

CHAPTER 1: BACKGROUND AND OBJECTIVES

1.1 History

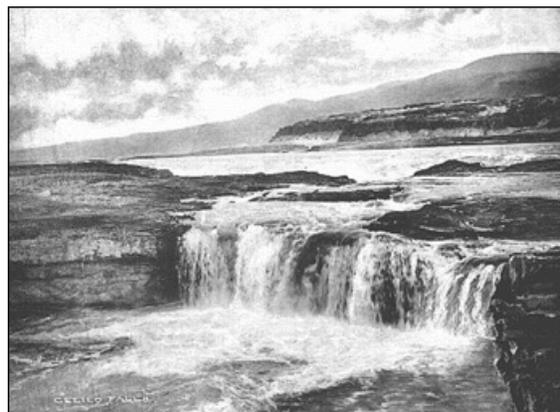
The Columbia River and its basin have long comprised one of the greatest natural resources of the United States. As the largest river in the Pacific Northwest, the Columbia and its tributaries affect our region in many ways—by fostering world-famous Pacific salmon runs, supplying water for irrigation and recreation and providing clean, natural fuel for more than half of the region’s electrical generation.

The region’s best-known and most celebrated exploration is the 1804-1806 expedition of Lewis and Clark where they explored and chronicled the American West. After traveling up the Missouri River and crossing over the Rocky Mountains, Lewis and Clark and their Corps of Discovery floated down the Columbia River to the Pacific Ocean. Their journals are filled with vivid descriptions of the river’s diverse ecology ranging from temperate rain forests to semi-arid plateaus, and its astounding abundance of timber, fish and game.

It is interesting to note that even long before that historic trip, the vast resources of the Columbia River Basin were the key to the Pacific Northwest’s economy. Our region’s population and economy, which were transformed following the visit by Messrs. Lewis and Clark, are growing at an accelerating pace today. As a result, there are ever-increasing social, political, and economic pressures placed on the resources of the Columbia River. This growth also increases tensions among the various interests that use the river’s vast resources.

1.1.1 The Columbia Basin

The Columbia River Basin (Figure 1-1) is a single hydrologic unit extending over seven U.S. states (Oregon, Washington, Idaho, Montana, Nevada, Wyoming, and Utah), many Indian reservations, and one Canadian province. It flows for more than 1,200 miles, draining a 219,000-square-mile basin. Precipitation levels within the basin vary widely, ranging from 6 to 110 inches per year (Lang, 2006).



The Columbia River plunged over basalt outcroppings like Celilo Falls in the Gorge before dam building activities in the 20th century.

1.1.2 Uses of the Columbia

There are nine primary uses of the Columbia River system:

- Flood Control
- Fish Migration
- Fish and Wildlife Habitat
- Electric Power Generation
- Navigation
- Irrigation

- Recreation
- Water Supply and Quality
- Cultural Resources

Flood Control

Controlling the damaging floodwaters was one of the original purposes for many of the dams on the river and flood control remains a high priority for system operation during high runoff years. For example, thirty-two people died in the Portland area during the 20-day flood of 1948 when the Columbia River broke through the dike surrounding the town of Vanport (FCRPS, 2001).



Construction of Grand Coulee Dam, often dubbed "the eighth wonder of the world," provided a tremendous boost to the regional economy during the Depression years (Boswell and McConaghy, 1996).

Fish Migration

The Columbia River remains famous for its salmon runs, but salmon populations on the river have declined. Several species of salmon are now listed as endangered under the federal Endangered Species Act (ESA) (Table 1-1). By law, efforts must be made to protect these species from further degradation and to start the process of recovery. Federal dams in the lower Columbia

and Snake Rivers have fish ladders to help anadromous fish migrate upstream, and bypass systems have been installed to help juvenile smolts in their downstream migration. The goal of the Washington State Department of Ecology (Ecology) and other stakeholders in the Columbia River Basin is to protect the salmon and the Columbia River's natural resources while continuing to wisely use the Columbia River's water for the benefit of the region.

