US Army Corps
of Engineers®
Walla Walla District

Report of the Secretary of the Army on Civil Works Activities For Fiscal Year 2009

Columbia River Fish Mitigation Program
Little Goose Pit-Tag Detector Installation
Columbia County

Department of the Army Corps of Engineers Extract Report of Walla Walla District

WALLA WALLA, WA, DISTRICT

The U.S. Army Corps of Engineers (Corps), Walla Walla District (District) consists of all Corps activities in the Columbia River drainage and tributaries thereto between the head of McNary Reservoir (Lake Wallula) (river mile 345.4) and Umatilla Bridge (river mile 290.5) below McNary Lock and Dam, except the Yakima River Basin above Van Giesen Street Bridge (river mile 8.4) near Richland, WA. The primary tributary drainage area is the Snake River, which includes more than 107,000 square miles in six states: Washington, Oregon, Idaho, Wyoming, and small portions of Nevada and Utah.

IMPROVEMENTS

Flood Control

1. COLUMBIA RIVER BASIN, LOCAL FLOOD PROTECTION PROJECTS

Location. Improvements included in this project are along the Columbia River and its tributaries.

Existing project. The Flood Control Act of 1950 approved a general comprehensive plan for the Columbia River Basin for flood control and other purposes based on plans in H. Doc. 531, 81st Congress, 2nd Session, and authorized $75 million to be appropriated for partial accomplishment of certain projects. From that authorization, an amount (not to exceed $15 million) was allotted for construction of local flood protection works throughout the Columbia River Basin, subject to conditions that all work undertaken pursuant to authorization would be economically justified prior to construction, and local cooperation specified in the Flood Control Act of 1936, as amended, should be required.

Local cooperation. Section 3, Flood Control Act of June 22, 1936, applies.

Operations during fiscal year (FY). No projects were de-authorized.

2. INSPECTION OF COMPLETED FLOOD CONTROL PROJECTS

Federal law requires local interests to maintain and operate completed local protection projects in accordance with regulations prescribed by the Secretary of the Army. Inspections were made to determine the extent of compliance and advise local interests, as necessary, of measures required to correct deficiencies.

The FY costs were $287,886. Total costs through September 30, 2009, were $3,879,952.

3. JACKSON HOLE, WY

Location. This project is located on the banks of the Snake River, Teton County, west of Jackson, WY.

Existing project. On the Snake River, there are approximately 23.5 miles of Federally-constructed levees consisting of the following: (1) On the right bank: a series of levees, off-set levees, and bank protection structures, all with full riprap protection from 10 miles upstream of the Jackson-Wilson Bridge to 3.5 miles below the bridge for a total of 13.5 miles; and (2) On the left bank: a series of Federally-constructed levees and bank protection structures, all with full riprap protection, extending from 10 miles upstream of the Jackson-Wilson Bridge to 5 miles upstream. The project resumes 1.5 miles immediately upstream of the same bridge and continues to 3.5 miles below the bridge, for a total of 10 miles. In addition, a series of Federally and non-Federally constructed levees, with a total length of approximately 5 miles, most having some or full riprap protection, are interspersed along both banks of the Snake River from Highway 26 Bridge to 4 miles downstream of the Jackson-Wilson Bridge.

The project also includes riprap-protected levees on the left and right banks of the Gros Ventre River. The left bank levee begins 1.5 miles west of Cattlemen's Bridge and extends 0.5 mile east of the same bridge. The right bank levee begins 0.5 mile west of Cattlemen's Bridge and extends 0.3 mile east of the same bridge.

The project is authorized by Public Law (PL) 81-516, Flood Control Act of 1950, for flood control protection by channel improvements consisting of channel rectification, levees, and revetments along the Snake River in the vicinity of Wilson, WY. The Water Resources Development Act of 1986, PL 99-662, authorized the Secretary of the Army to assume responsibility for operation and maintenance of the "Federal Levees" and additions and modifications thereto. It states, "the project for Jackson Hole . . . is modified to provide that the operation and maintenance of the project. . . shall be the responsibility of the Secretary: Provided, that the . . . sponsors shall pay the initial $35,000 in cash or materials . . . plus inflation . . ."

The Water Resources Development Act of 1996 (PL 104-303) amended PL 99-662 by including in-kind services and adding ". . . the Secretary may enter into agreements with the non-Federal sponsor permitting the non-Federal sponsor to perform operation and maintenance for the project on a cost-reimbursable basis."

Since 1978, $340,789,000 (cumulative nominal $) in potential flood damages has been prevented by the levees.

Operations during FY. Teton County, under their Local Cooperative Agreement, worked with the Corps assessing levee maintenance requirements. Hydrologic and Geotechnical surveys are ongoing for the Flood Capacity Study. Mitigation site plans are being developed for Imeson Road. Station markers were installed on all levee segments. The FY costs

were $617,102. (See table 30-A, Cost and Financial Statement.)

The Water Resources Development Act of 2000 (PL 106-541) authorized the Upper Snake River Restoration Project. Congress added new start funding to the FY 03 budget and also in FY 04. The project is located in and along a 22-mile stretch of the upper Snake River near Jackson, WY, in Teton County. It is partially in and adjacent to Grand Teton National Park, the National Elk Refuge, and in close proximity to Yellowstone National Park.

The project will restore fish and wildlife habitat that was lost as a result of construction, operation, and maintenance of levees constructed by Federal and non-Federal interests. Restoration measures include eco-fences, channel capacity excavation, spur dikes, anchored rootwads, rock grade control, secondary channels, off-channel, and channel stabilization pools. The project has a 14-year phased construction schedule and includes continuing construction, adaptive management, and monitoring to provide implementation flexibility. The rock grade structure, a separable element of site 9 completed in FY 05, continues to perform as designed by protecting the island habitat during the spring 2009 runoff conditions.

The FY 09 Construction costs were $24,945. (See table 30-A, Cost and Financial Statement.)

4. LUCKY PEAK LAKE, ID

Location. This project is located on the Boise River in southwestern Idaho about 10 miles southeast of the city of Boise, ID. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a rolled earthfill dam about 250 feet above the streambed and 1,700 feet long at the crest, with a lake providing a total storage at an upper operating lake level of 306,000 acre-feet. The project provides flood control, irrigation, and recreation.

Construction of the existing project was initiated in November 1949 and completed in June 1961. Since 1961, $1,384,353,000 (cumulative nominal $) in potential flood damages has been prevented by the project.

During a detailed study of outlet capacity and potential for adding hydropower to the existing project, a need for an auxiliary outlet became apparent. Construction of an auxiliary outlet was authorized in the Water Resource Development Act of 1976. In FY 78, an *Interim Feasibility Report on Modification of Lucky Peak Dam and Lake* (power facilities) was submitted to the Board of Engineers for Rivers and Harbors and approved. States, agencies, and the Chief of Engineers commented on the report to the Secretary of the Army. The report was forwarded to the Office of Management and Budget in February 1982.

A license to construct and operate power facilities at the project was issued by the Federal Energy Regulatory Commission (FERC) (Project #2832) to the Boise Project Board of Control on June 10, 1980, and modified on October 9, 1980, and in 1982. Construction of the auxiliary outlet facility began in May 1984 and was completed in August 1986. Construction of modifications to the existing outlet tunnel and powerhouse excavation began in August 1986 and were completed in January 1987. Powerhouse general contract construction began in April 1986. The project was completed and dedicated on October 7, 1988. Power on-line for all units was initiated on August 18, 1988. A Federally authorized second outlet was de-authorized in FY 90.

Recreation facilities at Lucky Peak Lake consist of 20 picnic/day-use areas, 4 boat launch ramps, and 3 swimming areas. The FY visitation to Lucky Peak Lake was 982,990.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: Normal operation and maintenance of the dam structures and recreation areas continued. A 5-year routine inspection of dam facilities was conducted with no significant adverse findings. The FY costs were $1,663,087. (See table 30-A, Costs and Financial Statement.)

