or priorities of use, closing streams to future appropriation, establishing instream flows, allocating and reserving water for beneficial use, withdrawing waters from appropriation to collect data, establishing appropriation limits, and designating water management areas. Later basin planning has focused on establishing instream flows, stream closures, and, in some instances, water allocation policies.

Ecology's basin plans attempt to balance a number of competing out-of-stream uses while preserving fisheries and other instream resources. Hydropower is considered among these uses, but is not a primary focus. In several basin plans, project-specific bypass flows may be allowed. The developer will be responsible for performing the appropriate studies to justify alternative flows. The proposed alternative flows must continue to satisfy base flows necessary to provide for preservation of wildlife; fish; scenic, aesthetic and other environmental values; and navigational values. Seventeen of the state's 71 basins have had basin plans or instream flow programs prepared.

Fisheries Watershed Planning

Watershed planning is the term given for the State of Washington's effort to develop a comprehensive and coordinated plan for enhancing salmon runs within Puget Sound and the coastal areas. This effort was mandated by state legislation with lead responsibility given to the Washington Department of Fisheries.

Watershed planning focuses on long-range goals for maximizing fishing opportunities through the achievement of agreed-upon harvest strategies, hatchery supplementation programs, and habitat rehabilitation plans. The primary vehicle for achieving these goals is the development of Comprehensive Resource and Production Management Plans (CRPMPs) for each of eight subregions within Puget Sound and five subregions on the Washington coast and in the Cape Flattery area. This process will ultimately result in detailed fish production and harvest plans for each of these 13 areas. More immediate issues will also be addressed within the context of the CRPMP process.

Within the Columbia River Basin, the Washington Department of Fisheries is pursuing a similar planning effort through participation in the Northwest Power Planning Council's Systems Planning Project. Systems Planning will develop specific salmon production plans for each subbasin within the Columbia drainage.

Scenic Rivers Planning

The Washington State Parks and Recreation Commission is charged with administering the State's Scenic Rivers Program. This program's objective is to conserve and protect free-flowing rivers with significant natural values. Washington's program allows for rivers to be designated into Primitive, Modified Natural, Rural, and Urban management classifications depending on the river's physical characteristics and intended use.

The program calls for management plans to be prepared for rivers included in the system. Hydropower development can be addressed in these plans. The enabling legislation gives the Commission the right to limit hydropower development on designated rivers when this is deemed appropriate.

The Commission has conducted an assessment of rivers throughout Washington to identify rivers eligible for this system. Information has been collected for the more than 50 river segments found to meet preliminary eligibility requirements. The Commission proposes additions to the Scenic Rivers System to the Legislature based on the statewide assessment and public support.

Non-point Pollution Watershed Planning

The Puget Sound Water Quality Authority, in cooperation with Ecology, has adopted a rule to provide direction for local watershed planning and management (Chapter 400-12 WAC). Watershed planning is an important component of the Non-point Source Pollution program in the Puget Sound Water Quality Management Plan. Under the program, citizen committees in the 12 Puget Sound counties identified and ranked watersheds within their counties. Watershed management committees were established to develop action plans to prevent and reduce non-point source pollution in priority watersheds. Sources of non-point pollution addressed in these action plans may include: farm practices, stormwater runoff, on-site sewage disposal systems, forestry practices, marinas and boats, and other sources.

Attachment A
RCW 90.54.800

Attachment A

RCW 90.54.800

An Act Relating to a Comprehensive State Hydropower Plan

Be it enacted by the Legislature of the State of Washington:

NEW SECTION. Sec. 1. LEGISLATIVE FINDINGS. The legislature finds that the task force on hydroelectric development and resource protection has recommended that:

1) The state adopt goals to direct future development of hydropower and protection of river-related resources.
(2) The state take steps to enhance the existing hydropower permit review process; and
(3) The state develop, in concert with appropriate interests, a comprehensive state hydropower plan.

NEW SECTION. Sec. 2. HYDRO TASK FORCE. (1) The Washington state energy office shall contract with an independent facilitator to reconvene and coordinate the task force assembled to implement section 301, chapter 7, Laws of 1987 1st ex. sess. The task force shall prepare by March 31, 1991, a state comprehensive hydropower plan to serve the broad public interest regarding development of cost-effective electricity and conservation of river-related environmental values. Task force meetings shall be open to the public. The facilitator shall assist the task force in appropriate efforts to inform the general public regarding project concepts and progress. Task force members shall make appropriate efforts to inform the interest groups they represent.
(2) By December 15, 1989, the task force shall engage in a midpoint review whereby participants can jointly appraise the progress of the project. If, in the opinion of the participants, a consensus to continue as a task force cannot be achieved, the executive agencies shall use their existing statutory authority to develop a plan, with the assistance of all affected parties and participating agencies, building upon the work that has been done by the task force.
(3) If the task force continues beyond December 15, 1989, it shall by July 1, 1990, recommend to the legislature a lead agency for implementation and management of the state comprehensive hydropower plan.

NEW SECTION. Sec. 3. POLICY GUIDELINES. Future development of hydropower and protection of river-related resources shall be guided by policies and programs which:

(1) Create opportunities for balanced development of cost-effective and environmentally sound hydropower projects by a range of development interests;
(2) Protect significant values associated with the state's rivers, including fish and wildlife populations and habitats, water quality and quantity, unique physical and botanical features, archeological sites, and scenic and recreational resources;
(3) Protect the interests of the citizens of the state regarding river-related economic development, municipal water supply, supply of electric energy, flood control, recreational opportunity, and environmental integrity;
(4) Fully utilize the state's authority in the federal hydropower licensing process.

NEW SECTION. Sec. 4. PLAN CONTENT. (1) At a minimum, the plan shall designate two categories of resource agreement areas: (a) Sensitive areas where hydropower development is likely to conflict with significant environmental values, and (b) less sensitive areas where development will not conflict with or may enhance environmental values. Some areas may remain unclassified due to lack of information or if they fall between the two categories. The plan shall integrate resource agreement area findings with existing state laws and programs including instream flow basin plans

prepared by the department of ecology, watershed planning coordinated by the department of fisheries, watershed planning coordinated through the Puget Sound water quality authority, watershed planning for municipal water supply, the scenic rivers program administered by the parks and recreation commission, and the planning process developed through the joint selection committee on water resources policy and any actions resulting from that process.

(2) At a minimum, the final plan report shall:

(a) List applicable laws, rules, and policies;

(b) Describe the waterways or basins covered by the plan;

(c) Designate the categories of resource agreement area for each waterway or basin;

(d) Describe, for each waterway where hydropower is to be affected, the significant resources that cause the waterway or basin to be so designated;

(e) Identify goals, objectives, and recommendations for improving, developing, or conserving affected waterways;

(f) Describe how the plan is to be integrated with other planning activities and policy initiatives and how the plan will be implemented and amended;