Fish and Wildlife Habitat

The Columbia Basin boasts a plethora of wildlife and resident and migrating fish. The region has spent hundreds of millions of dollars restoring and protecting habitat. The investments include programs to reestablish wetlands, control streambank erosion, purchase sensitive wildlife tracts, and acquire harvest rights for old growth timber to protect habitat.

Electric Power Generation

The Columbia River Basin is the most hydroelectrically developed river system in the world. More than 400 dams, 11 run-of-the-river dams on the mainstem and hundreds of major and modest structures on tributaries generate more than 21 million kilowatts of hydroelectric energy for the region.

Rock Island Dam, in the middle reach of the river, was the first major hydropower producer on the Columbia. Completed in 1932, Rock Island Dam is small compared to the behemoths—Bonneville and Grand Coulee—that the federal government completed in 1938

and 1941, respectively. The last dams were built on the Columbia in the 1960s and 1970s. In 1973, Canada completed the last of the mainstem dams, Mica Dam on the upper river. The dams create large reservoirs that provide flood control and water for large irrigation systems on the Columbia Plateau.

Navigation

The Columbia and Snake Rivers can be navigated as far upstream as Richland, Washington and Lewiston, Idaho. Four federal dams on the mainstem of the Columbia—Bonneville, The Dalles, John Day, and McNary—have navigation locks that allow passage of boats and barges.

Irrigation

Today, much of the basin's agricultural production depends heavily on irrigation, and water diverted for agriculture is the largest offstream water use in the Columbia system. Nearly all the potatoes, sugar beets, hops, fruit, vegetables, and mint produced in the region are from irrigated land, as is a large portion of hay and grain production (National Research Council, 2004).

The Columbia Basin Project (CBP) is the region's largest irrigation project. Authorized by Congress in 1935, the federal project was developed in parallel with the construction of Grand Coulee Dam. Initial designs of the CBP called for the delivery of irrigation water to 1.1 million acres of land. Today, about 621,000 acres are irrigated (National Research Council, 2004).

Recreation

The rivers and lakes in the Columbia Basin attract boaters, sport anglers, swimmers, hunters, hikers, and campers throughout the year. Thousands of sightseers visit the river and the irrigation projects. The strong winds in the Columbia River Gorge have made the area a world-class destination for windsurfers.

Water Supply and Quality

The Columbia River and its tributaries supply water to numerous municipalities and industries. While this use does not consume a significant portion of the river's water, such withdrawals are a factor that is considered by the river system operators in managing the river. Of particular importance to these users is maintaining the high quality of the Columbia River water so that it continues to provide an attractive source of supply for municipal and industrial purposes.

Cultural Resources

The history of human beings in the Columbia River Basin spans thousands of years. Indian cultures may have existed in the basin perhaps 10,000 years ago, and European and American influences began in the late 1600s and early 1700s. The Columbia River plays a pivotal role in the cultures of many Pacific Northwest tribes, including the Yakama Nation, the Confederated Tribes of the Colville Reservation, the Spokane Tribe of Indians, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of Warm Springs, and the Kalispel Tribe of Indians.

1.1.3 John Day/McNary Reserve

The reservation of water for irrigation, subject to specific conditions, is in the interest of the State of Washington. On August 8, 1978, the John Day/McNary Reserve (WAC 173-531) was created to set aside 1,320,000 acre-feet per year to provide a water supply for the 330,000 acres of irrigation projected to be developed in the Columbia Basin by the year 2020. Originally, the reserve was intended to forestall the diversion of the Columbia River to address water needs in California. It was also designed as a means to deliver water to lands under existing water right permits, pending applications, and land for which appropriation applications may not yet have been filed. In the last 22 years, about 85 permits have been issued from the John Day/McNary Reserve for 76,000 acre-feet a year—roughly 6 percent of the total set aside (Lee, 2006). Scientific and public policy conflicts regarding the effects of additional water use on the health of the Columbia River's ecosystems have sharply limited the number of new permits issued from the reserve.