American Recovery and Reinvestment Act (ARRA): The following improvements were accomplished in FY 09:

- Scanned, modernized, and stored critical real estate documents.

- Initiated planning and procurement of new secure storage building in a high traffic recreation area.

- Completed Dam Safety Inspection by architectural engineer (AE) Shannon-Wilson Engineering, Inc.

- Completed Dam Safety Interim Risk Reduction Measures Plan by AE Shannon-Wilson Engineering, Inc.

The ARRA FY 09 costs were $67,813. Total project costs were $67,813. (See table 30-A, Cost and Financial Statement.)

5. MILL CREEK, BENNINGTON LAKE, WA

Location. This project is located in and upstream from Walla Walla, WA, on Mill Creek, a tributary of the Walla Walla River. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes an off-stream earthfill storage dam, about 125 feet above the streambed and 3,200 feet long at the crest, two concrete-lined outlet channels, an earthfill diversion dam, and diversion structures. The project provides for flood control and recreation. Authorizing legislation to provide a channel through the city of Walla Walla was added to the project in 1941. Recreation was added to the project purposes through the Federal Water Project Recreation Act of 1965.

Construction of the dam and appurtenant works was completed in 1942. Paving of the channel through the city of Walla Walla was completed in 1966. Since 1942, $68,205,000 (cumulative nominal $) in potential flood damages has been prevented by the combined storage and channel operation.

Rehabilitation of the existing project was initiated in FY 78 and completed in FY 79. The plan of rehabilitation included action to correct the seepage and internal erosion that has occurred during each subsequent filling of the reservoir. A cutoff wall was constructed but did not alleviate the seepage problem, thus requiring limited flood control use of the project. The seepage and internal erosion create a high vulnerability for dam failure.

Mill Creek/Bennington Lake offers visitors three day-use/picnic areas and one boat launch ramp. Visitation to Mill Creek/Bennington Lake for the FY was 279,873.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: Normal operation and maintenance continued, which included regulation of water control structures and care of recreation areas. The FY costs were $1,432,852. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplished during FY 09:

- Initiated and completed engineering and design; and awarded contract for road paving repairs.

The ARRA FY 09 costs were $2,541. Total project costs were $2,541. (See table 30-A, Costs and Financial Statement.)

Interim Risk Reduction Measures (IRRM). In May 2008, a Dam Safety Screening for Portfolio Risk Assessment was performed for the Mill Creek Project. On May 31, 2007, the Corps released Engineer Circular (EC) 1110-2-6064, IRRM for Dam Safety. This circular includes a Dam Safety Action Classification (DSAC) table. Under the DSAC rating system, the District developed, prepared, and implemented IRRMs to reduce the probability of unacceptable risk of Corps dams. IRRMs are short-term efforts to reduce dam safety risks while long-term solutions are pursued.

On August 18, 2008, Mill Creek Dam received a DSAC rating of 1. The DSAC rating means the risk to public safety is unacceptable when Bennington Lake is more than 17 percent full for an extended period of time. The findings create an urgent and compelling requirement for interim risk reduction measures and system modifications.

IRRM Operations during FY: The following improvements were accomplished during FY 09:

- Completed two IRRM Plans for the Mill Creek Storage and Diversion Dams.
- Conducted public and stakeholder meetings.
- Updated emergency response plans and conducted multi-agency flood exercises.
- Conducted a Potential Failure Mode Analysis and a draft Issues Evaluation Study for the Storage Dam.
- Installed new monitoring instrumentation in the Storage Dam and waterflow gauge stations.
- Implemented modified water management operating practices to reduce risk on dams

The FY 09 construction costs were $589,677. Total project costs are $635,423. (See table 30-A, Cost and Financial Statement.)

6. SCHEDULING FLOOD CONTROL RESERVOIR OPERATIONS

Functional regulation of non-Corps projects is accomplished as authorized under Section 7, Flood Control Act of 1944, and coordinated with the Bureau of Reclamation for Jackson, Palisades, Ririe, Little Wood, Arrowrock, Anderson Ranch, and Malheur River Basin.

Flood control operations at Jackson Lake, Palisades, Ririe, Little Wood, Boise River Reservoirs, and the Malheur River Reservoirs are in accordance with formal agreements with the Bureau of Reclamation. Flood control regulation for Brownlee Reservoir was accomplished under flood control regulation provisions in the Federal Power Commission license to Idaho Power Company.

The FY costs associated with flood control operation of non-Corps and Corps-owned projects was $428,678.

7. TRIBAL PARTNERSHIP PROGRAM

Location. The Shoshone Bannock Tribes of Fort Hall Reservation and the study area are located just northwest of Pocatello, ID, in the southeastern corner of Idaho.

Existing project. Section 203 of the Water Resources Development Act of 2000, Tribal Partnership Program, authorized the Corps to undertake a reconnaissance phase study to determine if there is a Federal (Corps) interest in participating in a cost-shared feasibility phase study with the Shoshone Bannock Tribes of Fort Hall. This study is to determine if there is Federal interest in providing, collecting, and evaluating critical data and information relevant to protecting ecologically and culturally sensitive areas in the Fort Hall "Bottoms" and adjacent lands. It would evaluate alternatives that would restore lost environmental qualities of the original ecosystems and develop and analyze key risk reduction actions that would reduce the impacts of floods and flood damage in both developed tribal lands and culturally sensitive lands. The study would assess methods and alternatives that would improve water quality and quantity; identify areas on and directly adjacent to the reservation where erosion control would improve, protect, and enhance riparian/wetlands areas, total maximum daily loads, etc.; and develop comprehensive environmental and floodplain solutions for "natural" river corridor improvements to the Fort Hall "Bottoms" watershed and adjacent lands.

Local cooperation. Preparation of the 905(b) report is 100 percent Federally funded. The Shoshone Bannock Tribes of Fort Hall have been participating in the development of this study.

Operations during FY. A draft 905(b) report was submitted to Tribal staff in July 2009 for review and comment. Tribal comments were incorporated and a final 905(b) report was completed in September 2009. The FY costs were $2,346. Total costs through September 30, 2009, were $102,008. (See table 30-A, Costs and Financial Statement.)

8. FLOOD CONTROL ACTIVITIES UNDER SPECIAL AUTHORIZATION

Flood control activities pursuant to Section 205, PL 858, 80th Congress, as amended: The FY costs were $18,923 for one project and coordination account: (1) Coppei Creek, $3,952; and (2) coordination account, $14,971.

Emergency flood control activities – repair, flood fighting, and rescue work (PL 99, 84th Congress, and antecedent legislation): There were no Federal costs this FY.

Emergency bank protection (Section 14, Flood Control Act of 1946, PL 526, 70th Congress): The FY costs were $4,067 for Section 14 Coordination.

Snagging and clearing of navigable streams and tributaries in interest of flood control (Section 208, Flood Control Act of 1954, PL 780, 83rd Congress): There were no Federal costs this FY.

Multiple-Purpose Projects, Including Power

9. COLUMBIA RIVER FISH MITIGATION PROGRAM (WALLA WALLA PROJECTS), OR, WA, AND ID

Location. This project is located at Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Locks and Dams on the lower Snake River in the state of Washington, and McNary Lock and Dam on the Columbia River in the states of Oregon and Washington. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The eight Corps hydroelectric projects on the Columbia and lower Snake Rivers have been identified as a major contributing factor in causing mortality to downstream migrating juvenile salmon and steelhead. Without adequate bypass facilities to guide these juvenile fish away from the power turbines at the dams, mortalities incurred through project passage severely impact the commercial, recreational, and Tribal fisheries. The Corps has recognized the need to reduce juvenile fish mortality and has undertaken bypass measures that include mechanized fish bypass systems with barge and truck transportation. Spill as an additional bypass route over the spillways has been used to divert fish from entering turbine units, but it is a significant adverse economic factor due to lost power revenues. Congress passed, and the President signed, the FY 89 Energy and Water Development Appropriation Act (PL 100-371), which mandated the expenditure of funds for the design, testing, and construction of new or improved fish bypass facilities for the Columbia River fish mitigation projects. Completion of bypass and transportation facilities will significantly increase the survival of migrating downstream juvenile fish. The mitigation study will determine the overall scope of the fish mitigation facilities for these Columbia and lower Snake River dams. The mitigation study project was added to the President's FY 91 budget.

