Mid-Columbia River Basin

The Mid-Columbia River Basin includes all areas draining into the Columbia River downstream from the Yakima and Snake rivers to Bonneville Dam. The Cascade Range, on the west, has a general elevation of about 6,000 feet; and the Blue Mountains, on the east, rise to about 5,000 feet. Much of the rolling plateau land near the Columbia River is sharply cut by canyons with steep, rocky walls. The western two-thirds of the basin are in the Corps of Engineers' Portland District, and the remainder is in Walla Walla District. The Mid-Columbia Basin in Washington encompasses nearly 5,500 square miles, and extends into Oregon. Important Washington tributaries include the Wind, White Salmon, Klickitat and Walla Walla rivers. The Walla Walla River rises in the Blue Mountains, the eastern rampart of the basin. The other three streams originate in the Cascade Range near the basin's western edge. Where the Columbia River enters the Mid-Columbia Basin, its average flow is about 185,200 cubic feet per second. At Bonneville Dam, where it leaves the basin, the Columbia's average flow is about 198,000 cubic feet per second. The climate is semi-arid. Sagebrush and grasses are the dominant vegetation, except at the extreme western edge along the Cascades and in the Columbia River Gorge, where evergreen forests and a more humid climate prevail. The Blue Mountain area is forested, but receives somewhat less rainfall than the Cascade Range at similar elevations. The climate is characterized by cool-to-cold winters and warm, dry summers. Winter storms generally result in heavy precipitation near the crest of the Cascade Range and on the western slopes of other mountains. Normal annual precipitation ranges from 9 to 15 inches on the lowlands and in the rain shadow of the Cascades, and 60 to 80 inches on the higher mountain areas. As much as 250 to 350 inches of snow falls annually in the upper Cascades and from 100 to 150 inches in the Blue Mountains. In the mountains, snow normally remains on the ground from December through May. On rare occasions, warm winter storms combine snowmelt and heavy rainfall at all elevations. These storms and abnormally rapid spring snowmelt produce floods on the major tributaries. The Mid-Columbia Basin is sparsely populated, and most communities are small. The only sizable cities in the basin are Walla Walla and Pasco-Kennewick-Richland. Bonneville, The Dalles, John Day, and McNary dams on the Columbia River, generate power and provide water and lockage for river navigation. In addition, John Day provides about 500,000 acre-feet of storage space to help control Columbia River floods. Levees were constructed as part of the reservoir projects to protect from overflow. Revetments were built to prevent wave damage. McNary Dam is operated by the Walla Walla District, and the other three by the Portland District.

Bonneville Lock and Dam - Lake Bonneville

Multi-purpose Project (Portland District) Bonneville, the first Corps dam on the

Columbia River, is at the upper limit of tidal influence, about 145 miles upstream from the mouth of the river and 40 miles east of Portland-Vancouver. The project includes a spillway, two powerhouses, a new navigation lock, fish passage facilities, and visitor facilities. The project is in three principal sections, extending from two islands in the Columbia River. The spillway links Bradford Island with the Cascade Island, while the powerhouses extend from the islands to opposite shores. A navigation lock section is located along the Oregon shore. A new larger navigation lock was opened for commercial traffic on March 26, 1993. Construction at Bonneville began in 1933, with operation beginning in 1938. During World War II, the first powerhouse was enlarged and additional generators were installed. A second powerhouse, adding eight units, was completed in 1981. The dam impounds 47-mile-long Lake Bonneville, which provides navigation upstream to The Dalles at minimum depth of 15 feet in the main channel. The original lock at Bonneville Dam, completed in 1938, is 76 feet wide and 500 feet long. It was the first and the smallest of eight original locks constructed on the Columbia-Snake Inland Waterway. The new lock is 86 feet wide, 675 feet long, and 19 feet over the sill, corresponding with the seven upstream locks. The new lock is large enough to hold a standard five-barge tow. This decreases lockage time from nearly eight hours to about one hour. This system of Corps dams provides a water highway running 465 miles from the Pacific Ocean to Lewiston, Idaho. The total excavation required for the new lock was about 5.5 million cubic yards, enough rock and dirt to fill 687,500 standard size dump trucks. Lined up end to end, these trucks would stretch 3,255 miles or clear across the United States! The new lock design provides a single lift lock on the Oregon shore, south of the existing lock, and increases the annual commercial shipping capacity at Bonneville to 30 million tons, projected to be adequate through the year 2040. (Annual capacity of the original lock was 13 million tons.) The approach to the new lock is safer, too. A guidewall was constructed along the channel side of the upstream lock entrance and along the landward side of the downstream lock entrance to assist traffic entering and leaving the lock. Modifications to the upstream approach channel were constructed to improve channel approach conditions. A swing bridge is in place at the downstream end of the new lock. This bridge crosses the lock to allow access to the rest of the project. This swing bridge is only the third one of its kind to be built in the world (the first, located in Iraq, failed after the U.S. bombed it in January 1991). The second is in Seattle. Current plans are to keep the original Bonneville lock in a mothballed status. Half of the funding for the new lock was drawn from the Inland Waterways Trust Fund, in accordance with the Water Resources Development Act of 1986. The fund is replenished by a fuel tax on commercial vehicles. The cost of the new navigation lock was $348,100,000. Waterborne traffic through the lock in 1996 was 9,737,000 tons, principally consisting of barge cargoes and rafted logs. The 10 main generating units and one smaller auxiliary unit in the first powerhouse have a total capacity of 587,500 kilowatts. For the fiscal year ending September 1996, total power generation,