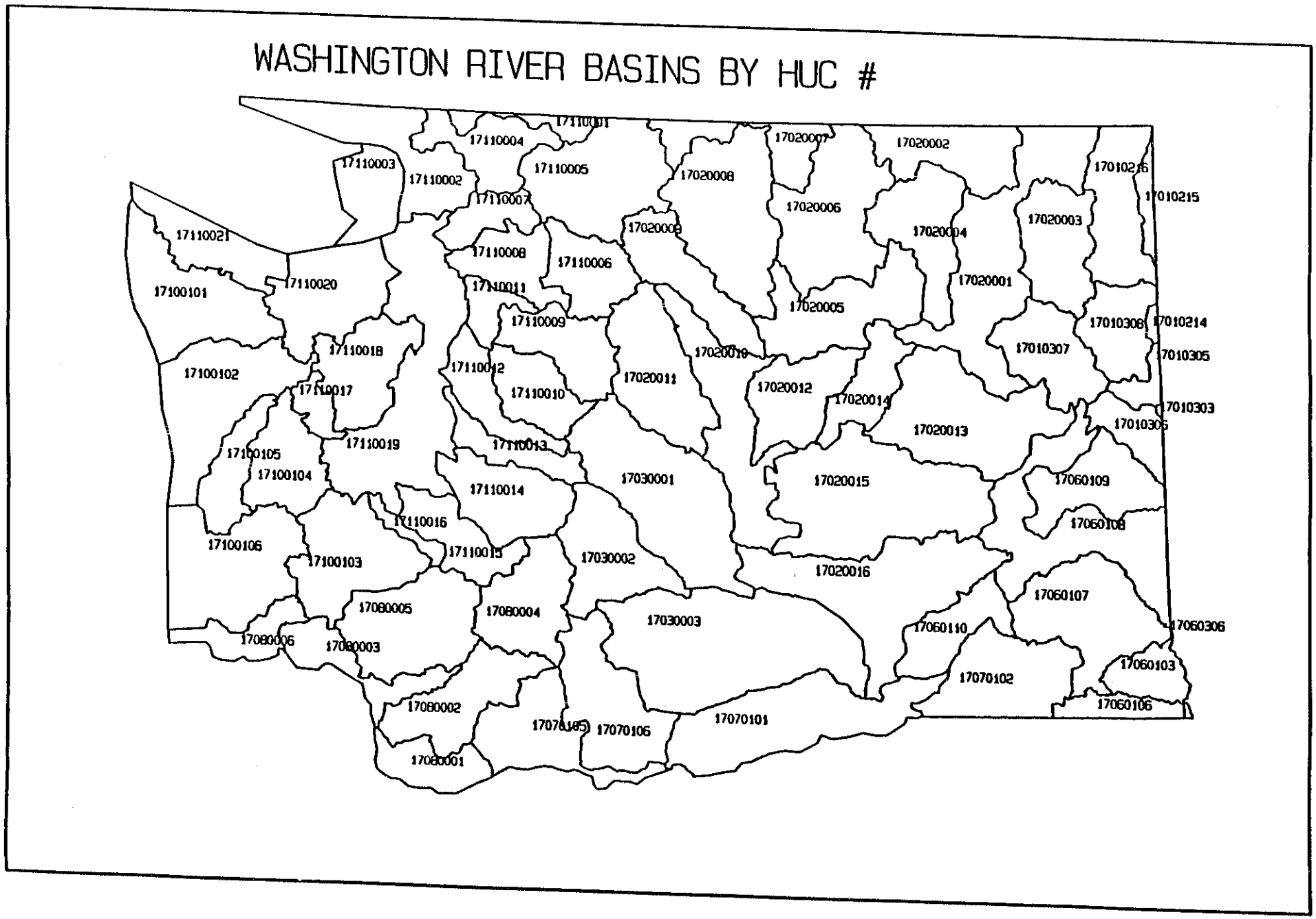
(g) Assess the anticipated effect of the plan on hydropower development and resource protection; and

(h) Describe the plan development process.

NEW SECTION. Sec. 5. If specific funding for the purposes of this act, referencing this act by bill number, is not provided by June 30, 1989, in the omnibus appropriations act, this act shall be null and void.

Passed the Senate March 14, 1989.
Passed the House April 12, 1989.
Approved by the Governor April 22, 1989.
Filed in Office of Secretary of State April 22, 1989.

Attachment B
River Basin Map


WASHINGTON RIVER BASINS BY HUC #
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17080006
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17070102
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Attachment C
Washington Rivers Information System (WARIS)

Attachment C
Washington Rivers Information System

Submitted By
Washington Department Of Wildlife

May 1991

Through the Washington Rivers Information System (WARIS), the Washington Department of Wildlife (WDW) has provided hydropower planning classification data covering four resource categories for inclusion in the Washington State Hydropower Development/Resource Protection Plan. These resource categories include: anadromous fish, resident fish, wildlife, and natural features (rare plants and plant communities). This document describes: 1) the information that was used to classify reaches as Resource Protection Areas, Sensitive/Hydropower Opportunity Areas, or Less Sensitive/Hydropower Opportunity Areas; 2) criteria applied to the data for classification; and 3) limitations in the data that prevented the criteria from being applied completely.

The Washington State Energy Office was provided with data identifying the 1:100,000 scale USGS Hydrologic Unit number (HYDROUNIT), the reach code (SEGRMI), and a hydropower category for each resource area. The detail data used to generate the hydropower category are housed in WDW's Geographic Information System (GIS) and are available upon request. One tabular INFO data file was provided for each USGS Hydrologic Unit. Each file contains one data record for each reach/arc in the 1:100,000 scale hydrography layer.

The WARIS is a statewide collection of natural resource data relating to rivers and streams. It was designed to provide administrators with accessible, easy-to-understand natural resource data to serve as a tool for planning, prioritization, and decisionmaking on a statewide or regional scale.

WARIS has its origin in the Pacific Northwest Rivers Study, a 1984 effort by the Bonneville Power Administration (BPA) and the states of Washington, Oregon, Idaho, and Montana. It is presently managed by the WDW, in cooperation with many other agencies, and is funded in large part by BPA.

WARIS is managed with a Geographic Information System (GIS)--ARC/INFO. It contains data unique to this system including: a 1:100,000 scale hydrography layer, and resident and anadromous fish descriptive data. It also acts as a summary vehicle for existing resource databases as they pertain to rivers and streams. These resource categories include: wildlife, rare plants and plant communities, geologic features, recreation, cultural and historical features, and institutional constraints.

These data are presently available only in ARC/INFO or hard copy map formats. A PC menu access system is being developed to increase accessibility.

Anadromous Fish

Anadromous fish data contained in WARIS have recently been updated to the 1:100,000 scale of resolution and to reflect current knowledge in the field. The update was a cooperative effort between the Washington Department of Fisheries (WDF), WDW, and the Northwest Indian Fisheries Commission (NWIFC). This update was coordinated by WDW and funded by BPA, with in-kind contributions from NWIFC and WDW.

Personnel from each agency interviewed their field colleagues to map the locations of upper extents of anadromous ranges, blockages to anadromous passage, passage facilities, and production facilities

statewide. Data were mapped on plots of 1:100,000 scale hydrography (developed by USGS, Water Resources Division, Portland) produced with WDW's GIS--ARC/INFO. Data were automated using ARC/INFO and presently exist in two formats:

1. An ARC/INFO point coverage containing locations of upper extents of anadromous distribution, blockages, passage facilities, and production facilities. Each point contains descriptive attribute data on the species and facilities present.

2. An INFO attribute file containing river reach code (from the hydrography layer) and each reach's associated anadromous features, including species, blockages, production facilities, and passage facilities present.

Some refinements are yet to be made in the INFO attribute file. These include: 1) determining the proportion of anadromous use of the upper extent reaches, and 2) determining the reach mile (distance upstream from a reach's downstream confluence) of blockages, passage facilities, and production facilities.