The plan of improvement includes the following facilities: (1) Ice Harbor Lock and Dam (Ice Harbor): screens, new gantry crane, collection bypass facility, intake gate raise, spillway deflectors, surface bypass, and fish ladder temperature control; (2) Lower Monumental Lock and Dam (Lower Monumental): hold/load and collection bypass facility, screens, passive integrated transponder tag (PIT-Tag) facility, barge load facility modifications, barges, gate raise modifications, gantry crane, fish ladder temperature control, outfall relocation, and surface bypass; (3) Little Goose Lock and Dam (Little Goose): screens, gantry crane modification, collection bypass facility, outfall pipe, fish ladder temperature control, fallout fences, gate raise, deck screen modifications, PIT-Tag facility, and surface bypass; (4) Lower Granite Lock and Dam (Lower Granite): juvenile fish facility, gantry crane, gate raise, outfall pipe, fish barges, screens, additional moorage facility, fish slot closures, juvenile fish facility improvements, barge exit modifications, deck screen modifications, fish ladder temperature control, surface bypass, PIT-Tag facility, and fallout fences; and (5) McNary Lock and Dam (McNary): gantry crane, screens, hold/load facility, gate raise modifications, maintenance facility, fish ladder exits, hold/load facility, adult/juvenile collection channel stoplogs, juvenile fish facility, surface bypass, and gantry crane modifications.

In response to the 1995 Endangered Species Act, Section 7, Consultation Biological Opinion, issued by the National Marine Fisheries Service, the District conducted a feasibility study (Lower Snake River Juvenile Salmon Migration Feasibility Study) to evaluate salmon migration problems on the lower Snake River. The objective of the study was to improve salmon migration conditions through the four Corps-operated dams and reservoirs on the lower Snake River. The study focused on how these dams could be changed to improve survival and recovery prospects for Snake River salmon stocks under the Endangered Species Act. Using an adaptive management policy as additional biological data is collected, the configuration changes identified in that study continue to be implemented.

As of spring 2009, permanent or interim surface bypass technology was installed at all of the District's Snake River Dams and at McNary Dam. These structures are focused on improving juvenile fish surface passage for endangered and threatened salmon migrating past all Corps hydroelectric projects. These structures were deployed using an aggressive, nontraditional approach to development that involved fast-track design, construction, testing, and evaluation. Based on post-construction biological evaluations conducted to date, these structures have proven to be successful in reducing passage delay and increasing dam passage survival.

The fully funded Federal project cost is estimated at $682,700,000 for District projects.

Local cooperation. None required.

Operations during FY. The following studies and improvements were accomplished during FY 09:

- Continued studies to evaluate the effect of top spillway weirs on approach, passage, and survival of juvenile salmon (run-of-river spring Chinook salmon, steelhead, and fall Chinook salmon) at McNary. Two spill operations in the spring and two spill levels in the summer were evaluated. Spill patterns were developed to optimize passage through the top spillway weirs and provide a surface passage route to reduce migration delay through the forebay. The research methodology used during both the spring and summer spill season was acoustic telemetry.

- Completed preliminary design and hydraulic modeling of surface passage alternatives for McNary. Alternatives evaluated included surface passage outlets at the spillway, north concrete non-overflow, powerhouse, and south earthen non-overflow. Behavioral guidance structure alternatives to guide fish to these surface passage outlets were also considered. Based on recommendations made in the McNary Dam Configuration and Operations plan, it is anticipated that one or more of these alternatives will be further developed and implemented.

- Completed design for modifications to the south shore adult fish ladder that will improve conditions for adult lamprey passage. The modifications will be made prior to the 2010 fish passage season. Additionally, hydraulic modeling was initiated to develop an improved fish ladder entrance that will provide easier entrance conditions for lamprey without impacting adult salmon criteria.

- Fifth year, post-construction biological testing was conducted at Ice Harbor to evaluate efficiency of the removable spillway weir (RSW) during both spring and summer operations.

- Second year, post RSW installation biological testing to determine fish behavior, spill efficiencies, and relative project and route-specific survival were estimated under two spill treatments (during spring and summer) for juvenile salmon at Lower Monumental.

- Initiated construction on the juvenile PIT-Tag monitoring facilities on the main transportation flume, dewatering structure modifications, and juvenile outfall relocation at Little Goose. The PIT-Tag monitoring system was completed prior to the 2009 fish passage season and will improve detection of migrating PIT-Tagged juveniles. The dewatering structure modification and outfall relocation will be completed prior to the 2010 fish passage season and will mitigate for excessive vibrational forces causing stress in dewatering structure members and improve survival at the outfall location.

- Completed construction of a variable crest temporary spillway weir at Little Goose. The construction contract was awarded in September 2008, and the new structure was in place for the 2009 juvenile passage season.

- Completed construction of two spillbay deflectors in bays 1 and 8. The deflectors reduce levels of total dissolved gas associated with spill and incorporate geometry that improves hydraulic conditions for juvenile fish passing over the spillway.

- Conducted first year, post-construction studies to evaluate the effect of a variable crest top spillway weir on approach, passage, and survival of juvenile salmon at Little Goose. Spill patterns were developed to optimize passage through the top spillway weir and provide a surface passage route to reduce migration delay through the forebay. The research methodology used during both the spring and summer spill season was radio telemetry.

- Continued preliminary design for improvements to the Lower Granite juvenile bypass/holding and loading facilities. The existing facilities were the first to be constructed on the Snake River and have many features that currently do not meet criteria for juvenile salmon passage.

- Several mitigation analysis studies continued throughout FY 09, including the Turbine Survival Program Study. In 2009, turbine passage studies continued to investigate the effects of rapid pressure changes on fish survival and increased injury rates.

- Continued the system-wide spillway evaluation study to determine impacts of increased spill frequency and duration on Columbia and lower Snake River dams. These impacts are a result of voluntary spill operations that aid juvenile fish passage. The study's focus shifted to reliability and risk of failure of spillway appurtenances due to increased spill operations.

- Continued studies evaluating impacts of avian predation on salmon smolt from the Columbia and Snake Rivers. This included monitoring the Caspian tern colony on Crescent Island, determining stock-specific predation rates on juvenile salmonids, surveying and monitoring for new or existing tern and cormorant colonies in the mid-Columbia River, and PIT-Tag recovery from avian islands. Research provided an estimate of relative magnitude of impacts among multiple avian predators in the mid-Columbia River.

- Continued research on estuarine detection of juvenile salmon using paired PIT detection trawls. This research was to estimate salmon hydrosystem survival for determining annual performance of the hydrosystem.

- Researchers evaluated Pacific adult lamprey passage success through the adult fish ladders at McNary and Ice Harbor.

- Continued efforts to develop a separator for juvenile lamprey. These efforts included work identifying behavioral reactions to light, current direction, and vertical/ horizontal passage preference.

- Continued a study to estimate the survival of fall Chinook salmon in the Columbia and Snake River system. This research will assist in developing system-wide operations that will maximize survival of fall Chinook salmon throughout the fish passage season.

The FY costs were $33,986,278. Total project costs are $667,388,825. (See table 30-A, Cost and Financial Statement.)