1.1.4 Increasing Attention to Instream Flow

In June 1980, Washington adopted an administrative rule for protecting instream flows on the mainstem Columbia River (WAC 173-563). The rule required that water rights on the Columbia River mainstem issued after 1980 be subject to the state instream flow rule. These water rights (interruptible rights) could be curtailed in low flow conditions in order to maintain adequate flows for fish. Interruptible rights can be curtailed when the March 1 forecast for April through September runoff at The Dalles

Dam on the lower Columbia River is less than 60 million acre-feet.

In the 1990s, the federal listing of Columbia River salmon species as threatened or endangered under the ESA intensified the debate over whether additional withdrawals of water could be allowed from the river without adversely affecting salmon runs.

After the 1991 listing of Snake River sockeye salmon, the state established a moratorium on issuing new water rights from the Columbia and Snake Rivers in response to a petition filed by environmental groups. Legislative direction lifted the moratorium in 1997 and the administrative rules for protecting instream flows on the Columbia River were revised in 1998. The revised rule, known as the consultation rule, stipulated that all water right applications would be evaluated on a case-by-case basis for possible impacts to fish through consultation with appropriate local, state, and federal agencies and tribal governments.

The consultation rule increased the time needed to process water right applications along the Columbia River, but did nothing to resolve the underlying scientific disputes regarding flow.

Over time the backlog of applications increased to hundreds, many of which have been pending for over a decade. Some communities along the river lacked adequate or reliable water rights to meet the needs of a growing population and economic development. Ecology did not issue any new water rights from the Columbia River between 1991 and 2003.

1.1.4.1 Litigation

In 2000, the Columbia-Snake River Irrigators Association (CSRIA) and the City of Pasco filed a lawsuit to obtain a court order requiring Ecology to process water rights that were pending prior to the 1991 moratorium. Ecology, the City of Pasco, and the irrigators reached an agreement on the case and Ecology issued six new Columbia River water rights. The settlement provided applicants with two options in how their water right applications can be processed by Ecology (American Bar Association, 2003). The first option is for an applicant to pay \$10 per acre-foot per year for the water used to receive a water right permit not subject to flow conditions (uninterruptible water right). The money would be used to replace water in a drought situation or to purchase perpetual mitigation for adverse impacts to salmon. Under the second option, the applicant could receive a water right subject to flow conditions (interruptible water right).

1.1.5 *Columbia River Initiative*

Former Governor Gary Locke created the Columbia River Initiative (CRI) to address the water management issues in the Columbia River. The CRI included a framework for issuing new water rights from the Columbia River while improving streamflows for fish. The CRI was composed of four elements—a legislative proposal for consideration in the 2005 legislative session, a proposed budget to secure water and conduct feasibility studies of new off-channel storage projects, draft rule language for implementation of the CRI, and cooperative agreements with federal and local partners.

1.1.5.1 Draft Rulemaking

The proposed CRI rule included:

- Procedures for drought permits for existing water rights currently subject to interruption during low streamflows;
- Setting the cost to be paid annually by new water right holders to obtain water from the state; and
- Defining responsibilities for acquiring, accounting for, and approving the allocation of water from the Columbia River mainstem.

As part of the CRI, Ecology undertook several actions to develop a water management plan. These included developing cooperative agreements with the Bureau of Reclamation and the Colville Tribe and technical and economic studies of the proposed rule.

1.1.5.2 EIS

In December 2004, Ecology and the Washington Department of Fish and Wildlife (WDFW) prepared a programmatic Draft EIS on a water management plan for the Columbia River developed under the CRI (Ecology and WDFW, 2004). The Draft EIS evaluated potential impacts of the proposed rule. Governor Gregoire halted the CRI process because of legislative opposition to the proposal and created the Columbia River Partnership. No Final EIS was issued on the proposed CRI rule.

1.2 *Columbia River Water Management Program*

Ecology is currently in the process of developing a Columbia River Water Management Program (Management Program)

to facilitate implementation of the legislation, including administration of the Columbia River Basin Water Supply Development Account. Part of the program development process is a State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS). The following sections were taken directly from the Draft EIS (DEIS) (Ecology, 2006b) with slight modifications. Sections taken from the DEIS are cited at the end of each paragraph to distinguish them from original text.