Hydropower Criteria

Resource Protection Areas were assigned a hydropower category (AFHYDROCAT) equal to 1. For anadromous fish, from a data perspective, resource protection areas are defined as:

- All connected reaches downstream of Impassable Barriers or anadromous fish upper extents (i.e., reaches with ACCESS = 1 or NUMSPP = 1)
- All reaches with planned access (PLANACCESS = 1)

Sensitive/Hydropower Opportunity Areas were assigned a hydropower category (AFHYDROCAT) equal to 2. They are defined as:

- Reaches with outplanted fish (OUTPLANT = 1)
- Reaches that provide a water source to production facilities (HATWATSRC = 1)
- Reaches potentially accessible to anadromous fish (POTACCESS = 1)
- Reaches upstream of Spring Chinook upper extents (SPECIALMGMT = 1)

Less Sensitive/Hydropower Opportunity Areas were assigned a hydropower category of 3.

- No reaches assigned

Unknown Areas were assigned a hydropower category of 4.

- All reaches not covered under the above categories

Data Limitations

Data limitations that affected how the hydropower criteria were actually applied are as follows:

1. Not all potential access areas listed by WDF have been tagged in the database; the most important ones noted by WDF, however, have been tagged.

2. Not all production facilities have a hatchery water source identified.

3. There are no reaches assigned a hydropower category of 3. (Category 3 indicates there is adequate information to conclude there is low resource conflict.) If it were possible to travel upstream of all impassable barriers, those reaches could be coded HYDROCAT = 3. This was not done due to an unpredictable upstream linkage system in the 100K hydrography layer.

4. Upper extent reaches are tagged as having fish present, even though only the lower portion of the reach is actually used. This can be modified in the future to identify the portion of the reach used by anadromous fish if necessary. In the meantime, a point coverage of the actual locations of upper extents can be obtained to visually determine the used portion of the reach.

Resident Fish

The resident fish data in WARIS have recently been updated to the 1:100,000 scale. The data design was based on the processes and data types originally employed in the Pacific Northwest Rivers Assessment Study. In the interest of improving clarity and objectivity in the data, the data items to be collected were restructured. This makes it possible to add more specific definitions to the parameters and also to add items where necessary. The overall objective was to limit the items for which data was collected to those most central to assessing "Reach Quality for Resident Fish" and identifying "Critical Resources."

Data were collected on resident fish species present in a reach and their population origin (planted or wild). Relative values were assigned to each reach based on the value (for recreation or management) of fish species present. A flag was added to indicate the presence of a species of concern. The relative abundance of game fish present was evaluated. Data were also collected on habitat characteristics important to fish production (e.g., Gradient, Substrate, Instream Cover, Riparian Cover, Water Quality Limiting Factors, Habitat Sensitivity to Upland Impacts, and Critical Spawning Habitat). For a simple assessment of recreational value, a relative amount of angler use on the reach was evaluated.

Data were collected through interviews with WDW, fish and habitat biologists. Consistency in the persons conducting interviews was critical and maintained throughout. Data were collected by USGS Hydrologic Unit.

Biologists relied mostly on their professional knowledge based on field surveys, research projects, and common knowledge. They were encouraged to use reports and survey data when needed and to involve other professional personnel who had knowledge of the area.

Data Description

Data item values are of two formats: true/false flags and three descriptive categories. Each descriptive category was assigned a relative value of high, medium, or low (1, 2, 3), based on that characteristic's importance for producing resident fish. The relative values assigned to each item are not species-specific (for the 79 known resident fish species found in Washington state), but are based on general trout habitat requirements taken from studies modeling stream habitat and trout production. Following is a list of data items and their definitions.

Item Name	Codes Used
Species Descriptors:	
Species Present	Species Codes used by WDW Fish Management
Population Origin	1 = Native population (no hatchery integration) 2 = Wild population (naturally sustaining with hatchery integration) 3 = Historical population dependent upon hatchery planted fish
Game Fish Value	1 = High value: all native gamefish 2 = Medium value: introduced gamefish with active management fishery program 3 = Low value: introduced gamefish with no active management fishery program; or no gamefish present
Nongame Fish Value	1 = High value: native nongame fish of threatened, endangered, sensitive, or monitored status listed by state, federal, or WDW 2 = Medium value: all other native nongame fish 3 = Low value: introduced nongame fish
Species of Concern	T = True: Bull Trout/Dolly Varden, Olympic Mudminnow, or Pygmy Whitefish present F = False: No Bull Trout/Dolly Varden, Olympic Mudminnow, or Pygmy Whitefish present
Habitat Descriptors:	
Gradient	1 = Greater than 4% 2 = Less than 4% and greater than 1% 3 = Less than 1%
Substrate	1 = Predominately boulders and rubble 2 = Predominately rubble and gravel 3 = Predominately gravel and fines
Instream Cover	1 = Greater than 50% of wetted area 2 = Less than 50% and greater than 25% of wetted area 3 = Less than 25% of wetted area
Riparian Cover	1 = Greater than 50% of streambank, and little or no erosion 2 = Less than 50% and greater than 25% of streambank, and limited active erosion 3 = Less than 25% of streambank, and active erosion present

Item Name	Codes Used
Water Quality	1 = No known limiting factors
2 =	Limiting factors not annual in occurrence
3 =	Limiting factors annual in occurrence
Sensitivity to AND slope Upland Impacts AND	T = Greater than 1,500 ft elevation, between 30-50%, AND unstable soils, adequate vegetation present to prevent erosion
F =	All conditions above not met
Critical Spawning habitat that Habitat	T = Known "KEY" reaches of spawning are critical to perpetuation of fish populations
F =	Reaches where spawning habitat is absent or noncritical to perpetuation of fish populations

Miscellaneous Descriptors:

Angler Use1 =	High angler use relative to a geographic area
2 =	Intermediate angler use relative to a geographic area
3 =	Low angler use relative to a geographic area
Gamefish Abundance 1 =	High gamefish abundance relative to a geographic area
2 =	Intermediate gamefish abundance relative to a geographic area
3 =	Low gamefish abundance relative to a geographic area

Resident Fish Data Ranking Process

To provide managers with a means of interpreting the resident fish data and determining management priorities from it, two summary fields were produced: 1) a SUMMARY VALUE that describes the overall quality of a reach for resident fish by assigning a relative rank to each reach, and 2) a CRITICAL RESOURCES flag that identifies reaches that have either a SPECIES OF CONCERN present or CRITICAL SPAWNING HABITAT present.

Many different processes to determine a summary value were explored, and the options were reviewed by a panel of eight fish biologists. The process that preserved the most information and interjected the least bias was chosen. That summary process is:

Sum the values of each data item (each item was assigned a 1, 2, or 3--High, Intermediate, Low--value by biologists) i.e.,

SUMMARY RANK = GRADIENT + SUBSTRATE + INSTREAM COVER + RIPARIAN COVER + WATER QUALITY + ORIGIN + GAMEFISH VALUE + NONGAME FISH VALUE + ANGLER USE + GAMEFISH ABUNDANCE

The possible range of values for SUMMARY RANK are 10 to 30. SUMMARY RANK was calculated for each reach that had data in all items. Ranks for all basins were pooled and a frequency distribution of SUMMARY RANK versus TOTAL MILES OF RIVER/STREAM was examined to group the data into four classes. Those groupings are as follows:

Summary Value	Definition	Range of Summary Ranks
1	Outstanding Value	10 - 15
2	Substantial Value	16 - 20
3	Moderate Value	21 - 25
4	Low Value	26 - 30
5	Insufficient or no data	

Data applications can use the SUMMARY VALUE to identify relative quality of river/stream reaches for resident fish and use the CRITICAL RESOURCES flag to identify reaches that cannot withstand alterations without jeopardizing rare or critical resources.