10. DWORSHAK DAM AND RESERVOIR, ID

Location. This Dam is on the North Fork of the Clearwater River, 1.9 miles above its junction with the Clearwater River, near Orofino, ID, and about 35 miles east of Lewiston, ID. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a dam, powerplant, public parks, and appurtenant facilities. The project provides for flood control, navigation, hydroelectric power generation, recreation, and area redevelopment. The reservoir has a normal operating range between the elevations of 1,600 and 1,445 mean sea level (msl). The reservoir has a gross storage capacity of 3,468,000 acre-feet (2 million acre-feet are effective for both local and regional flood control and for at-site and downstream power generation). In addition, the reservoir, which extends 59 miles into rugged and relatively inaccessible timberland, provides cost-effective transportation for moving marketable logs. The reservoir provides habitat for elk, deer, and other wildlife. The dam structure is about 3,287 feet long and about 717 feet above the streambed. Fish passage is not feasible due to the height of the dam. A hatchery has been built below the dam to assure continuance of anadromous fish runs. The powerhouse has two 90,000-kilowatt (kW) and one 220,000 kW generating units in operation for a capacity of 400,000 kW.

Provisions had been made for three additional 220,000-kW generating units for an ultimate installed capacity of 1,060,000 kW. A reconnaissance report justifying the feasibility and cost benefits for the addition of a fourth 200,000-kW generating unit was completed in FY 78. However, environmental and economic studies on additional generating units were curtailed due to public opposition. Unit 4 is undeveloped. Units 5 and 6 were de-authorized in FY 90, and Unit 4 was de-authorized in FY 95. Principal project data are set forth in table 30-C.

Construction of the project began in July 1966. It was placed in operation in 1972 and completed in 1986. Since the project became operational in June 1972, it has prevented about $2,836,000 (cumulative nominal $) in potential flood damages. Power generation through September 2009 was 64.36 billion kW hours.

At Dworshak Reservoir, recreation facilities consist of 12 day-use/picnic areas, six camp areas, six boats launches, and two swim areas. The Dworshak Information Center provides a regional overview of the Corps' efforts in the Clearwater River Basin. Total visitation to Dworshak Reservoir for the FY was 146,483.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: Management of wildlife habitat continued on project lands to provide winter browse for elk and deer. During the FY, 1.8 billion kW hours of electrical power were generated by the three generating units. The FY costs were $11,405,241. (See table 30-A, Cost and Financial Statement.)

Operations and Maintenance (O&M) **ARRA:** The following improvements were accomplished in FY 09:

- Initiated and completed engineering and design; and awarded contract for Dent Acres area road paving repairs.
- Initiated and completed engineering and design; and awarded contract for Granddad area road paving repairs.
- Initiated design of Dworshak Fish Hatchery effluent system.

The O&M ARRA FY 09 costs were $146,036. Total project costs were $146,036. (See table 30-A, Cost and Financial Statement.)

Construction General (CG) **ARRA:** The following improvements were accomplished in FY 09:

- Initiated and completed design for high-head waterstop task order.
- Awarded design task order contract for high-head waterstop repair technology demonstration.

The CG ARRA FY 09 costs were $13,640. Total project costs were $13,640. (See table 30-A, Cost and Financial Statement.)

Interim Risk Reduction Measures (IRRM). In October 2008, the District received a Dam Safety Action Classification (DSAC) rating of 2, a classification of "unsafe," for Dworshak Dam and Reservoir on the North Fork of the Clearwater River above Lewiston, Idaho. An IRRM Plan was created and approved. The IRRM plan is being implemented.

The IRRM plan implementation requires additional hard engineering data to make a determination on the actual causes of structural movement and resulting water flow through the structure. The primary IRRMs investigate structural cracking, foundation instability and resultant waterstop failure, and observed unacceptable volumes of high-pressure water in the foundation currently running into the galleries. In order to control water flowing through the dam and foundation, as well as to validate the probable failure modes and assign risk to those modes, additional instrumentation—internal and external—and foundation analysis studies are required. The outcomes of these efforts will provide the hard engineering data that will enable informed decisions on when and if major structural modifications are needed. Each of these studies will produce a report that will support a decision document for the Major Modification Report in early FY 11.

IRRM Operations during FY. The following improvements were accomplished during FY 09:

- Completed Probable Modes of Failure Study.
- Began Issues Evacuation Study to quantify risk probabilities of failure modes and quantify public risk to life and property.
- Completed emergency exercises.
- Increased monitoring and modeling of monolith and foundation leakage.
- Designed and contracted for high-head waterstop repair technology demonstration.
- Initiated external stability analysis study.
- Initiated finite element study using a local, national, and AE team.

The FY 09 construction costs were $504,555. Total project costs are $645,245. (See table 30-A, Cost and Financial Statement.)

11. ICE HARBOR LOCK AND DAM, LAKE SACAJAWEA, WA

Location. This dam is located on the Snake River, 9.7 miles above the river mouth at the head of Lake Wallula (McNary Reservoir) and 12 miles east of Pasco, WA. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a dam, powerplant, navigation lock, two fish ladders, recreation areas, and appurtenant facilities. The project provides navigation, hydroelectric power generation, recreation, and incidental irrigation. The reservoir has a normal operating range between elevations 440 and 437 msl. Lake Sacajawea extends upstream about 31.9 miles and provides slack water to Lower Monumental. The dam structure is approximately 2,822 feet long and approximately

130 feet above the streambed. The fish passage facilities include two fish ladders. The powerhouse has three 90,000-kW units and three 111,000-kW generating units in operation for a capacity of 603,000 kW.

The spillway dam is 590 feet long, and the overflow crest at elevation 391 msl is surmounted by 10 tainter gates, 50 feet wide and 52.9 feet high, that provide the capacity to pass a design flood of 850,000 cubic feet per second (cfs). The deck is at elevation 453 msl and provides a service road and track for a gantry crane. The navigation lock is a single-lift type with clear plan dimensions of 86 by 675 feet and a 16-foot minimum depth over the sills. A navigation channel 250 feet wide, 14 feet deep, and 41.6 miles long is provided from the mouth of the Snake River to the dam, and from the dam to Lower Monumental. Principal data are set forth in table 30-C.

Construction of the original project began in December 1955. It was placed in operation in 1961 and completed in 1971. Construction of the additional generating units was started in 1971 and completed in 1981. Power generation through September 2009 was 97.89 billion kW hours.

Recreation areas on Lake Sacajawea include 11 picnic/day-use sites, 4 camping areas, 7 areas with boat launching, and 4 swimming areas. There are 32 miles of the Northwest Discovery Water Trail. The Ice Harbor Information Center provides a regional overview of the Corps' efforts in the Snake River Basin. Total visitation on Lake Sacajawea for the FY was 482,234.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: During the FY, 1.9 billion kW hours of electrical power were generated by the six generating units. Traffic through the navigation lock consisted of grains, petroleum products, fertilizer, wood products, and miscellaneous cargo that amounted to 2,582,000 tons during calendar year 2009. The FY costs were $9,449,744. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplished during FY 09.

- Charbonneau Park Potable Water System. A contract was awarded to an 8(a) small business for a new nitrate treatment facility. The ion exchange facility will remove nitrate contamination from the park's well water; thereby, bringing it into compliance with the Environmental Protection Agency (EPA) drinking water standards. The system is scheduled to be in operation in April 2010 for the beginning of the recreational season. Task orders were also awarded for to the AE designer for technical support and oversight during the construction contract.

- Initiated and completed engineering and design; and awarded contract for road paving repairs.

- Initiated and completed engineering and design and awarded contract for electrical system upgrades at Fishhook and Charbonneau Parks.

The ARRA FY 09 costs were $217,909. Total project costs were $217,909. (See table 30-A, Cost and Financial Statement.)