including the second powerhouse of 5.4 billion kilowatt-hours of power was marketed by the Bonneville Power Administration. Through September 1996 the project's costs were $1,139,000,000 for construction, $267,008,200 for operation and maintenance, and $28,845,000 for major rehabilitations. Since beginning operations in 1938, revenues of $643,600,000 from electric power sales have been deposited in the U.S. Treasury. Power generating construction and operating costs are repaid from those deposits. Second powerhouse construction began in 1974 on the Washington side of the Columbia River at the former townsite of North Bonneville. The town was relocated about one-and-one-half miles downstream. Cost of the second powerhouse is estimated at $678.7 million (1996). The new powerhouse adds 558,000 kilowatts of generating capacity, more than doubling the project's previous capacity. First power from the second powerhouse came on-line in May 1981. The second powerhouse is an important addition to the Columbia River hydropower system. The power plant reduces water and energy waste that often resulted when large volumes of water passed through larger upstream powerplants during periods of peak electrical demand. The first Bonneville powerhouse is too small to handle such large flows from The Dalles and John Day. Until completion of the second powerhouse, water was passed over the Bonneville spillway and was lost for power generation. With increased efficiency, the second powerhouse is an important part of the regional system using hydropower for peaking power during maximum electrical demand periods. The new town site and municipal facilities for North Bonneville were essentially completed October 1977. Corps and town officials exchanged deeds in March 1978, giving the town possession of municipal facilities in the relocated town, and giving the Corps of Engineers municipal facilities and right-of-access to utilities in the old town. Other work completed during early stages of the second powerhouse project included relocation of about four miles of Washington Highway 14, and three miles of Burlington Northern railroad. While construction was in progress, a significant archeological site was excavated. It is the only known relatively undisturbed site along the lower Columbia River with evidence of occupation from prehistoric into historic times. This site was first noted in the Lewis and Clark journals, and is on the National Register of Historic Places. Evidence at the site spans about 500 years, from the time of native American occupation to the time of historic settlement in the mid-1800s. When it was realized the site would be affected by construction, work was begun to retrieve cultural material necessary for site interpretation. Work was completed in the summer of 1979 at a cost of about $1.2 million. Project lands two miles downstream, covered by material excavated for the powerhouse construction, were restored for public day use. A recreation facility was built at Home Valley, 10 miles upstream, after cost-share agreements were arranged with a local sponsor. Modifications completed in 1978 allow use of Lake Bonneville for smoothing out water released from upstream powerplants during production of peaking power. Spillway gates and

fish passage facilities were modified to accommodate peaking operations. The modifications cost a total of $27,195,000. Adult fish passage facilities at the Bonneville project include three fish ladders (on Bradford Island, Cascade Island and on the Washington shore), fish-collecting systems along both powerhouses (channeled to the fish ladders) and fish locks. The Bradford Island and Washington shore ladders have facilities that allow visitors to watch salmon and other fish migrating upstream. Provisions are also made for downstream passage of fingerlings. The salmon hatchery, near the project's Oregon entrance, helps replace fall chinook salmon lost because of construction of John Day Dam. A major expansion of the salmon hatchery in 1974-75 doubled the facility's previous annual projection of 8 million salmon fingerlings. Bonneville Dam and Lake Bonneville are in the heart of the Columbia River Gorge, one of the Pacific Northwest's most scenic areas. Walls of the gorge rise 2,000 feet above Lake Bonneville in many places and can be seen from any of the project's nine recreation areas. In Washington, the areas include North Shore access (Corps of Engineers) and Bingen Boat Ramp (Klickitat Port Commission). About 3,644,360 people visited the project in 1996.