1.2.1 Engrossed Second Substitute House Bill (ESSHB) 2860

The 2006 Legislature passed Engrossed Second Substitute House Bill 2860 (ESSHB 2860), an act related to water management in the Columbia River Basin. The Legislature recognized that a key priority of water resource management in the Columbia River Basin is the development of new water supplies that include storage and conservation in order to meet the economic and community development needs of people and the instream flow needs of fish (Ecology, 2006b).

ESSHB 2860 establishes the need for a Columbia River Basin water supply development program, directs Ecology to aggressively pursue development of water supplies to benefit both instream and out-of-stream uses and creates a Columbia River Basin Water Supply Development Account (Ecology, 2006b).

Funding for the Columbia River Basin Water Supply Development Account can come from legislative appropriations, funds earned through implementation of the Management Program components, and other sources. Funds in the account can be used to assess, plan and develop

new storage facilities, conservation projects, or other actions to provide new water supplies in the Columbia Basin (Ecology, 2006b).

Water gained from the funded projects is to be used for both instream and out-of-stream uses. Two-thirds of the funds provided by the Legislature in the account must be used to support the development of new storage facilities with the remaining one-third used for the other purposes of the legislation (Ecology, 2006b).

Ecology's initial implementation of the program has resulted in funding of a number of projects specifically identified by the legislature, including:

- Ecology has allocated \$400,000 to the Confederated Tribes of the Umatilla Indian Reservation to engage in a four-year study to determine the feasibility of restoring streamflows to the Walla Walla River while maintaining a healthy agricultural economy. The study, co-sponsored by the U.S. Army Corps of Engineers (Corps), will consider two storage options, purchasing water rights, increasing irrigation efficiencies, and shallow aquifer recharge.
- Ecology has allocated approximately \$1.3 million dollars to the Bureau of Reclamation to evaluate the feasibility of improving water supplies in the Yakima River through storage and/or pump exchanges.
- Ecology has allocated approximately \$2.5 million dollars in state cost share to the Bureau of Reclamation and the Washington State Department of Fish and Wildlife to evaluate the feasibility of an alternate feed route to Potholes Reservoir.

- Ecology has allocated approximately \$4 million dollars in state cost share with the Bureau of Reclamation for evaluating alternatives for supply surface water to the Odessa Subarea.
- Ecology has allocated approximately \$3.9 million dollars in state cost share with the Bureau of Reclamation for evaluating off-site storage opportunities for the mainstem Columbia River.
- Ecology has allocated approximately \$1.3 million dollars to the Colville Tribes and Washington State Department of Fish and Wildlife to evaluate the feasibility of modifying existing storage through additional drawdown of Lake Roosevelt.

1.2.2 **Columbia River Water Management Program Components**

The major components of the Management Program are storage facilities, conservation projects, VRAs to provide new water for out-of-stream use, a Columbia River water supply inventory and water supply and demand forecast and a Columbia River water resources information system (Ecology, 2006b).

1.2.2.1 **Storage**

As directed by the legislation, the Management Program will focus its efforts to develop water supplies for the Columbia River Basin in the following areas:

- Alternatives to ground water for agricultural users in the Odessa Subarea aquifer;
- Sources of water supply for pending water right applications;
- A new, uninterruptible supply of water for the holders of interruptible water rights on the Columbia River mainstem that are subject

to instream flows or other mitigation conditions to protect streamflows; and

- New municipal, domestic, industrial and irrigation water needs within the Columbia River Basin (Ecology, 2006b).

A variety of types of storage projects may be funded or approved under the legislation. The Management Program EIS groups the potential storage projects into four categories:

- New large storage facilities (> 1 million acre-feet)
- New small storage facilities (< 1 million acre-feet)
- Modification of existing storage facilities
- Aquifer storage and recovery (ASR) (Ecology, 2006b).

Ecology and the Bureau of Reclamation are cooperating on a study evaluating the feasibility of storage sites in the Columbia River Basin.