Hydropower Criteria

Following are hydropower classification criteria from a data perspective:

Resource Protection Areas were assigned a HYDROCAT = 1 and are defined as:

- Reaches containing critical spawning habitat and/or a species of concern (CRITICAL = True)
- Reaches with a summary value of 1 (SUMVAL = 1)

Sensitive/Hydropower Opportunity Areas were assigned a HYDROCAT = 2 and are defined as:

- Reaches with a summary value of 2 or 3 (SUMVAL = 2 or 3)

Less Sensitive/Hydropower Opportunity Areas were assigned a HYDROCAT of 3 and are defined as:

- Reaches with a summary value of 4 (HYDROCAT = 3)

Unknown Areas were defined as:

- Reaches with a summary value of 5--insufficient or no data (HYDROCAT = 4)

Data Limitations

All criteria described above were met. The only noteworthy data limitations are: 1) that a high proportion (53 percent) of reaches are unknown, most of which are small tributaries; and 2) the data interviews were generally limited to WDW fish biologists.

Wildlife

Wildlife information in WARIS is a combination of existing, spatial databases in WDW. They include:

1. Natural Heritage Database--point occurrence data of nongame species of concern, focusing on rare, threatened, and endangered species.

2. Spotted Owl Database--spotted owl occurrence and center of activity data.

3. Habitat Conservation Areas--mapped U.S. Forest Service-designated Habitat Conservation Areas.

4. Priority Habitats and Species Database--mapped WDW priority habitats and priority species use areas.

Data Description

Data from the above existing databases were overlaid with the 100K hydrography using ARC/INFO to associate wildlife features with rivers and streams. The following paragraphs describe attribute data that were extracted from each database and tagged to rivers or streams when an association occurred. Also listed are the criteria for determining an association between a wildlife feature and a river or stream.

Natural Heritage Database--Point occurrences of nongame species were associated with a particular river/stream reach if the point occurred within a specified buffered distance around the point. These distances varied for each species depending on the status of the species (see page G-9 for a listing of species, species status, and buffer distances used). Data items that were transferred to river reaches generally describe the species present, their status, reference items (to extract further details from Heritage Database if needed), point accuracy, species use, occurrence date, and phylogenetic class.

Spotted Owl Database--Spotted Owl centroids were associated with a stream reach if they occurred within 2.2 miles (3,540 meters) of a reach (this is the U.S. Fish and Wildlife Service recommended distance for spotted owl protection). The only attribute datum that was tagged to the reach was a reference item needed to extract further details from the Spotted Owl Database.

Habitat Conservation Areas--A stream reach was tagged with a flag indicating the presence of a spotted owl Habitat Conservation Area (HCA) if the reach directly intersected the HCA polygon. The reach was tagged with the name of the National Forest in which the HCA exists.

Priority Habitats and Species Database--A stream reach was tagged with a flag indicating the presence of a Priority Habitat or Species (PHS) area if the reach directly intersected the PHS polygon. No further attributes were tagged to reaches because those data had not yet been computerized.

Hydropower Criteria

Following are hydropower classification criteria from a data perspective:

Resource Protection Areas

- A reach is within 1,000 feet (310 meters) of any individual occurrence of federal or state threatened or endangered species recorded in Nongame Data Systems. Nongame data points were buffered with a 1,000-foot radius circled and overlayed onto river reaches.

- A reach overlaps with a polygon mapped in the Priority Habitats and Species program for any federal or state threatened or endangered species.

Sensitive/Hydropower Opportunity Areas

- A reach overlaps with a priority habitat area mapped in the PHS program, excluding species covered in Resource Protected Areas.

- A reach overlaps with a Habitat Conservation Area for spotted owls as designated by the Interagency Scientific Committee.

- A reach is within the recommended buffer distance of an individual occurrence of a priority species (excluding those occurrences covered in Resource Protected Areas).

Less Sensitive/Hydropower Opportunity Areas

- No reaches were assigned to this category.

Unknown Areas

- A reach has no data.

Data Limitations

Priority Habitats and Species data and species listings were only available for commercial and private forest land.

Natural Heritage Features

Natural features data presently in WARIS include Endangered, Threatened, and Sensitive plant species, high-quality native terrestrial ecosystems, and high-quality native wetland and aquatic ecosystems. These data are collected and maintained by rare plant and plant community occurrence data housed in the Washington Natural Heritage Program of the Washington Department of Natural Resources (DNR). These data are point occurrences only and are called element occurrences. Point data were converted to an ARC/INFO coverage and spatially related to the 1:100,000 scale hydrography layer to tag reaches with element occurrences that are present within specified distances from stream/river reaches.

Element occurrences were tagged to river reaches using two buffer distances. If the data point represented an individual occurrence of a rare plant, those points were buffered with a 1,000-foot radius circle and any reach intersecting that circle was tagged with that element occurrence. If the data point represented a polygon feature or a plant community, the point was buffered with a 2,640-foot radius circle and intersected with river reaches.

Attribute data further describing the point occurrences were tagged to the streams. These items generally included: species present, species status, reference numbers to obtain further details from the Natural Heritage Program, coordinate accuracy, and occurrence date.

Hydropower Criteria

Resource Protection Areas

1. A reach flows through or abuts a DNR or Nature Conservancy-owned Natural Resource Conservation Area.

- A reach flows through or abuts a DNR Natural Area Preserve owned and/or managed by the State of Washington or The Nature Conservancy.

- A reach flows through or abuts a U.S. Research Natural Area.

Sensitive/Hydropower Opportunity Areas

- A reach flows through a buffer area of a Natural Heritage feature. Points in the Washington Natural Heritage Database were buffered with a 1,000-foot radius circle buffer, if they represent point features on the ground, and were buffered with a 2,640 foot radius circle buffer, if they represent polygon features on the ground.

Less Sensitive/Hydropower Opportunity Areas

- No reaches were assigned to this category.

Unknown Areas

- A reach has no data.

Data Limitations

All data for Natural Features exist as point locations in the Washington Natural Heritage Database. Therefore, the actual boundaries of Natural Area Preserves, Natural Conservation Areas, and Research Natural Areas were not used. Instead, a point location was buffered 2,640 feet to approximate the area polygon. Additionally, the point data for these areas are not current. Also, some natural heritage features (plant communities, wetlands) exist as points while on the ground they represent polygon features. Their area was approximated with a 2,640-foot buffer.

Wildlife Species List with Species Status and Buffer Distances

STATE STATUS:

SE = STATE ENDANGERED
ST = STATE THREATENED
SS = STATE SENSITIVE
SM = STATE MONITOR
SC = STATE CANDIDATE

FEDERAL STATUS:

FE = FEDERAL ENDANGERED
FT = FEDERAL THREATENED
FS = FEDERAL SENSITIVE
FC = FEDERAL CANDIDATE

Common Name	Species Code	Federal Status	State Status	PHS Y/N	Buffer Distance (meters)
American white pelican	PEER	FS	SE	N	3220
Arctic tern	STPAR		SM	N	310
Aspen stands	ASPEN			Y	0
Band-tailed pigeon	COFA			Y	0
Barrow's goldeneye	BUIS			Y	0
Bighorn sheep	OVCA			Y	0
Blue grouse	DEOB			Y	0
Bald eagle	HALE	FT	ST	Y	3220
Barred owl	STVA		SM	N	310
Beller's ground beetle	AGBE	FC2	SC	Y	800