Columbia River Treaty Fishing Access Sites, Washington and Oregon

(Portland District) Through treaties signed in the 1850's, Indian Tribes in the Pacific Northwest reserved the right to access and fish at usual and accustomed fishing stations along the Columbia River. In the mid-1930's, fishing sites were submerged or destroyed during the construction of Bonneville Dam. In response to this, the United States entered into an agreement with Northwest Tribes. The Secretary of the Army was authorized to acquire lands and provide facilities in Oregon and Washington to replace Indian fishing grounds along the Columbia river "in-lieu" of those sites inundated by the Bonneville Dam. The Rivers and Harbors Act of 1945 provided authority and funding to implement the agreement. The Corps purchased and improved five sites totaling 40 acres. Construction began in 1952. By 1963, Indian fishing ground campsites had been completed in Big White Salmon, Little White Salmon, and Wind River in Washington; and Lone Pine and Cascade Locks in Oregon. Several years later, additional improvements were completed at all sites except one in Oregon. In 1974, modifications were completed to protect the Indian fishing sites from Lake Bonneville pool fluctuations due to peaking power production. In 1988, Congress authorized the improvement and transfer of additional lands to provide equitable satisfaction of the United States' commitment to compensate for fishing site losses that occurred because of the construction of Bonneville Dam. Congress authorized through public law the implementation of a wide range of land management, transfer, acquisition and development actions required to improve fishing access. Improvements will include all-weather access roads, camping facilities, boat ramps, docks, sanitation, and fish cleaning facilities. In 1996, Congress authorized adjustments in site boundaries. The boundary changes will minimize impacts to public facilities and the environment, and reduce site

development costs. Construction in 1996 included a new site in the Bonnevile area and rehabilitation of three in-lieu sites: Cascade Locks and Lone Pine in Oregon, and Underwood in Washington. Two additional sites were acquired from willing sellers in Lyle, Washington, and Stanley Rock, Oregon. All 31 sites of the $67 million project are scheduled to be completed by the year 2000. The 31 sites along the Columbia River will provide fishing access for Indian tribes who exercise treaty fishing rights. Construction and rehabilitation of these facilities will greatly improve access to the Columbia River in Zone 6, an area comprising Bonneville, the Dalles, and John Day pools. This area is most heavily used for treaty fishing by four Pacific Northwest Indian Tribes: the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Confederated Tribes and Bands of the Yakima Indian Nation. Through fiscal year '96, construction costs totaled $5.4 million.

The Dalles Lock and Dam - Lake Celilo

Completed Multi-purpose Project (Portland District) The Dalles Dam is at the head of Lake Bonneville, 192 miles upstream from the mouth of the Columbia River and two miles east of The Dalles, Oregon. Construction began in 1952, and the project went into operation five years later. The project includes a navigation lock, spillway, powerhouse, fish passage facilities and the non-overflow sections of the dam. Recreational facilities are provided along 24-mile-long Lake Celilo. When the lake was filled, Celilo Falls was inundated, as was The Dalles-Celilo Canal, which had been used since 1915 to move river traffic past the rapids. Now the lake provides navigation at a minimum depth of 15 feet in the main channel. The project's navigation lock, on the Washington shore, is 86 feet wide, 675 feet long, has an 88-foot normal lift and provides a 15-foot minimum depth over the sills. Waterborne commerce through the lock in 1996 was 9,680,500 tons. The powerhouse, with generating capacity of 1,807,000 kilowatts, is connected to the Pacific Northwest power system. The powerhouse has 22 main generators - 14 rated at 78,000 kilowatts, eight rated at 86,000 kilowatts - and two 13,500-kilowatt auxiliary units which also provide water to attract fish to the fishladder. During 1996 the powerplant generated 7.4 billion kilowatt hours, marketed by the Bonneville Power Administration and 16.5 million kilowatt hours used by the project. Through September 1996 construction costs totaled $303,260,300 while operation and maintenance costs amounted to $176,834,000. Since the project began operating in 1957, revenues of $399,100,000 from electric power sales have been deposited in the United States Treasury. Construction and operating costs of the project's power facilities are repaid from those deposits. Facilities to move fish around the dam include two fish ladders, powerhouse collection systems and a transportation channel, and the lock. Each ladder is about one-third mile long. Visitors can observe migrating fish at both ladders. Recreation facilities have been developed