1.2.2.2 **Conservation**

Funds from the Columbia River Basin Water Supply Development Account may be used to implement water conservation projects. Net water savings through conservation measures funded by the Management Program will be placed in Ecology's Trust Water Rights Program (Trust Program) in proportion to the state funding provided to the project. In turn, Ecology would allocate water from the Trust Program for irrigation or other beneficial uses (Ecology, 2006b).

Net water savings achieved through conservation projects within the boundaries of the Columbia Basin Project (CBP) and used to offset ground water use in the Odessa Subarea

are exempt from the trust requirement (Ecology, 2006b).

1.2.2.3 Voluntary Regional Agreements (VRAs)

The legislation provides for groups or organizations to enter into VRAs with Ecology to exchange a package of conservation projects for new water rights or water right transfers. VRAs could be proposed anywhere within the Washington portion of the Columbia Basin upstream of Bonneville Dam. VRAs must meet minimum requirements to be approved (Ecology, 2006b).

1.2.3 Early Activities and Alternatives under SEPA Review

The legislation also includes these early actions:

- Lake Roosevelt Drawdown
- Alternative Feed Routes
- Columbia/Snake River Irrigators Associate (CSRIA) Voluntary Regional Agreement

This report does not evaluate these projects specifically; however a brief description is provided below.

1.2.3.1 Lake Roosevelt Drawdown

As part of the Memorandum of Understanding between the State of Washington, the Bureau of Reclamation, and the major Columbia River Irrigation Districts, the Bureau of Reclamation will file two water right applications with Ecology to divert a total of 132,500 acre-feet from Lake Roosevelt. The water is proposed to be diverted from the Bureau of Reclamation's existing 6.4 million acre-foot storage right for water behind Grand Coulee Dam. The Bureau of

Reclamation's applications are predicated on agreement being reached with the Confederated Tribes of the Colville Reservation regarding the diversion (Ecology, 2006b).

The first water right application would be to divert 82,500 acre-feet from Lake Roosevelt during non-drought years. The non-drought diversion would result in an approximately one-foot additional drawdown of the reservoir. The second water right application would be to divert 50,000 acre-feet, in addition to the aforementioned 82,500 acre-feet, from Lake Roosevelt during drought years. The drought year diversion would add approximately 0.5 feet to the one-foot drawdown during non-drought years (Ecology, 2006b).

1.2.3.2 Alternative Feed Routes

The Bureau of Reclamation, in cooperation with the State of Washington, is studying three possible alternative feed routes to convey water from Banks Lake to Potholes Reservoir to supply the South Columbia Basin Irrigation District (Reclamation, 2006c; Ecology, 2006b). This project would create a secondary feed route to the Potholes Reservoir from Pinto Dam to help ensure reliability of water supply to the reservoir.

The Crab Creek Route Alternative would discharge flows through Pinto Dam, Brook Lake, and use the natural channel of Crab Creek to deliver water to Moses Lake and Potholes Reservoir. The proposed W-20 Route Alternative would increase diversions from Pinto Dam to the Main Canal, route those flows to the West Canal and into the W-20 Canal and

from the W-20 Canal to Moses Lake through a new conveyance system that would be constructed. The Frenchman Hills Alternative would route water from Pinto Dam through the Main Canal and West Canal to the Frenchman Hills Wasteway and would require no new construction (Ecology, 2006b).

1.2.3.3 CSRIA Voluntary Regional Agreement

The CSRIA represents farming operations in Eastern Washington that irrigate about 250,000 acres of row crop, vineyard, and orchard lands. Their members have farming operations along the Columbia-Snake River system north from the City of Brewster, reaching to the south along the John Day and McNary Pools of the Columbia River. Some of the members own farming operations in the Yakima Valley and within the CBP area. The membership also includes several municipal service irrigators, including Brewster, Kennewick, West Richland, and the Kennewick Irrigation and Hospital Districts (Ecology, 2006b).

The CSRIA proposes to undertake conservation and other measures to create new conserved water that can be used for new uninterrupted water rights on the Columbia River and lower Snake River (at or below Ice Harbor Pool). The conserved water would be transferred to Ecology's Trust Program. The VRA does not specify where the projects would be located. The VRA includes provisions for payments to reimburse Ecology for conservation projects funded in advance by the state. The conservation projects could be undertaken by municipal as well as agricultural users (Ecology, 2006b).