Common Name	Species Code	Federal Status	State Status	PHS Y/N	Buffer Distance (meters)
Black swift	CYNI		SM	N	310
Black tern	CHNI		SM	N	310
Black-backed woodpecker	PIAR		SM	Y	310
Black-crowned night-heron	NYNY		SM	N	310
Black-necked stilt	HIME		SM	N	310
Brandt's cormorant	PHPEN		SC	N	800
Burrowing owl	ATCU		SC	N	800
Cavity nesting ducks	CANED			Y	0
Columbian black-tailed deer	ODHEC			Y	0
Common goldeneye	BUCL			Y	0
California mountain kingsnake	LAZO		SC	N	800
Caspian tern	STCA		SM	N	310
Cave	CAVE			Y	0
Clark's grebe	AECL		SM	N	310
Cliffs	CLIFF			Y	0
Columbian white-tailed deer	ODVIL			Y	0
Common loon	GAIM	FS	SC	Y	1610
Cope's giant salamander	DICO		SM	N	310
Dunn's salamander	PLDU		SC	Y	800
Elk	CEEL			Y	0
Ferruginous hawk	BURE	FC2	ST	N	1610
Fisher	MAPE		SC	Y	800
Forster's tern	STFO		SM	N	310
Fringed myotis	MYTH		SM	N	310
Giant Columbia River limpet	FINU	FC2	SC	N	1610
Golden eagle	AQCH		SC	Y	800
Golden hairstreak	HAGR		SC	Y	1610
Grasshopper sparrow	AMSA		SM	N	310
Gray wolf	CALU	FE	SE	Y	3220
Great Columbia River spire snail	LICO	FC2	SC	N	1610
Great blue heron	ARHE		SM	Y	310
Great egret	CASAL		SM	N	310
Great gray owl	STNE	FS	SM	N	310
Green-backed heron	BUST		SM	N	310
Green-tailed towhee	PICH		SC	N	800
Grizzly bear	URAR	FT	SE	Y	3220
Harlequin duck	HIHI			Y	0
Hooded merganser	LOCUC			Y	0
Larch mountain salamander	PLLA	FC2	SC	Y	1610
Lesser goldfinch	CAPS		SM	N	310
Lewis' woodpecker	MELE	FS	SC	Y	800
Loggerhead shrike	LALU		SC	N	800
Long-billed curlew	NUAM	FC2	SM	N	310
Long-eared myotis	MYEV		SM	N	310
Long-legged myotis	MYVO		SM	N	310
Lynx	LYCA			Y	0
Marten	MAAM			Y	0
Moose	ALAL			Y	0
Mountain goat	ORAM			Y	0
Mule and black-tailed deer	ODHE			Y	0
Mule deer	ODHEH			Y	0

Common Name	Species Code	Federal Status	State Status	PHS Y/N	Buffer Distance (meters)
Marbled murrelet	BRMA	FC2	SC	Y	800
Mardon skipper	POMA		SC	N	800
Merlin	FACO		SM	N	310
Northwest white-tailed deer	ODVIO			Y	0
Night snake	HYTO		SM	N	310
Northern Spotted Owl	STOC	FT	ST	Y	3540
Northern bog lemming	SYBO		SM	N	310
Northern goshawk	ACGE		SC	Y	800
Northern grasshopper mouse	ONLE		SM	N	310
Oak woodland	OAK			Y	0
Olympic mudminnow	NOHU	FC2	SC	Y	800
Olympic salamander	RHOL		SM	N	310
Ord's kangaroo rat	DIOR		SM	N	310
Oregon silverspot	SPZE	FT	SC	Y	1610
Oregon vesper sparrow	POGRA		SM	N	310
Osprey	PAHA		SM	Y	310
Pallid bat	ANPA		SM	N	310
Peregrine falcon	FAPE	FE	SE	Y	3220
Pileated woodpecker	DRPI		SC	Y	800
Prairie falcon	FAME		SM	N	310
Purple martin	PRSU	FS	SC	Y	800
Pygmy rabbit	SYID		SC	N	1610
Pygmy shrew	SOHO		SC	Y	800
Pygmy whitefish	PRCO		SM	Y	310
Rocky mountain bighorn sheep	OVCACA			Y	0
Rocky mountain elk	CEELN			Y	0
Roosevelt elk	CEELR			Y	0
Red-necked grebe	POGR		SM	N	310
Ring-necked snake	DIPU		SM	N	310
Riparian area	RIPAR			Y	0
Roy prairie pocket gopher	THMAG	FC2	SC	N	800
Sage grouse	CEUR	FC2	SC	N	800
Sage sparrow	AMBE		SC	N	800
Sage thrasher	ORMO		SC	N	800
Sand roller	PETR		SM	N	310
Sandhill crane	GRCA	FS	SE	Y	3220
Sea otter	ENLU		SE	N	3220
Sharp-tailed grouse	TYPH	FC2	SC	N	800
Shepard's parnassian	PACL		SC	N	1610
Snag-rich area	SNAG			Y	0
Snowy plover	CHAL	FC2	SE	N	3220
Southern alligator lizard	ELMU		SM	N	310
Spotted frog	RAPR		SC	Y	800
Streaked horned lark	ERALS		SM	N	310
Striped whipsnake	MATA		SC	N	800
Swainson's hawk	BUSW		SC	N	800
Talus slopes	TALUS			Y	0
Thicket hairstreak	MISP		SM	N	310
Three-toed woodpecker	PITR		SM	N	310
Tiger salamander	AMTI		SM	N	310
Townsend's big-eared bat	PLTO	FC2	SC	Y	1610

Common Name	Species Code	Federal Status	State Status	PHS Y/N	Buffer Distance (meters)
Turkey vulture	CAAUR		SM	N	310
Upland sandpiper	BALO		SE	N	220
Van dyke's salamander	PLVA		SC	Y	800
Vaux's swift	CHVA		SC	Y	800
White-tailed deer	ODVI			Y	0
Wild turkey	MEGA			Y	0
Wood duck	AISP			Y	0
Washington ground squirrel	SPWA		SM	N	310
Western bluebird	SIME	FS	SC	Y	800
Western gray squirrel	SCGRI		SC	Y	800
Western grebe	AEOC		SM	N	310
Western pipistrelle	PIHE		SM	N	310
Western pond turtle	CLMA	FC2	SC	Y	1610
Wetland	WET			Y	0
White-headed woodpecker	PIAL		SC	Y	800
Whulge checkerspot	EUEDYA		SC	N	800
Wolverine	GUGU	FC2	SM	N	310
Woodhouse's toad	BUWO		SM	N	310
Woodland caribou	RATA	FE	SE	Y	3220

Attachment D
Unresolved Fish Passage Problems

Attachment D

Unresolved Fish Passage Problems

This attachment has not been coded to the Washington State River Resource/Hydropower Database used in this report. It is based on water resource inventory area designations (WRIA) used prior to the present GIS database. To further identify stream locations found on this list, the user must consult the Washington Department of Fisheries' publication *A Catalog of Washington Streams and Salmon Utilization*. This can be acquired from WDF's Information and Education Division, Rm 115 General Administration Building, Olympia, Washington 98504. An alternative to purchasing this publication is to contact the WDF regional biologist assigned to the region of the proposed hydroelectric project.

The tributaries listed are generally small. WDF construction crews address the blockages each summer construction season. New blockages are added to the list when identified. Please contact WDF for the latest information regarding a specific location.