12. LITTLE GOOSE LOCK AND DAM, LAKE BRYAN, WA

Location. The dam is 70.3 miles above the mouth of the Snake River and at the head of Lake Herbert G. West (Lower Monumental Reservoir), about 40 miles northerly of Walla Walla, WA, and 50 miles westerly of Lewiston, ID. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a dam, powerplant, navigation lock, fish ladder, and appurtenant facilities. The project provides for navigation, hydroelectric power generation, recreation, and incidental irrigation. The reservoir has a normal operating range between elevations 638 and 633 msl. Lake Bryan extends upstream about 37.2 miles and provides slack water to Lower Granite. The dam structure is 2,655 feet long and approximately 165 feet above the streambed. Fish passage facilities include one ladder with entrances on both shores and a fish channel through the spillway, which connects to the powerhouse fish collection system and south shore ladder. The powerhouse has six 135,000-kW generating units in operation for a capacity of 810,000 kW. The spillway dam is 512 feet long, and the overflow crest at elevation 581 msl is surmounted by eight tainter gates, 50 feet wide and 60 feet high, that provide the capacity to pass a design flood of 850,000 cfs. The navigation lock is a single-lift type with clear plan dimensions of 86 by 668 feet and a 15-foot minimum

depth over the sills. A navigation channel 250 feet wide, 14 feet deep, and 37.2 miles long is provided from the dam to Lower Granite. Relocations along the lake included 32 miles of Camas Prairie Railroad, 6.8 miles of county roads, 2.2 miles of state highways, and the Central Ferry Bridge. Principal project data are set forth in table 30-C.

Construction of the original project began in 1963. It was placed in operation in 1970 and completed in 1976. Construction of additional generating units began in 1974 and was completed in 1984. Power generation through September 2009 was 95.2 billion kW hours.

Lake Bryan provides seven day-use sites, five campgrounds, five boat-launching areas, and two swimming areas. There are 39 miles of the Northwest Discovery Water Trail. Total FY visitation to Lake Bryan was 205,715.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: During the FY, 2.3 billion kW hours of electrical power was generated by the six generating units. Traffic through the navigation lock consisted of grains, petroleum products, fertilizer, wood products, and miscellaneous cargo that amounted to 2,357,400 tons during calendar year 2009. The FY costs were $7,376,034. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplished during FY 09:

- Initiated and completed engineering and design; and awarded contract for road paving repairs.

- Initiated and completed engineering and design and awarded contract to upgrade heating, ventilation, and air conditioning (HVAC) system in visitors center.

The ARRA FY 09 costs were $109,356. Total project costs were $109,356. (See table 30-A, Costs and Financial Statement.)

13. LOWER GRANITE LOCK AND DAM, LOWER GRANITE LAKE, WA

Location. This dam is at river mile 107.5 on the Snake River at the head of Lake Bryan (Little Goose Reservoir) and about 33 miles downstream from Lewiston, ID. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a dam, powerplant, navigation lock, fish ladder, appurtenant facilities, and includes approximately 8 miles of slack water levees along the Snake and Clearwater Rivers at Lewiston, ID. The project provides for slack water navigation, hydroelectric power generation, recreation, and incidental irrigation. The reservoir has a normal operating range between elevations 738 and 733 msl in Lewiston, ID, and Clarkston, WA. Lower Granite Lake extends upstream approximately 38 miles and provides slack water to the confluence of the Snake and Clearwater Rivers. The dam structure is approximately 3,200 feet long and approximately 146 feet above the streambed. Fish passage facilities include one ladder with entrances on both shores with a fish channel through the spillway that connects to the powerhouse fish collection system and south shore ladder. The powerhouse has six 135,000-kW generating units in operation for a capacity of 810,000 kW.

The spillway dam is 512 feet long, and the overflow crest at elevation 681 msl is surmounted by eight tainter gates, 50 feet wide and 60 feet high, which provide the capacity to pass a design flood of 850,000 cfs. The navigation lock is single-lift type with clear plan dimensions of 86 by 674 feet and 15-foot minimum depth over the sills. A navigation channel 250 feet wide, 14 feet deep, and 39.3 miles long is provided from the dam to the confluence of the Snake and Clearwater Rivers. Principal data are set forth in table 30-C.

Construction of the original project started in July 1965. It was placed in operation in 1975 and completed in 1984. Construction of additional generating units was started in 1974 and completed in 1979. Power generation through September 2009 was 86.24 billion kW hours. Approximately $29,508,000 (cumulative nominal $) in potential flood damages has been prevented since the levees became functional.

Lower Granite Lake offers visitors 16 day-use/ picnic sites, 6 sites with camping, 12 boat launch ramps, and 4 swimming areas. There are 45 miles of the Northwest Discovery Water Trail. Total recreation visitation to Lower Granite Lake for the FY was 1,682,042.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: During the FY, 2.4 billion kW hours of electrical power was generated by the six generating units. Traffic through the navigation lock consisted of grains, petroleum products, fertilizer, wood products, and miscellaneous cargo that

amounted to 1,199,500 tons during calendar year 2009. The FY costs were $12,639,863. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplished in FY 09:

- Initiated and completed engineering and design; and awarded contract for road paving repairs.
- Initiated and completed engineering and design and awarded contract for a storage building in the north yard.
- Initiated and completed engineering and design and awarded contract to upgrade HVAC system in visitors center

The ARRA FY 09 costs were $261,275. Total project costs were $261,272. (See table 30-A, Costs and Financial Statement.)

Juvenile Fish Transportation Program. As the first collector dam on the Snake River, Lower Granite is a primary component of the Juvenile Fish Transportation Program. Transport began in the late 1960s as a research program on how to bypass juvenile salmon and steelhead around dams and reservoirs of the Corps' Columbia and Snake River dams. Transport became an operational program in 1981 with collection and transport from Lower Granite, Little Goose, and McNary. Transport was expanded in 1993 to include Lower Monumental. Development and improvement of collection and bypass systems continued, with a new collection system completed at McNary in 1994; a new bypass system completed at Ice Harbor in 1996; and extended-length submersible bar screens installed at Lower Granite, Little Goose, and McNary in 1996 and 1997.

In 2003, a new removable spillway weir (RSW) was tested at Lower Granite. A second RSW was tested at Ice Harbor in 2005 (fish are not collected here for transport), and a third RSW was tested at Lower Monumental during the 2008 fish passage season. During the 2007 season, two temporary spillway weirs (TSW) were tested in spillbays 20 and 22 at McNary. Testing continued at McNary during the 2008 season after the TSW in spillbay 22 was moved to spillbay 19. Further tests followed in 2009 with TSWs placed in spillbays 4 and 20 early in the season and spillbays 19 and 20 late in the season. In 2009, TSW operations started in spillbay 1 at Little Goose. A low crest TSW was utilized early in the season and a high crest TSW was utilized later in the season.

The 2009 juvenile fish transport season was marked by slightly below normal river flows in the Snake River and well below average river flows in the Columbia River. The three Snake River transport projects operated under regionally coordinated, court-approved operations, including daily spill from April 3 through August 31, with transportation of juvenile fish collected. Spill at McNary took place from April 10 through August 31. During the court ordered spill period, emphasis was placed on a mix of fish transportation and in-river migration.

The start of juvenile fish transport operations was staggered and commenced at much later dates than usual at Snake River projects in 2009 to allow early season fish to migrate in-river. Dates of operation were similar to those in 2008. Juvenile fish collection at Lower Granite in 2009 was 6,593,661 as compared with 5,082,176 in 2008 and 3,201,658 in 2007. A total of 2,465,023 fish were bypassed back to the river in 2009 and 4,119,643 were transported. At Little Goose, a total of 5,182,190 juvenile salmon and steelhead were collected in 2009, as compared to 4,885,642 collected in 2008 and 2,098,951 in 2007. A total of 2,228,651 fish were bypassed back to the river in 2009, and 2,944,890 fish were transported. At Lower Monumental, 1,182,585 juvenile salmon and steelhead were collected, as compared to 2,097,408 in 2008 and 900,533 in 2007. A total of 13,891 fish were bypassed from Lower Monumental in 2009 and 1,167,425 were transported.

