The Pacific Northwest Region

The Pacific Northwest is described in Indian legends; reports from Russian, Spanish, and English explorers; descriptions from Lewis and Clark; and by more recent visitors as bountiful, beautiful, and varied. All paint glowing word pictures of mountains, sea, forests, rivers, canyons, glaciers, harbors, and deserts. The Rocky Mountain, Cascade, and Coast Ranges connect valleys and plains fed by rivers providing the water that is a major resource of the Pacific Northwest. The Columbia River and coastal streams supply power, transportation, and water supplies for communities, commerce and industry, irrigation, recreation, fish, and wildlife. The climate of the Pacific Northwest is as varied as its topography. Predominant weather systems in the northern reaches of the Pacific Ocean and storms are borne inland by prevailing westerly winds. Good supplies of rain and snow fall in the western part of the region. Storm clouds are usually depleted when they reach the high, dry, interior reaches. On the eastern slopes of the mountains, the weather changes and dry winds draw moisture from semi-arid lands on the high plateaus and deserts. This varied climate has created a broad mix of vegetation ranging from rain forests, vast timbered tracts, and verdant valleys to dusty, dry sagebrush and juniper-covered plateaus and plains. Water has always been important in development of the Pacific Northwest and is one of the keys to the region's future. The Columbia River system is the Northwest's river highway. Its flows stem from highlands in Canada to Washington, Oregon, Idaho, Montana, Wyoming, and Nevada. Surface water totals 200 million acre-feet annually. Canada provides 54 million acre-feet from streams flowing south into the Columbia. More than 600 miles of shoreline, including estuaries, beaches, tidelands, and rockbound shores, run along the Washington and Oregon coasts. A land-locked closed basin lies completely in Oregon, enclosed in the southern part of the high central Oregon plateau. More than 170 million acres of land are classified into use types. Cropland totals 20 million acres. There are 85 million acres of forest land and 58 million acres of rangeland. The last category, about eight million acres, includes five million acres of barren land and mountain rock outcroppings and three million acres of concentrated population. Communities are situated in low-lying good soil areas adjacent to streams. Some of the region's most fertile soil has been developed for residential or industrial settlement. Major population centers are Seattle-Tacoma, Portland-Vancouver, Spokane, Eugene, Salem, and Boise. The 1990 census counted more than 10.4 million people in the Pacific Northwest. National projections estimate the population will reach 16 million by 2030, with heaviest concentrations of people in the two largest metro areas, a megalopolis stretching from Everett, Washington, to Eugene, Oregon. Economic leaders in the region are agriculture, timber, and tourism. Largest employers are service industries, manufacturing, and retailing. Employment is predicted to increase from 5.7 million employed in 1990 to 6.9 million in the year 2000, an increase of 20.7

percent. Nationwide employment during the same period is expected to increase by about 13.4 percent. Predicted growth in all segments of Northwest society is expected to bring heavy demands for municipal and industrial water supplies, electric energy, irrigation flows, recreation, and other essential uses. Demands will add to pressure and stress on all natural resources in the Pacific Northwest.

Northwestern Division

The U.S. Army Corps of Engineers has eight division offices throughout the United States. These divisions manage Corps civil works activities accomplished by districts whose boundaries are based on river basins rather than state lines. On April 1, 1997, the North Pacific Division and the Missouri River Division were realigned and combined to form the Northwestern Division with corporate headquarters in Portland, Oregon, and an additional office located in Omaha, Nebraska. The Northwestern Division Engineer directs all Corps of Engineers water resource activities in a 14-state area that contains about 25 percent of the nation's continental land mass. The Division Chief and his senior staff provide direction and guidance for five subordinate district offices located in Kansas City, Missouri; Omaha, Nebraska; Portland, Oregon; Seattle, Washington; and Walla Walla, Washington. They coordinate technical policy and budgetary issues that cross district boundaries and interact with other Federal and state agencies, congressional leaders, interest groups, and international commissions. The division office oversees management, coordination, and analysis of various division-wide programs, ensuring that processes, procedures, and activities performed by the districts result in top-quality products and services to Corps customers.