X - tribe = unknown name
Stream = stream name
WRIA = water resource inventory area
RM = River mile (approximate)
Structure = type of blockage

Stream	WRIA	RM	STRUCTURE
Saar Cr.	00.0003	11.1	Frost Rd CMP
Goodwin Ditch	00.0019	1.8	Goodwin Rd SP
X-Trib	00.0019A	0.4	Double SP
X-Trib	00.0019A	1.1	Driveway CC Round
Dale Cr.	00.0020	0.8	Goodwin Rd CMP
X-Trib	01.0031	0.3	I-5 CMP
California Cr.	01.0045	6.6	CC Box
X-Trib	01.0071	0.4	Bay Rd SP
Terrell Cr.	01.0089		Concrete Dam
Terrell Cr.	01.0089		Terrel Lake Dam
Lummi R.	01.0104		CMP
X-Trib	01.0107		Tide Gate
Schell Ditch	01.0116	3.5	Imhoff Rd Culvert
Schell Ditch	01.0116	3.8	CMP
Schell Ditch	01.0116	3.9	Concrete Box Culvert
Schell Ditch	01.0116	4.2	Field View Rd CMP
Schell Ditch	01.0116	4.7	Heather Drive CMP
Silver Cr.	01.0124		Dam
Ten Mile Cr.	01.0163		Benham's Dam
Deer Cr.	01.0165		Dam and Ladder
Fourmile Cr.	01.0181		Noon Rd CMP
X-Trib	01.0184		Dam
X-Trib	01.0184		CMP
X-Trib	01.0191A	0.1	Everson-GoshenRd CMP
Whiskey Cr.	01.0192	0.1	Tide Gate
Snyder Ditch	01.0196	0.	Tide Gate

Stream	WRIA	RM	STRUCTURE
Duffner Ditch	01.0202	3.4	Tromp Rd CMP
X-Trib to 01.0202	01.0202B	2.8	12" CPP
X-Trib	01.0206	0.6	Culvert(LoomisTr.rd)
X-Trib	01.0206B	0.1	Dam
Bender Ditch	01.0212		CMP
Bender Ditch	01.0212		CMP
Elder Ditch	01.0220	0.4	Van Dyk Rd CMP
Jones Cr.	01.0262		Concrete Sill
Hutchinson Cr.	01.0264	1.8	Ladder
X-Trib	01.0337	0.3	Marshall Hill Rd CMP
M.F. Nooksack R.	01.0339	7.2	Dam
X-Trib	01.0347		Rock Dam
X-Trib	01.0347		CMP
X-Trib	01.0348		CMP
Bear Cr.	01.0352		CMP
X-Trib	01.0393A	0.	NF Rd CMP
Kendall Cr.	01.0406	0.1	Fishway @ Hatchery
X-Trib	01.0425	0.1	Mt Baker Hwy CMP
X-Trib	01.0550	0.	CMP
Squalicum Cr.	01.0552		Concrete Dam
Squalicum Cr.	01.0552		Mt Baker Hwy
Baker Cr.	01.0554		Birchwood Rd CMP
X-Trib	01.0559	0.1	Guide Meridiam CMP
Whatcom Cr.	01.0566		Sewer Crossing
Whatcom Cr.	01.0566		Dupont St CC Box
Padden Cr.	01.0622		Fairhaven Pkwy CMP
Chuckanut Cr.	01.0626	0.35	SR 111 Concrete Box
X-Trib	01.0654	0.3	Dam
X-Trib	01.0654	0.6	Lily Lake Rd CMP
X-Trib	01.0654	0.7	Dam
Thomas Cr.	03.0010		CMP
Butler Cr.	03.0019	4.3	cc's
Butler Cr.	03.0019		Dam
X-Trib	03.0023A	0.	Alger-Cain Lk Rd CC
X-Trib	03.0023A	0.05	Landscape Falls
Skarrup Cr.	03.0053	2.4	Echo Hill Rd CMP
X-Trib	03.0053B	0.	Dam
Parson Cr.	03.0054	0.	Prairie Rd Cmp
X-Trib	03.0061	0.2	CMP
X-Trib	03.0061	0.25	CMP
X-Trib. Samish R.	03.0062	0.1	Culvert-Upp.Sam.Rd.
Vernon Cr.	03.0063	0.1	Culvert-Up.Sam.Rd.
N.P. (Haner) Cr.	03.0078	0.3	Box Bridge/Dr.Way
N.P. (Haner) Cr.	03.0078	0.35	Box Culvert/SR-9
X-Trib. Samish R.	03.0085A	0.1	Culvert-SR 9
Indian Slough	03.0102	0.	Tidegate/Trashrack
Milltown Cr.	03.0182	3.	Dam-just above CL Rd
Milltown Cr.	03.0182		Fagan Rd CMP
X-Trib	03.0183	0.1	Franklin Rd CC Round
X-Trib	03.0183	0.7	Bonney View Rd CMP
X-Trib	03.0183	0.8	Milltown Rd CMP
X-Trib	03.0183	1.2	Dam and Standpipe

Stream	WRIA	RM	STRUCTURE
X-Trib	03.0184	0.1	I-5 Culvert
X-Trib	03.0196	0.1	Pleasant Hill Rd CMP
X-Trib	03.0196	0.68	Pleasant Hill Rd CMP
Bulson Cr.	03.0198		SR 534 CMP
Little Day Cr.	03.0233	0.06	Elk Lane SP
X-Trib	03.0237	0.01	Dam
Walker Cr.	03.0239	4.7	ORV Rd MP
X-Trib	03.0241	1.4	ORV Rd CMP
X-Trib	03.0259	0.6	Lake Cavanaugh Rd CC
X-Trib	03.0271A		CMP
Coal Cr.	03.0279	0.	Hoehn Rd CC Round
Parker Cr.	03.0292	0.4	S Skagit Hwy CC
X-Trib	03.0293B	0.48	CMP
Jones Cr.	03.0332	3.	Dam
X-Trib	03.0342		Wet Crossing
Red Cabin Cr.	03.0343	3.3	BP Scott Mainline
Little Careys Cr.	03.0354A	0.05	Culvert
Maddox Cr.	03.2966	5.4	CMP
X-Trib	03.2970		Blodgett Rd SP
X-Trib to Sterling Slough	03.????	0.	RR Culvert
X-Trib to Sterling Slough	03.????	0.	HWY 20 Culvert
X-Trib to Sterling Slough	03.????		CMP near Sapp Rd
X-Trib to Hanson Cr.	03.????		Dam Near N State RD
X-Trib	04.0373	0.1	S Skagit Hwy Culvert
Lornezan Cr.	04.0434A	0.	Dalles Rd CMP
Lornezan Cr.	04.0434A	0.8	Paddle Wheel
X-Trib	04.0644	0.2	C-Sauk V Rd CC Round
X-Trib	04.0645	0.1	C-Sauk V RD CC Round
Hooper Cr.	04.0646	0.25	C-Sauk V RD CC Round
Hooper Cr.	04.0646	0.7	CC Round
Aldon Cr.	04.0659	0.31	C-Sauk V RD CMP
Miller Cr.	04.0661	0.1	C-Sauk V Rd SP&FWY
X-Trib	04.0668	0.1	Sauk V Rd CMP & FWY
X-Trib	04.0668	0.7	Abandoned MP
Tiny Kisutch	04.0673H	0.4	CMP
X-Trib	04.0675	0.54	Skagit Hwy CMP
X-Trib	04.1064	0.23	Skagit Hwy CMP
Prairie Cr.	04.1069	0.3	S-Prairie Rd CCRound
Owl Cr.	04.1143	0.29	CMP
Jordan Cr.	04.1412		Hatchery Intake
Babcock Cr.	04.1862	0.2	Culvert under SR20
Church Cr.	05.0018	2.	Hwy 532 Culvert
X-Trib	05.0064		Hwy 532 Culvert
X-Trib	05.0138		Grandview Rd Culvert
Fortson Cr.	05.0254		SR 530 CMP
M.F. Quiliceda Cr.	07.0058		56" cmp
X-Trib	07.0059		47th Dr.NE Culvert
Tokul Cr.	07.0440	0.4	WDW FW @ intake!
Wagley's Cr.	07.0939	0.3	2-4'cc's under BNRR
Wagley's Cr.	07.0939	0.3	2 - CC rd. culverts
X-Trib. Skykomish R.	07.0964	0.7	CMP
Pidgeon Cr. #1	07.1722	1.	36'cc under 41st SE