1.2.4 Twelve-Month Implementation Work Plan for the Management Program

After passage of ESSHB 2860, a team of Ecology staff established a 12-Month Work Plan for implementation of the Management Program. The 12-Month Work Plan is designed to identify near and longer term tasks and objectives to guide implementation and to lay the foundation for a successful long-term program. The plan focuses on specific, near-term, critical path activities with a 12-month period that meet the reporting requirements of the legislation. The plan includes hiring of Ecology staff, preparing the programmatic EIS, establishing a Columbia River Policy Advisory Group, coordinating with the Bureau of Reclamation on the early activities, developing the water supply and demand forecasting water use data components, developing a Columbia River Water Supply inventory, developing the VRA framework, developing a tribal consultation framework, developing a financial and economic analysis capacity, and negotiating Hanford Reach studies (Ecology, 2006b).

1.2.5 Goals for this First Legislative Report

This first legislative report comes just four months after the effective date of the legislation. The Columbia River Water Management Program is ambitious, and Ecology intends its legislative reporting to be comprehensive in nature to make sure its efforts to develop and administer the program are consistent with legislative intent. This report:

- Lays the foundation for understanding how the Columbia River is managed and what factors affect the supply of water in the basin;
- Documents existing demand for water in the Columbia and forecasts how demand will increase in the future; and
- Develops an initial inventory of conservation and storage projects that can be used to meet future demand.

1.2.6 Goals for Future Legislative Reports

As Ecology develops the program, subsequent legislative reports will include greater detail and greater accuracy. The program itself has a “water budget” focus, with conservation and storage providing the supply of water to meet new demands. The legislative reports will showcase how successful Ecology is in meeting the balanced goals of the bill, including both out-of-stream and instream demands. Finally, the long-range forecasting will enable Ecology and other state and federal agencies to consider in advance the policy, funding, and management requirements necessary for sustaining the Columbia River Basin.

1.3 Report Objectives and Organization

This report is intended to serve as a general overview of the supply and demands within the Columbia River Basin in the State of Washington from the Canadian border to Bonneville Dam. It presents a first look at what water is being used now and what water is needed in the future to satisfy the demand for Columbia River water. This report is an effort to compile and compare existing data, identify gaps and identify areas that

need further research or greater coordination between stakeholders.

This report is organized into four chapters. A description of what is in each chapter is provided below.

Chapter 2 describes stakeholder outreach efforts in the production of this report. The Columbia River Water Management Program must be transparent if it is to be successful. The annual legislative report is a logical place to document the status of the program, successes of the previous year, and goals for the future. This Chapter describes Ecology’s early efforts to build partnerships on program implementation and provide opportunities for stakeholders and the public to be involved in the development of the report.

Chapter 3 contains a baseline discussion of the Columbia River system, organized into three basic components: 1) A physical description of the Columbia River system; 2) A basic description of various institutional factors that affect the quantity of water in the Columbia River; and 3) A description of existing monitoring and forecasting that occurs to monitor and predict the amount of water in the Columbia River. The amount of existing information on these components is substantial. While not exhaustive in scope, this Chapter includes a compilation of selected data that relate to these components. The data are presented primarily as tables, but several maps and graphics of key information are provided.

Chapter 4 contains the inventory of new and existing information related to water

conservation, water storage, water rights, and water use, as described in Section 5 and Section 6 in the Legislation. A summary of potential agricultural water conservation projects is provided, based on data compiled from conservation and irrigation districts. A summary of water storage projects is provided, based on data compiled from WRIA watershed plans and recent Bureau of Reclamation appraisal studies. A summary of existing water rights within the Management Zone is provided, based on queries of Washington's Water Rights Tracking System (WRTS) water right database and Oregon Water Resources Department's (OWRD) water right database. Finally, a summary of current estimated water use is provided, based on data compiled from U.S. Geological Survey (USGS) surveys, Water Resource Inventory Area (WRIA) watershed plans, Office of Financial Management (OFM) population estimates, Washington Department of Health's (DOH) water system database, and water system plans for major municipalities along the Columbia River. The data in this Chapter are also presented primarily as tables, but several maps and graphics of key information are provided.