Technical Support Services

Water Management Division - Columbia Basin The Water Management Division is responsible for managing the system of Corps reservoirs in the greater Columbia River Basin and the coastal streams in Oregon and Washington. This is accomplished through developing, coordinating, and implementing reservoir operation plans to balance the competing demands for water. Because of the interconnection with many non-Corps projects, this effort also encompasses both federal and non-federal reservoirs in the basin owned and operated by different interests. Altogether, some 75 projects are involved. During flood control operations, the Corps is empowered, through various congressional authorities, to operate non-Corps reservoirs in a cooperative effort with other private and public agencies. The Columbia Basin Reservoir Control Center (RCC) in the Water Management Division in Portland, Oregon, manages the day-to-day regulation of the projects for flood control, navigation, power generation, recreation, fish and wildlife, and other purposes. Utilizing weather, streamflow, and project data, along with forecasts of future streamflow and present system requirements, RCC develops regulation strategies for the system and issues

operating instructions to the dams. Close coordination with agencies and individuals affected by any operation is important to ensure the best interests of the public are being served. RCC also coordinates with Bonneville Power Administration to request releases from the Canadian reservoirs under the terms of the Columbia River Treaty, discussed later in this section. The RCC is one of three main branches within the Water Management Division. The other two branches -- the Hydrologic Engineering Branch (HEB) and the Power Branch (PWR) - - specialize in hydropower planning, hydropower economics, flood control, water quality, and river forecasting. They prepare studies that establish reservoir operating plans and criteria for hydropower and flood control, and make analyses to address hydropower impacts of operational scenarios developed to increase fishery survival. As with the day-to-day operations, extensive coordination is also required for long-term hydropower planning. This coordination affects the northwest electrical utility industry, environmental agencies, and other water resource agencies, often through established regional coordinating entities such as the Northwest Power Pool, the Pacific Northwest Coordination Agreement, the Columbia River Treaty, and the Columbia River Water Management Group. Another important Water Management function performed by the RCC is chairing the Technical Management Team (TMT), an adaptive management inter-agency group charged with implementingwith implementing Federal Columbia River Power System operations to assist salmon migration. The TMT is composed of federal fish managers from the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the the states of Oregon, Washington, Idaho, Alaska, and Montana; and representatives of the Bureau of Reclamation, Bonneville Power Administration, and the Corps as well as the 13 sovereign Indian tribes. It meets at least weekly during the migration season and provides a forum for the federal action agencies to receive and discuss recommendations from federal, state, and tribal fishery interests. Still another critical mission occurs during periods of high runoff, when the Water Management Division, working cooperatively with other federal, private, and Canadian agencies, ensures that flood control criteria are met. The Corps also works with Bonneville Power Administration to manage the system to optimize production of hydroelectric power for the region and, when possible, for export to other regions. During low runoff, Water Management Division's work is no less critical, since a careful balancing of all water uses is needed to minimize adverse impacts associated with drought conditions.

Regional Issues

Columbia River Treaty with Canada The Columbia River Basin spans the boundary between the United States and Canada. To address jurisdictional and operating problems and promote regional growth, the United States and Canada signed the Columbia River Treaty in 1961, which was ratified three years later. The Treaty provided for the construction of three dams in Canada - Mica, Hugh Keenleyside, and Duncan - and one in the United States - Libby Dam on the

Kootenai River in Montana. The treaty provides that 15.5 million acre-feet of storage space to be made available for power production, of which 8.45 million acre-feet is reserved for flood control storage in Canadian reservoirs. The Treaty ensures Canada will operate storage features to provide downstream flood control and optimum power generation in the Basin. Libby's reservoir, Lake Koocanusa, extends 42 miles into British Columbia. Canada assumed all costs of construction and operation of that part of the reservoir in Canada. All four of the projects under the Treaty are constructed and have been in operation since 1972. In return for constructing and operating the three Canadian projects, Canada was paid a one-time lump sum payment of $64.4 million for 50 percent of the flood damages prevented in the United States during the 60-year life of the treaty. Canada also receives half of the additional power produced downstream as a result of the added Canadian storage. The United States does not receive any payments for downstream benefits that Canada receives from the operation of Libby Dam in Montana. The Treaty Flood Control Operating Plan document can be found here. Canada sold its share of this additional power to the United States for $254 million for a 30-year period. The Columbia Storage Power Exchange (CSPE), a non-profit U.S. corporation, was established for the purchase. Power is divided among 41 public and private utilities. Participants' shares range from 0.5 to 17.5 percent. These power allocation agreements phase out in stages from 1998 through 2003. After 2003, the United States is obligated to deliver half of the additional power attributed to Canadian storage operations back to Canada. The Columbia River Treaty signed with Canada addresses Canadian operational needs for flood control and power. In 1995, a dispute occurred when Libby Dam was first operated for listed species. The U.S. and Canadian entities disagreed on how to determine downstream power benefits for the years after August 2000. In February 2000, a Libby Coordination Agreement (LCA) was signed which resolved the long-standing dispute and allowed both entities to coordinate for the next 26 years (until power agreements under this Treaty expire) real-time operation of Libby Dam. It permits a method to calculate and compensate Canada for power losses incurred as a result of the U.S. operating Libby Dam for ESA purposes. The Bonneville Power Administrator and the Northwestern Division Engineer are designated by Presidential Executive Order as the U.S. Entity. The British Columbia Hydro and Power Authority acts as the Canadian Entity, both have established operating and hydro- meteorological committees to develop and implement operating plans for Canadian storage and to collect real-time hydromet data needed to operate the system. Northwest Power Planning Council In December 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act that established the Northwest Power Planning Council. The Council is composed of two members each from Idaho, Montana, Oregon, and Washington appointed by their respective governors. The Council is charged with preparing and adopting a regional conservation and electric power plan and