At McNary, normal operations are to bypass fish in the spring until early to mid-July when collection and transport of summer migrants begin. This held true in 2009 as collection for transport operations began as scheduled on July 16, as was the case in 2008. In 2007, TSW operations precluded the transport of fish by barge and no fish were transported until truck operations began August 18. A total of 3,784,658 juvenile salmon and steelhead were collected in 2009, as compared to 2,395,116 in 2008 and 4,303,284 in 2007. Approximately 3,298,319 of the fish collected were bypassed back to the river to meet fishery agency requirements in 2009. A total of 448,833 juvenile fish were transported from McNary in 2009, noticeably higher than the 425,743 transported in 2008 and much higher than the 35,993 transported in 2007.

A grand total of 16,743,094 juvenile salmon and steelhead were collected at all projects in 2009, compared to 14,460,342 in 2008 and 10,504,426 in 2007. A total of 8,680,791 fish were transported in 2009, 52 percent of those collected, compared to

64 percent in 2008. Of the fish transported, 8,637,279 were transported by barge (95.5 percent) and 43,512 were trucked (0.5 percent).

14. LOWER MONUMENTAL LOCK AND DAM, LAKE HERBERT G. WEST, WA

Location. This dam is on the Snake River at the head of Lake Sacajawea (Ice Harbor Reservoir), about 45 miles northeast of Pasco, WA, and 41.6 miles above the river mouth. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a dam, powerplant, navigation lock, two fish ladders, and appurtenant facilities. The project provides for navigation, hydroelectric power generation, recreation, and incidental irrigation. The reservoir has a normal operating range between elevations 540 and 537 msl. Lake Herbert G. West (Lake West) extends upstream approximately 28.7 miles and provides slack water to Little Goose. The dam structure is approximately 3,791 feet long and approximately 135 feet above the streambed. The fish passage facilities include two fish ladders, one at each end of the dam. The powerhouse has six 135,000-kW generating units in operation for a capacity of 810,000 kW. The spillway dam is 572 feet long, and the overflow crest at elevation 483 msl is surmounted by eight tainter gates, 50 feet wide and 60 feet high, that provide capacity to pass a design flood of 850,000 cfs. The deck is at elevation 553 msl and provides a service road and track for a gantry crane. The navigation lock is a single-lift type with clear plan dimensions of 86 by 666 feet and a 15-foot minimum depth of the sills. A navigation channel 250 feet wide, 14 feet deep, and 28.1 miles long is provided from the dam to Little Goose. Relocations along the lake included railroads and highways. Principal data are set forth in table 30-C.

Construction of the original project started in June 1961. It was placed in operation in 1969 and completed in 1976. Construction of the additional generating units began in 1975 and was completed in 1981. Power generation through September 2009 was 110.33 billion kW hours.

Lake West offers seven day-use areas, five areas offering camping, five boat launch areas, and one designated swimming beach. There are 28 miles of the Northwest Discovery Trail. Total visitation on Lake West for the FY was 102,755.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: During the FY, 2.4 billion kW hours of electrical power were generated by the six generating units. Traffic through the navigation lock consisted of grains, petroleum products, fertilizer, wood products, and miscellaneous cargo that amounted to 2,297,900 tons during calendar year 2009. The FY costs were $7,848,856. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplished during FY 09:

- Initiated and completed design for navigation lock gate repairs.
- Advertised navigation lock gate repair contract.

The ARRA FY 09 costs were $66,396. Total project costs were $66,396. (See table 30-A, Costs and Financial Statement.)

15. LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN, WA, OR, AND ID

Location. This project is at various locations within the Columbia and Snake River drainages in the states of Idaho, Oregon, and Washington. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project consists of a series of fish hatcheries, wildlife development areas, and purchase of off-site project lands for fishing and hunting access and further habitat development. The project will compensate for loss of wildlife habitat and anadromous and resident fisheries due to impacts from the construction of four multipurpose dams and reservoirs on the lower Snake River (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite).

The real estate design memorandum and feature design memorandums have been approved to include hatcheries, satellites, off-project wildlife lands, and site selection. A final Environmental Impact Statement was filed with the Council on Environmental Quality on November 2, 1977. The Dworshak National Fish Hatchery Expansion and the Irrigon, Hagerman, Lyons Ferry, Lookingglass, McCall, Sawtooth, Magic Valley, and Clearwater hatcheries (including their respective satellite facilities) are all in operation. Transfer actions were completed in FY 04 for Big Canyon and

Pittsburg Landing. Captain John Rapids was completed in FY 08. Transfer actions for Captain John Rapids began in FY 09 and will continue through FY 10. Fencing is complete at all wildlife development areas. Off-project land acquisition is 100 percent complete. Habitat development continues at many of these sites. The Water Resources Development Act of 2007 amended the plan for woody riparian habitat to include aquatic restoration. Development has been initiated to compensate for habitat losses resulting from the inundation of habitat. This will result in creation of new riparian and aquatic habitat areas. The compensation project is contingent on appropriations and is currently scheduled for completion in FY 18.

Local Cooperation. None required.

Operations during FY. Estimated Federal cost for the project is $261,000,000. The FY costs were $359,501. Total project costs are $238,252,029. (See table 30-A, Cost and Financial Statement.)

16. McNARY LOCK AND DAM, LAKE WALLULA, OR AND WA

Location. This dam is on the Columbia River, 292 miles above the mouth, near Umatilla, OR, and 3 miles above the mouth of the Umatilla River. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The project includes a dam, powerplant, navigation lock, two fish ladders, appurtenant facilities, and a system of levees and pumping plants. The project provides for slack water navigation, hydroelectric power generation, recreation, and incidental irrigation. The reservoir has a normal operating range between elevations 340 and 335 msl. Lake Wallula extends upstream approximately 64 miles and provides slack water to Ice Harbor. The dam structure is 7,365 feet long and approximately 183 feet above the streambed. Fish passage facilities include two fish ladders. The powerhouse has fourteen 70,000-kW generating units in operation for a capacity of 980,000 kW. The spillway dam is 1,310 feet long, and the overflow crest is at elevation 291 msl and surmounted by 22 vertical lift gates, 50 feet wide and 51 feet high, which provide the capacity to pass a design flood of 2.2 million cfs. The navigation lock is a single-lift type with clear plan dimensions of 86 by 683 feet and a 15-foot minimum depth over the sills. A navigation channel (250 feet wide, 14 feet deep, and 32 miles long) is provided from the dam to the mouth of the Snake River. Relocations along the lake included railroad bridges over the Columbia and Snake Rivers in order to eliminate hazards to navigation. Principal project data are set forth in table 30-C.

Construction began in May 1947. It was placed in operation in 1953 and completed in 1982. Power generation through September 2009 was 344.41 billion kW hours.

Recreation areas on Lake Wallula include 19 day use/picnic sites, 4 campgrounds, 14 boat launching ramps, and 9 swimming areas. There are 45 miles of the Northwest Discovery Water Trail. The Pacific Salmon Visitor Information Center at McNary, which is staffed by park rangers, provides a regional overview of Corps efforts in salmon recovery issues. Total visitation on Lake Wallula for the FY was 4,242,075.

Local cooperation. None required.

Operations during FY. Operation and Maintenance: During the FY, 5.1 billion kW hours of electrical power were generated by the 14 generating units. Traffic through the navigation lock consisted of grains, petroleum products, fertilizer, wood products, and miscellaneous cargo that amounted to 5,777,500 tons during calendar year 2009. The FY costs were $14,597,071. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplished during FY 09:

- Initiated engineering and design efforts for two navigation cranes.
- Awarded navigation lock derrick crane upgrade contract.
- Awarded contracts for miscellaneous park amenities: picnic shelter, vault restrooms, drinking fountains, picnic tables, bleachers, etc.
- Purchased miscellaneous park amenities upgrades.
- Initiated engineering and design efforts for spillway gate rehabilitation repair.
- Developed plans and specifications for spillway gate rehabilitation contract award.