Chapter 5 contains an initial forecast of future water demand and compares the forecast demand

with information described in Chapters 3 and 4. The forecast is described in two tiers. The first tier demand forecast is based on water right applications in the WRTS database as of August 2006. The applications are aggregated by County (in total and by purpose of use), and compared with potential conservation and storage projects. The second tier demand forecast is based on simplistic projections of current water use, as reported in Chapter 4. The projected water use is aggregated by County and compared with the first tier demand forecast. The forecast methodology used in Chapter 5 is very simplified and presented in aggregate. There are a number of assumptions and limitations embedded in the quantities of water and comparisons presented in this Chapter. However, this is, to our knowledge, the first time that these types of data have been assembled and compared at a scale that encompasses all of the various elements of the Columbia River system. Because constraints on the scope and timeline for this initial legislative report prevented a more robust forecasting method to be developed, Chapter 5 concludes with a discussion of how to improve the supply/demand inventory and forecasting methodology in future updates to the Legislature.

TABLE

Table 1-1. Federally Listed Fish Species under the ESA in the Columbia River Basin

Region (ESU / DPS)	Species	Listing Status
Upper Columbia River	spring Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	Endangered
	steelhead trout (<i>O. mykiss</i>)	Threatened
Mid-Columbia River	steelhead trout (<i>O. mykiss</i>)	Threatened
Snake River	sockeye salmon (<i>O. nerka</i>)	Endangered
	fall Chinook salmon (<i>O. tshawytscha</i>)	Threatened
	Spring/summer Chinook salmon (<i>O. tshawytscha</i>)	Threatened
	steelhead trout (<i>O. mykiss</i>)	Threatened
Lower Columbia River	Chinook salmon (<i>O. tshawytscha</i>)	Threatened
	Coho salmon (<i>O. kisutch</i>)	Threatened
	steelhead trout (<i>O. mykiss</i>)	Threatened
Columbia River Basin	chum salmon (<i>O. keta</i>)	Threatened
	bull trout (<i>Salvelinus confluentus</i>)	Threatened
	eulachon (<i>Thaleichthys pacificus</i>)	Candidate
	Pacific lamprey (<i>Lampetra tridentatus</i>)	Species of Concern
	river lamprey (<i>L. ayresi</i>)	Species of Concern
	western brook lamprey (<i>L. richardsoni</i>)	Species of Concern
	coastal cutthroat trout (<i>O. clarki clarki</i>)	Species of Concern
	westslope cutthroat trout (<i>O. clarki lewisi</i>)	Species of Concern
	Redband trout, an interior race of rainbow trout (<i>O. mykiss</i>)	Species of Concern
	pygmy whitefish (<i>Prosopium coulteri</i>)	Species of Concern
	marginated sculpin (<i>Cottus marginatus</i>)	Species of Concern
	Great Columbia River spire snail (Columbia Pebblesnail; <i>Fluminicola Columbiana</i>)	Species of Concern
California floater (<i>Anodonta californiensis</i>)	Species of Concern	

NOTES

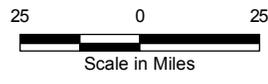
Abbreviations: DPS: distinct population segment; ESU: evolutionarily significant unit

Source: Washington State Department of Ecology (Ecology). 2006. Draft Programmatic EIS for the Columbia River Water Management Program. Ecology Publication # 06-11-030. October 5, 2006.

FIGURE



- LEGEND**
- Highway
 - River
 - County Boundary
 - WRIA Boundary



Map Projection:
 UTM Zone 11, NAD 83
 Source: WSDOE, USGS



This figure was originally produced in color. Reproduction in black and white may result in a loss of information.

FIGURE **1-1**
COLUMBIA RIVER BASIN
 WSDOE/COLUMBIA BASIN WATER SPPLY/WA