a fish and wildlife plan which puts fish and wildlife considerations on an equitable basis with power planning and other purposes for which hydroelectric facilities were developed. In December 1994, the Council passed amendments to its Fish and Wildlife Plan, which called upon the region to implement certain actions for Columbia and Snake River salmon. The amendments, called the Strategy for Salmon, laid out a number of actions for the Corps, including operational changes to the hydro system and physical changes to the dams. Many of these actions also appeared in a Biological Opinion issued in March 1995 by the National Marine Fisheries Service under the Endangered Species Act concerning listed Snake River salmon species. The Corps, while considering Council plans to the greatest extent possible, has a legal mandate to fulfill Endangered Species Act requirements, with a high priority on implementing measures contained in the Biological Opinion. The Council is currently in the midst of a public process to amend its Fish and Wildlife Plan.

Anadromous Fish

The Columbia River Basin provides habitat for anadromous salmon and steelhead. Anadromous fish hatch in freshwater rivers and tributaries, migrate to and mature in the ocean, and return to their place of origin as adults to spawn. Salmon generally live two to three years in the ocean before returning to spawning areas. Despite regional efforts to stop salmon and steelhead decline in the Columbia/Snake River Basin, 12 populations of salmon and steelhead have been listed as threatened or endangered under the Endangered Species Act (ESA). In December 1991, the National Marine Fisheries Service (NMFS) listed Snake River sockeye salmon as endangered; followed in May 1992 with Snake River spring/summer chinook and fall chinook salmon listed as threatened In August 1997, NMFS listed the Upper Columbia steelhead as endangered and Snake River steelhead as threatened under ESA. Less than a year later, in March 1998, Lower Columbia steelhead were listed as threatened and in March 1999, six other species were added to the list: Lower Columbia chinook, Upper Willamette River chinook, Upper Columbia chinook, Columbia River chum, Upper Willamette steelhead and Middle Columbia steelhead. A number of adverse factors have contributed to the current depressed state of salmon stocks in the Columbia and Snake River Basin: development, logging, mining, cattle grazing, and pollution in spawning and rearing habitat; increased competition for food and spread of disease from hatchery stocks and dilution of the gene pool; poor ocean conditions; dams that block spawning habitat and others that interfere with the migration of salmon from their upriver rearing areas to the ocean and as they return as adults to spawn; and over-fishing - historically in the 1800s and since then by incidental ocean take and sport and commercial fishery in the basin; and poor ocean conditions. The human activities which have caused the decline of these fish generally fall into one of four categories of impacts: hydro, habitat, hatcheries, and harvest (fishing). Most salmon and steelhead in the Columbia basin are affected to some extent by the hydropower