Stream	WRIA	RM	STRUCTURE
Thornton Cr.	08.0030		Dam 3 (25AVE-36AVE)
Thornton Cr.	08.0030		Dam 2 (25AVE-36AVE)
Thornton Cr.	08.0030		Dam 1 (25AVE-36AVE)
Thornton Cr.	08.0030		25th Ave Culvert
McAleer Cr.	08.0049	2.2	I-5/Ballinger Wy CMP
McAleer Cr.	08.0049	2.2	I-5/Ballinger CMP-2
Lyons Cr.	08.0052		CedarWay Dam Orifice
Lyons Cr.	08.0052		NE 195th X-ing
Peters Cr.	08.0104		SR901 and 150th CMP
Evans Cr.	08.0106	5.4	Box Culvert
Evans Cr.	08.0106	7.	CMP
Rutherford Cr.	08.0110		Culvert
Rutherford Cr.	08.0110		Dam?
Cottage Lake Cr.	08.0122	0.6	Avondale BoxCulverts
Seidel Cr.	08.0129		Dam at Headwaters
Seidel Cr.	08.0129		Box Culvert
Seidel Cr.	08.0129		2-CC Rounds
Struve Cr.	08.0131	0.1	Waterline Xing CMP
Struve Cr.	08.0131	0.7	216th Culvert
X-Trib to Tibbets Cr.	08.0171	0.1	SR 900 Box Culvert
Issaquah Cr.	08.0178	3.2	Hatchery Dam
E.Fk.Issaquah Cr.	08.0183	5.8	Dam
Carey Cr.	08.0218		SR 18 Culvert
Juanita Cr.	08.0230	2.3	Harris Bridge/Flume
Forbes Cr.	08.0242		I-405 Culvert
Forbes Cr.	08.0242		Culvert near I-405
Forbes Cr.	08.0242		New Channel
Kelsey Cr.	08.0260		Concrete weir/apron
Cedar R.	08.0299	21.5	Landsburg Pipeline
Cedar R.	08.0299	21.8	Landsburg Dam
Maplewood Cr.	08.0302		Dam #1
Maplewood Cr.	08.0302		Maple V Hwy Culvert
Maplewood Cr.	08.0302		Dam #2
Peterson Cr.	08.0328		Dam
X-Trib to Thornton Cr.	08.????	0.	Rockery Waterfall
X-Trib to Thornton Cr.	08.????	0.	45th Ave NE Culvert
X-Trib to Thornton Cr.	08.????	0.	36 Ave NE Culvert
X-Trib to Lyons Cr.	08.????	0.	Concrete Channel
Denny Cr.	08.????	0.	Ladder
X-Trib to Lyons Cr.	08.????		Rip-Rap Channel
X-Trib to McAleer Cr.	08.????		Brookside Playground
NF X-Trib to Sammamish R.	08.????		Dam
X-Trib to Lyons Cr.	08.????		Pond Culvert
X-Trib to North Cr.	08.????		SR 527 Culvert
X-Trib to Lyons Cr.	08.????		Waterfall
X-Trib to McAleer Cr.	08.????		Culvert(#8 on list)
NF X-Trib to Sammamish R.	08.????		Dam
X-Trib to Lyons Cr.	08.????		Culvert
X-Trib to McAleer Cr.	08.????		Culvert and Flume
X-Trib. to Sammamish R.	08.????		RR Culvert
X-Trib to Sammamish R.	08.????		School Building
X-Trib to Little Bear Cr.	08.????		SR 522 Blockage

Stream	WRIA	RM	STRUCTURE
X-Trib to North Cr.	08.????		Pond Culvert
X-Trib to Juanita Cr.	08.????		108th Ave NE Culvert
Yarrow Cr.	08.????		Dam and Ladder
X-Trib to Lake Sammamish	08.????		Private Residence
X-Trib to Issaquah Cr.	08.????		Double Culverts
X-Trib to Holder Cr.	08.????		Log Jam
X-Trib	08.????		Man-made Waterfalls
Goff Cr.	08.????		NE 24th St Culvert
X-Trib to Evans Cr.	08.????		Union Hill Culvert
X-Trib to Juanita Cr.	08.????		Dam
Yarrow Cr.	08.????		Culvert
X-Trib to Lake Sammamish	08.????		RR Culvert
X-Trib	08.????		116th and 165th CMP
X-Trib to Issaquah Cr.	08.????		Dam
X-Trib to Issaquah Cr.	08.????		Block #8 Co.Rd CMP
X-Trib to Bear Cr.	08.????		Avondale Rd Culvert
Goff Cr.	08.????		SR 520 Culvert
X-Trib to Bear Cr.	08.????		Unknown
Nudist Camp Cr.	08.????		IssaquahHobartRd CMP
Yarrow Cr.	08.????		Detention Pond
X-Trib to Juanita Cr.	08.????		Detention Pond CMP
Cochran Cr.	08.????		Wetland/sheetflow
Cochran Cr.	08.????		NE 38th PL Culvert
X-Trib to Issaquah Cr.	08.????		Horse Pasture
Idyllwood Cr.	08.????		SR 901 Culvert
X-Trib	09.0020		Dam-19225Springbr.Rd
N.F. Newaukum Cr.	09.0114		Dual cmp's
Salmon Cr.	09.0362	0.	Dam/CMP
Des Moines Cr.	09.0377	0.3	SR 509 Culvert
Wapato Cr.	10.0017	3.3	Dual CC's
Clear Cr.	10.0022	1.9	Trout Farm Dam
Swan Cr.	10.0023		64th St Culvert
Jovita Cr.	10.0033	0.7	Jovita Blvd Culverts
Salmon Ck.	10.0362	0.	Intertidal Dam
X-Trib to Scatter Cr.	10.????		CMP
Clover Cr.	12.0007		Dams - 8
Flett Cr.	12.0009	0.	Culvert
Ponce De Leon Cr.	12.0010	0.3	Dams - 2
Spanaway Cr.	12.0012		Dam
Indian Cr.	13.0023	0.1	Eastside St CMP/TR
Percival Cr.	13.0029	1.4	Mottman Rd Culvert
Green Cove Cr.	13.0133	1.1	36th St Culvert
Beatty Cr.	13.0143	1.6	Dam-Arneson Dr.
Beatty Cr.	13.0143	1.9	CMP Northill Dr.
X-Trib Perry Cr.	14.0002	0.2	CMP's Randall Rd.
Schneider Cr.	14.0009	1.7	Holiday V Rd Culvert
Holiday Valley Cr.	14.0009A	1.16	Culvert
Fiscus Cr.	14.0012B	0.4	Culvert
McDonald Cr.	14.0023	0.3	SR 108 CC Box
X-Trib	14.0036C	0.3	Shelton V Rd CMP
Cranberry Cr.	14.0051	4.1	Culvert
X-Trib	14.0051B	0.1	Culvert