- Awarded spillway gate rehabilitation contract.

The ARRA FY 09 costs were $119,748. Total project costs were $119,748. (See table 30-A, Costs and Financial Statement.)

17. SNAKE RIVER DOWNSTREAM FROM JOHNSON BAR LANDING, OR, WA, AND ID

Location. This project is on the Snake River, downstream from Johnson Bar Landing, at river mile 230. The Snake River, which is the largest tributary of the Columbia River, rises in Yellowstone National Park in western Wyoming, flows generally in a westerly direction for approximately 1,000 miles, and empties into the Columbia River, near Pasco, WA, 324 miles from the Pacific Ocean. (See table 30-B for Authorizing Legislation of projects in the District.)

Existing project. The River and Harbor Act of 1945 authorized construction of dams, as necessary, for power, incidental irrigation, and open channel improvements for purposes of providing slack water navigation and irrigation between the mouth of the Snake River and Lewiston, ID. That authorization modified previous authorizations only for the portion of improvement below Lewiston, ID. Acts of June 13, 1902, and August 30, 1935, as they pertain to open river improvement from Lewiston, ID, to Johnson Bar Landing, remain part of the existing project.

Improvements included in existing projects are Ice Harbor, Lake Sacajawea; Little Goose, Lake Bryan; Lower Granite, Lower Granite Lake; Lower Monumental, Lake Herbert G. West; and open-river improvement, Lewiston to Johnson Bar Landing. Each of the four locks and dams is described in an individual report, and cost and financial data for the entire project are shown on tables 30-A and 30-D.

Ice Harbor, Little Goose, Lower Granite, and Lower Monumental are in full operation.

Local cooperation. None required.

Terminal facilities. On the Snake River from the mouth to Johnson Bar Landing, there are 18 privately-owned barge terminals in use for shipping grain, petroleum products, fertilizers, wood products, cement, and other general cargo. There are also 5 marinas and 28 small-boat launching ramps, all open to the public. The facilities serve slack water navigation to river mile 140, the site of Lewiston, ID. That slack water reaches the Lewiston, ID, and Clarkston, WA, area since the lake behind Lower Granite was filled in February 1975.

Operations during FY. See individual reports for Ice Harbor, Little Goose, Lower Granite, and Lower Monumental. On the Snake River from Lewiston, ID, to Johnson Bar Landing, reconnaissance and condition surveys were conducted, and survey markers were maintained.

18. RURAL IDAHO, ID, ENVIRONMENTAL INFRASTRUCTURE AND RESOURCE PROTECTION AND DEVELOPMENT PROGRAM

Location. Projects are at various locations within the state of Idaho.

Existing project. The primary objective of this program is to provide design and construction assistance to non-Federal interests for carrying out water-related environmental infrastructure and resource protection and development projects. Projects may include wastewater treatment and related facilities, water supply and related facilities, environmental restoration, and surface water resource protection and development. Projects are authorized under Section 595 of the Water Resources Development Act of 1999, PL 106-53, as amended.

Local cooperation. Local sponsors are responsible for 25 percent of costs associated with the projects.

Operations during FY. New Work: The following improvements were accomplished in FY 09:

- For the Eastern Idaho Regional Wastewater Authority, completed design and continued construction for the Oxbow Wastewater Treatment Plant with the City of Shelley, ID.

- Continued design of Eastern Interceptor Project with the City of Ammon, ID.

- Initiated a value engineering study and design for Soda Springs, ID, wastewater treatment facility.

- Continued design for the City of Smelterville, ID, stormwater collection system.

The FY 09 costs were $4,530,962. (See table 30-A, Cost and Financial Statement.)

ARRA: The following improvements were accomplishments during FY 09:

- Initiated Eastern Interceptor Project construction with the City of Ammon, ID.
- Initiated design and construction on wastewater treatment facility for City of Bliss, ID.
- Initiated design and construction on wastewater treatment facility for City of Greenleaf, ID.
- Initiated design on wastewater treatment facility for City of Lava Hot Springs, ID.

The ARRA FY 09 costs were $0. Total project costs are $0. (See table 30-A, Cost and Financial Statement.)

19. ENVIRONMENTAL ACTIVITIES UNDER SPECIAL AUTHORIZATION

Project modification for the improvement of the environment (Section 1135(b), PL 99-662, as amended): The FY costs were $29,222 for continuation of three environmental restoration projects and coordination account, including: (1) Bennington Lake Diversion Dam, WA ($5,914); (2) Walla Walla River, OR ($8,253); and (3) Two Rivers, WA ($77); and coordination account ($14,978). There was one new continuing section 1135 project and no new starts.

Operations during FY. ARRA: The following improvements were accomplished during FY 09:

- Walla Walla River. New work was performed in preparing and reviewing design plans for the construction contract for the grade control structure (GCS), prior to reverting to Section 1135 program funding. The GCS will provide fish passage connectivity at the Nursery Bridge Dam to a fish ladder constructed in 2000 for endangered fish, but not functioning as designed. The GCS will also correct and prevent further erosion occurring below the dam.

The ARRA FY 09 costs were $19,650. Total project costs were $19,650. (See table 30-A, Costs and Financial Statement.)

Project modification for Aquatic Ecosystem Restoration (Section 206, PL 104-303, as amended): The FY costs were $125,806 for continuation of three aquatic ecosystem restoration projects and coordination account, including: (1) Camp Creek, OR ($47,961); (2) Paradise Creek, ID ($47,025); (3) Salmon River, ID ($15,761); and coordination account ($15,059).

Operations during FY. ARRA: The following improvements were accomplished during FY 09:

- Paradise Creek. New work was performed in preparing and reviewing contract specifications and issuing a solicitation for a design-build contract.

The ARRA FY 09 costs were $17,518. Total project costs were $17,518.

Project modification for regional sediment management (Section 204, PL 102-560, as amended): The FY costs were $35,684 for a new sediment management project: (1) Snake River Rsm, ID ($35,684).

Investigations

20. COLLECTION AND STUDY OF BASIC DATA

During the FY, flood hazard data for a number of locations in the District were collected and analyzed. Flood information was provided to several Federal agencies; the states of Idaho, Oregon, and Washington; various cities and counties in those states; and some private organizations.

Total cost of collection and study of basic data during the FY was $54,329, which included: Flood Plain Management Services ($7,683); Technical Services ($12,888); Quick Responses ($2,147); and Special Studies ($31,611).

Operations during FY. ARRA: The following improvements were accomplished during FY 09:

- Warm Springs Creek. Topographic contour mapping was developed using photogramatic means with existing aerial photography and supporting data. The river reach was approximately 3 miles in length located in Custer County, ID.

The ARRA FY09 costs were $24,960. Total project costs were $24,960.

21. PRECONSTRUCTION, ENGINEERING, AND DESIGN

None.

22. SURVEYS

The total FY 09 costs for surveys were $445,631, including Boise River ($21,622); special studies (Walla Walla River Watershed [$262,529]); miscellaneous activities (special investigations, FERC licensing activities, North American Waterfowl Management Plan, and Interagency Water Resource Development [$84,208]); coordination with other Federal agencies ($8,734); and Planning Assistance to States ($68,538).

Operations during FY. **ARRA:** The following improvements were accomplished during FY 09:

- Boise River. Updated the current Hydrologic Engineering Center River Analysis System (HEC-RAS) model used to delineate the floodplain along the Boise River, from the Diversion Dam downstream to the head of Eagle Island, located in Ada County, ID.

- Boise River. Acquired and processed Green light detection and ranging (LiDAR) data, aerial photography, and other data needed for model development.

The ARRA FY 09 costs were $13,581. Total project costs were $13,581.