system. On the Columbia and Snake rivers, the fish must pass eight hydroelectric dams operated by the Corps. Besides interfering with fish migration, the dams create reservoirs that alter water velocities and temperature regimes, which improve conditions for predators. Adult fish ladders were built into each of the eight lower Snake and Columbia river dams which allow adult fish to follow a series of graduated steps and pools to scale the up to 100-foot rise in elevation from the tailrace to the forebay of the dams. The ladders have proven effective. In the years since the dams have been in operation, many additions and improvements have been made to juvenile fish passage routes at the dams. There are a number of ways for juvenile fish to pass the dams: over the spillways, through the juvenile bypass systems, in specially designed barges, and through the turbines. Activities for Salmon Under the ESA, the Corps, along with the Bureau of Reclamation and Bonneville Power Administration, prepares a biological assessment of the effects on listed species of planned operation of the federal Columbia River power system. Following consultations with NMFS and the U.S. Fish and Wildlife Service (FWS) , NMFS and FWS issue biological opinions. In its Biological Opinion for 1995 and future years, NMFS and FWS found that the planned operation of the federal Columbia River power system would jeopardize the continued existence of the three listed Snake River salmon species and for FWS, the listed Kootenai River white sturgeon. Accordingly, the biological opinions provided reasonable and prudent alternative measures to avoid jeopardy. The Corps and other action agencies have since operated the system in accordance with the NMFS and FWS BiOps. The Biological Opinion called for a variety of actions and studies for improving conditions for salmon migration throughout the Columbia and Snake River system. The Corps has implemented operational measures such as flow augmentation, spills, juvenile fish transport, and lowered reservoir levels, as contained in the biological opinion. The NMFS 1995 biological opinion also called for evaluation and implementation of further improvements to the existing fish bypass systems, as well as study of alternative structural configurations at the dams such as reservoir draw-downs and surface bypass systems. The Corps' Walla Walla District undertook an extensive multi-year Lower Snake River Feasibility Study to examine the biological, social, economic and engineering impacts of various alternatives proposed. They will identify a preferred alternative for moving juvenile fish past the four Lower Snake dams in their final environmental impact statement expected in 2001.. A supplemental 1998 Biological Opinion by NMFS addressed the newly-added steelhead listings and encouraged maximization of voluntary spill and a 2000 supplemental NMFS Biological Opinion dealt mainly with providing for flows in the Lower Columbia River for chum. The NMFS and FWS final 2000 Biological Opinions for the Federal Columbia River Power System are due to be completed by the end of 2000 or early 2001. In accordance with the NMFS 1995 Biological Opinion, both near and long-term actions to improve fish passage have been implemented or are underway.

Near-term actions include (1) flow augmentation, or release of water from storage or headwater reservoirs to meet flow targets in the lower river for salmon and steelhead (2) reservoir operations of headwater projects to provide for spawning, minimize rapid fluctuation in both reservoirs and unimpounded river reaches, and for temperature control (3) spill measures to send fish over the spillway rather than through the turbines (4) fish transportation of juvenile salmon and steelhead for release below Bonneville Dam (5) and predator control programs to protect juvenile salmon from other species that prey on them. Long-term actions include (6) passage improvements such as fish guidance structures and turbine modifications and turbine studies to reduce turbulence, negative pressures and light/sound generation; (7) surface collectors, bypass improvements, and additional fish transport and monitoring facilities (8) studies to improve gas and temperature conditions in the system (9) a comprehensive Lower Snake River Feasibility Study to examine alternatives for long-term configuration and operation of the lower Snake River dams. (1) additional research efforts on evaluation of in-river migration versus transport of juvenile fish, study of juvenile fish survival and travel time through the reservoirs, and various aspects of fish behavior. Some of the more recent activities for fish include installation of extended submerged screens in the existing juvenile bypass systems at Lower Granite and Little Goose dams on the lower Snake River and at McNary Dam on the Lower Columbia to increase the percentage of juvenile fish guided away from the turbine intakes and up through the bypass channels. Testing continued at the John Day Dam of extended length (40 foot) bypass screens to potentially replace existing 20-foot screens associated with the existing juvenile bypass system. Passive integrated transponder (PIT) tag monitoring facilities were completed at John Day Dam and at Boneville Dam a juvenile outfall has been completed at the second powerhouse. Drawdown of the John Day pool to minimum operating level during the juvenile fish migration season and study of a spillway crest level drawdown at John Day were requested in the 1995 BiOp. Phase I of the John Day drawdown study was initiated in 1999; the final phase I report is expected to go to congress in late 2000. Since 1995, surface bypass systems, which intercept fish within the upper portion of the water column where they typically migrate, were installed and tested at Ice Harbor, Lower Granite and The Dalles dams. In 1999 sluiceway and spillway juvenile fish survival studies continued in conjunction with the development of future bypass system alternatives. Design work for relocating the sluiceway outfall and for providing emergency auxiliary water for adult fishways continues. The Technical Management Team with representatives from the U.S. Fish & Wildlife Service, NMFS, Bureau of Reclamation, Bonneville Power Administration, and the Corps), the Northwest Power Planning Council, and the states of Oregon, Washington, and Idaho closely monitor river and fish conditions and recommends adjustments to operations to assist both anadromous and resident fish. Click here to visit our website for more information on fish mitigation measures. Publication Available Because of

regional interest in actions to aid the migration of salmon and steelhead past the dams operated by the Corps, a publication, Salmon Passage Notes, is published several times a year. Individuals who wish to be on the mailing list should write to Editor, Salmon Passage Notes, Northwestern Division, U.S. Army Corps of Engineers, P.O. Box 2870, Portland, OR 97208-2870. Another excellent source of information can be found here - the interagency website.

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