in a number of areas near the dam and upstream along the river. Seufert Visitors Center was completed and open to the public in fall of 1980. Seufert Park on the Oregon shore, operated by the Corps, has a good view of the downstream side of the dam. A small train takes visitors from the visitor center to the powerhouse and dam. The Corps' Celilo Park, on Lake Celilo, has facilities for picnicking, fishing, swimming and boat launching. The park, near the site of the former Indian fishing grounds at Celilo Falls, is directly accessible from Interstate 84 about 12 miles east of The Dalles. Biggs Park offers picnicking and boat launching facilities. Deschutes State Park, located on the Deschutes River arm of Lake Celilo, has both day use and camping areas. On the Washington shore, four areas have been developed. Spearfish Lake and Avery Park are managed by the Corps of Engineers and Maryhill and Horsethief Lake are administered by Washington State Parks Department. About 1,131,072 recreation visits were made to The Dalles project areas in 1996.

John Day Lock and Dam - Lake Umatilla

Completed Multi-purpose Project (Portland District) John Day Dam is at the head of Lake Celilo, 216 miles upstream from the mouth of Columbia River and 26 miles upstream from The Dalles, Oregon. The project includes a navigation lock, spillway, powerhouse, non-overflow sections and fish passage facilities on both shores. Construction began in 1958 and first power was generated in 1968. Lake Umatilla, impounded by the dam, extends upstream about 76 miles to the foot of McNary Dam. Lake Umatilla provides for commercial navigation with a minimum 16-foot depth in the main channel. The navigation lock, on the Washington shore, is 86 feet wide, 669 feet long and provides 15 feet of water depth over the sills, with a 113-foot maximum lift. It is the highest single-lift lock in the world. Lock traffic in 1996 totaled 9,053,000 tons. The powerhouse has 16 main generators of 135,000-kilowatt capacity, with a total generating capacity of 2,160,000 kilowatts. The 16th generator went on line in November 1971. Skeleton units to accommodate four additional generators are included in the powerhouse. The project has a potential generating capacity of 2,700,000 kilowatts. Unlike the other dams on the Middle Columbia River, John Day is operated for flood control. When high runoff is forecast, Lake Umatilla can be drawn down to provide space for about 500,000 acre-feet of floodwaters. Since the project began operation, it has prevented almost $11.6 million in flood damages. Total project costs through September 1996 were $512,400,200 for construction, $195,260,900 for operation and maintenance plus $42,390,700 for major rehabilitation. Since the powerplant began operating in 1968, $436,400,000 electric power sales have been deposited in the United States Treasury for repayment of power generating facilities construction and operating costs. Fish passage facilities are located on both the Washington and Oregon shores. A fish-viewing room on the Oregon side has visitor facilities for watching migrating fish pass by at eye level. Spring Creek Fish Hatchery, on the

Washington shore of Lake Bonneville, provides partial mitigation of fall chinook salmon losses caused by construction of the dam. It is operated by the U.S. Fish and Wildlife Service. The Bonneville hatchery provides other mitigation. Recreation is available at more than a dozen areas along Lake Umatilla, in addition to two visitor areas at John Day Dam. Areas that have been developed at Arlington, Boardman, Umatilla and Irrigon in Oregon, and parks at Crow Butte, Roosevelt and Plymouth in Washington, are operated by local and state governments. Boardman Park, about 65 miles upstream from John Day Dam, and Le Page Park, on the John Day River arm of Lake Umatilla just above the dam, have swimming, picnicking and camping facilities. Philippi Park, further up the John Day arm, is a Corps-operated campground accessible only by boat. About 2,180,200 recreation visits were made to John Day project areas in 1996.

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