Stream	WRIA	RM	STRUCTURE
Malaney Cr.	14.0067	0.5	Agate Rd Culvert
X-Trib	14.0095	0.1	Culvert
Knackstedt Cr.	15.0029	0.1	CC,CMP
Minter Cr.	15.0048	4.7	Dam
Bear Cr.	15.0052	1.4	Concrete Box Culvert
Burley Cr.	15.0056	1.4	Burley-Olalla Rd CCs
Burley Cr.	15.0056	3.7	Concrete Box Culvert
Burley Cr.	15.0056	4.1	CMP
Burley Cr.	15.0056	4.5	Culvert
Bear Cr.	15.0057	0.4	Rock Cascades
Bear Cr.	15.0057	0.9	CMP
Bear Cr.	15.0057	0.95	Diversion Dam
Bear Cr.	15.0057	1.	Culvert
Bear Cr.	15.0057	1.1	CMP
Bear Cr.	15.0057	1.4	Dam
Bear Cr.	15.0057	1.4	CC Box
X-Trib to Henderson Bay	15.0063	0.1	48"cc Goodnough Rd.
X-Trib	15.0068		7725-92nd St Culvert
Mark Dickson Cr.	15.0070	0.3	Dam
Trib. to Mark Dickson Cr.	15.0070A	0.	2-24 in. CMP's
Trib. to Mark Dickson Cr.	15.0070A	0.1	36 in. cc rd.
X-Trib	15.0080		Culvert
Sunnycove Cr.	15.0105	0.	Culvert
Judd Cr.	15.0129	2.	CC Rd. / 11th Ave SW
X-Trib	15.0186	0.6	Sedgewick Rd CC
X-Trib Curley Cr.	15.0187	0.2	Locker Rd CC and FWY
Beaver Cr.	15.0192	0.29	Culvert
Anderson Cr.	15.0211	0.2	280'Flume
Gorst Cr.	15.0216	2.3	Belfair V Rd CCRound
Gorst Cr.	15.0216	3.5	SR 3 CC Round
Gorst Cr.	15.0216	3.6	Garbage Dump CMP
X-Trib	15.0217	0.015	Concrete Wall
Jarstad Cr.	15.0218	0.1	CC Round
Heins Cr.	15.0221	0.1	CMP, Log Control
Heins Cr.	15.0221	0.3	CC Box under RR
Wildcat Cr.	15.0229	4.45	WDW Lake Screen
Wildcat Cr.	15.0229	4.45	Fish Screens
Dickerson Cr.	15.0231	0.2	CMP North David Rd.
Dickerson Cr.	15.0231	0.4	Dam
Dickerson Cr.	15.0231	0.45	Multiplate Culvert
W.F. Clear Cr.	15.0250	2.2	Multiplate
X-Trib	15.0254	0.5	Mountain View Rd CC
Barker Cr.	15.0255	0.2	Culvert
Barker Cr.	15.0255	1.3	CMP/Bucklin Hills Rd
Steele Cr.	15.0273	0.65	SR 303 CMP
Steele Cr.	15.0273	0.7	SR 303 CMP
Steele Cr.	15.0273	0.7	Instream Pond
Steele Cr.	15.0273	0.8	Dam
X-Trib	15.0274	0.1	Culvert
X-Trib	15.0274	0.15	CC Round
X-Trib	15.0274	0.2	Rock Channel
X-Trib	15.0274	0.2	SR 303 Culvert

Stream	WRIA	RM	STRUCTURE
X-Trib	15.0274	0.21	Dam
X-Trib	15.0274	0.25	Dam
X-Trib	15.0275	0.4	Paulson Rd CC
X-Trib	15.0275	0.8	CC Round
Dogfish Cr.	15.0285	0.8	Bond Rd Culvert
Dogfish Cr.	15.0285	1.35	CMP
X-Trib	15.0286	1.07	Culvert
X-Trib	15.0286	1.2	Pugh Rd Culvert
X-Trib	15.0286		Culvert
X-Trib	15.0287	0.1	Pugh Rd Culvert
X-Trib	15.0287	0.15	Dam
X-Trib. Fletcher Bay	15.0340	0.2	CC NE New Brooklyn
Gamble Cr.	15.0356		Culvert
Johnson Cr.	15.0387	0.3	CC Round
Big Beef Cr.	15.0389	6.2	Wildcat Lk. Rd cmp's
Seabeck Cr.	15.0400	0.9	CMP/Holly-Seabeck Rd
Thomas Cr.	15.0417	0.1	Culvert
Dewatto R.	15.0423	0.1	CMP Dewatto Bay Rd
X-Trib	15.0447	0.2	Maggie Lk Rd Culvert
X-Trib Tahuya R.	15.0447	0.2	CMP/Belfair-Tahuya R
Erdman Lake Outlet	15.0459	0.6	Culvert/Fishway
Bear Cr.	15.0510	0.2	CMP/Old Belfair Hwy
X-Trib to Bear Cr.	15.????	0.	CC Round
X-Trib to Bear Cr.	15.????	0.	CC Round
X-Trib to Bear Cr.	15.????	0.1	Madronna Rd CC Round
X-Trib to Dogfish Cr.	15.????	0.25	Man-made Cascade
X-Trib to Dogfish Cr.	15.????	0.8	CC Round
Ripley Cr.	17.0089	3.3	CMP/L. Qilicene R Rd
Thorndyke Cr.	17.0170	1.	Double CMP's
Johnson Cr.	17.0301	0.8	Culvert/SR 101
Canyon Cr.	18.0038	0.2	Intake Dam
Canyon Cr.	18.0038	0.2	Intake Dam for SCD
Bagley Cr.	18.0183	0.3	Collapsed Bridge
Bagley Cr.	18.0183	1.5	Box Culvert/SR 101
Lees Cr.	18.0232	0.8	Box Culvert/SR 101
Tumwater Cr.	18.0256	1.3	Box Culvert/SR 101
Salt Cr.	19.0009		930 RD CMP
Sadie Cr.	19.0083	1.9	312 Rd Culvert
X-Trib	19.0110	1.3	Dempsy Rd Culvert
X-trib. to Dickey River	20.0098	0.1	CMP under 5003 Road
Gunderson Cr.	20.0118		C-2030Rd CMP's(2)
X-Trib to Gunderson Cr.	20.0119		C-2030 Rd CMP's (2)
Canyon Cr.	20.0470	0.2	Hoh R Rd CMP
West Twin Cr.	20.0506	0.1	10'MP
Snider Cr.	20.0511	0.1	2-3.5' CMP's
X-Trib to Gunderson Cr.	20.????		C-2000 Rd CMP
Donkey Cr.	21.0024	0.05	H-C Mainline Rd CMP
Iska Cr.	21.0042		C-1100 Rd Pipe
Peterson Cr.	21.0068	1.2	CMP-Clearwater Mnlne
Higley Cr.	21.0460	0.1	CMP N. Shore Rd.
Slide Cr.	21.0464	0.1	MP N. Shore Rd.
McCormick Cr.	21.????	0.1	MP N. Shore Rd.

Stream	WRIA	RM	STRUCTURE
Mill Cr.	21.????	0.1	Old Mill Structure
S.F. Big Cr.	22.0058	0.2	Falls
X-Trib to E.F. Satsop R.	22.0471A		Culvert
Cedar Cr.	23.0570	8.	Intake Dam
X-trib. to Scatter Cr.	23.0720	0.25	3-36 CCRd. culverts
Clear Cr.	25.0253	0.1	CMP
Ferrier Cr.	26.0000	0.2	Dam/Blownout 1990
Monahan Cr.	26.0195		Delameter Rd Culvert
Winkler Cr.	28.0229	0.5	CC Round NE Borin rd
Soosette Creek	9.0073	1.2	multiplate CMP
Little Corral Cr.	????????		Dam
Sand Hollow Cr.	????????		Culvert