Other Activities

23. SHORELINE PROTECTION

Beach Erosion Control project activities pursuant to Section 103, Public Law 874, 87th Congress, as amended (preauthorization): The FY costs were $27,767 for Section 103 coordination.

24. CATASTROPHIC DISASTER PREPAREDNESS

PL 93-228

Continuity of Operations (510)	$13,584
National Preparedness Planning (520)	0
Emergency Operations Center Support (530)	0
Catastrophic Disaster Training and Exercise (560)	0
Total Catastrophic Disaster Preparedness Program	$13,584

25. FLOOD CONTROL AND COASTAL EMERGENCIES (FCCE)

Flood Control work under authorized emergency flood control activities, flood fighting.

PL 84-99

Disaster Preparedness (100)	$499,200
Emergency Operations (200)	0
Rehabilitation and Inspection Program (300)	133,989
Drought Assistance (400)	0
Advance Measures (500)	0
Hazard Mitigation (600)	0
Total FCCE	$633,189

26. GENERAL REGULATORY

Permit Evaluation (100)	$1,598,767
Enforcement (200)	105,807
Studies (300)	0
Environmental Impact Statement (500)	0
Administrative Appeals (600)	0
Compliance – Authorized Activities (800)	85,595
Total Regulatory	$1,790,169

Operations during FY. ARRA (Permit): The District currently is developing a new Statewide Regional General Permit for minor activities in Section 10 and Section 404 waters of Idaho. The regional permit covers activities such as piers, floating docks, marine launch rails, mooring piles,

boat lifts, and small structures requiring minor discharges of fill material. A Regional General Permit would include Endangered Species Act consultation on activities identified in the permit. The District also developed tribal protocols with each of the five tribes in Idaho. The proposal would include training of tribal members on Regulatory Program and permit processes, introducing Regulatory Program project managers, identifying tribal contacts for each tribe, and developing strong relationships. The following improvements were accomplished during FY 09:

- Developed work plan to include approach and scope of work; researched similar regional general permits and protocols in other districts.
- Published 30-day public notice and sent draft Regional General Permit for public comment.
- Prepared Environmental Assessment and Statement of Findings.
- Prepared final Regional General Permit and public notice.
- Met with several tribal representatives and discussed the mission of the Regulatory Program within Idaho documenting tribal concerns and geographic areas of interest.

ARRA (Studies): The District has completed new work on cumulative effects analysis on Regional General Permit 27 (RGP 27) activities in Lake Pend Oreille. The analysis studies the impacts of near shore structures (e.g., piers, docks, and piling) on bull trout, kokanee, and other fish species. The following improvements were accomplished during FY 09:

- Consulted with Environmental Research and Development Center and U.S. Geological Survey (USGS) on review actions of cumulative effects analysis.
- Developed work plan to include approach and scope of work; research cumulative effects analyses in other districts.
- Conducted research and surveys of Lake Pend Oreille; conducted interviews.
- Initiated contract development.

The ARRA FY 09 costs were $69,555 including: (1) Permits, $36,938; and (2) Studies, $32,617.

TABLE 30-A		COST AND FINANCIAL STATEMENT					
See Section In Text	Project	Funding	FY 06 ($)	FY 07 ($)	FY 08 ($)	FY 09 ($)	Total Cost to 30-Sep-09 ($)
3.	Jackson Hole, WY	New Work					
		Approp.	-	-	445,000	-	3,716,070
		Cost	-	-	34,560	24,945	3,330,575
		Maint.					
		Approp.	875,000	850,000	307,000	1,046,940	15,421,100 [1/]
		Cost	239,206	585,089	765,429	617,102	14,494,957 [2/]
	(Contributed funds)	Maint.					
		Contrib.	-	-	-	-	378,798
		Cost	-	-	-	-	378,798
4.	Lucky Peak Lake, ID	New Work					
		Approp.	-	-	-	-	19,652,081
		Cost	-	-	-	-	19,652,081
		Maint.					
		Approp.	1,543,720	1,744,000	1,551,000	1,638,560	40,277,760
		Cost	2,105,109	1,737,494	1,618,050	1,663,087	40,123,718
		Maint. ARRA				169,000	169,000
		Approp	-	-	-	67,813	67,813
		Cost	-	-	-	-	-
5.	Mill Creek, WA	New Work					
		Approp.	-	-	100,000	1,280,000	3,638,495
		Cost	-	-	45,746	589,677	2,894,172
		Maint.					
		Approp.	917,000	1,198,000	1,424,000	2,716,760	30,780,570 [3/]
		Cost	1,263,181	1,200,339	1,327,221	1,432,852	29,309,687 [4/]
		Maint. ARRA					
		Approp	-	-	-	90,000	90,000
		Cost	-	-	-	2,541	2,541
		Rehab					
		Approp.	-	-	-	-	17,714,102
		Cost	-	-	-	-	17,714,102
7.	Tribal Partnership Program	New Work					
		Approp.	-	-	-	-	133,000
		Cost	38,402	22,524	11,137	2,346	102,008
9.	Columbia River Fish Mitigation Program, OR, WA, and ID	New Work					
		Approp.	45,070,000	45,000,000	34,220,000	27,436,000	675,730,000
		Cost	33,419,273	46,370,514	32,643,221	33,986,278	667,388,825

TABLE 30-A (Continued) COST AND FINANCIAL STATEMENT

See Section In Text	Project	Funding	FY 06 ($)	FY 07 ($)	FY 08 ($)	FY 09 ($)	Total Cost to 30-Sep-09 ($)
10.	Dworshak Dam and Reservoir, ID	New Work Approp.	-	-	200,000	640,000	328,322,196
		Cost	-	-	140,690	504,555	328,127,441
		New Work ARRA Approp	-	-	-	2,000,000	2,000,000
		Cost	-	-	-	13,640	13,640
		Maint. Approp.	10,618,201	9,950,147	13,735,876	10,272,950	253,545,921 [5/]
		Cost	8,751,310	10,301,229	11,529,632	11,405,241	250,150,120 [6/]
		Maint. ARRA Approp	-	-	-	2,375,000	2,375,000
		Cost	-	-	-	146,036	146,036
11.	Ice Harbor Lock and Dam, WA	New Work Approp.	-	-	-	-	210,249,757
		Cost	-	-	-	-	210,249,757
		Maint. Approp.	9,562,802	8,351,749	8,524,415	9,989,820	247,850,377
		Cost	7,700,743	9,256,732	9,071,540	9,449,744	246,182,550
		Maint. ARRA Approp	-	-	-	3,734,000	3,734,000
		Cost	-	-	-	217,909	217,909
12.	Little Goose Lock and Dam, WA	New Work Approp.	-	-	-	-	262,632,022
		Cost	-	-	-	-	262,632,022
		Maint. Approp.	6,890,289	8,022,390	5,804,387	7,762,180	175,688,335
		Cost	5,839,669	7,136,670	7,597,822	7,376,034	174,533,316
		Maint. ARRA Approp	-	-	-	1,507,000	1,507,000
		Cost	-	-	-	109,356	109,356
13.	Lower Granite Lock and Dam, WA	New Work Approp.	-	-	-	-	400,080,315
		Cost	-	-	-	-	400,080,315
		Maint. Approp.	14,012,075	9,898,152	11,579,668	13,718,640	260,922,297
		Cost	13,250,126	8,736,258	11,390,555	12,639,863	256,785,024
		Maint. ARRA Approp	-	-	-	3,336,000	3,336,000
		Cost	-	-	-	261,275	261,275

TABLE 30-A (Continued) COST AND FINANCIAL STATEMENT

See Section In Text	Project	Funding	FY 06 ($)	FY 07 ($)	FY 08 ($)	FY 09 ($)	Total Cost to 30-Sep-09 ($)
14.	Lower Monumental Lock and Dam, WA	New Work Approp.	-	-	-	-	238,612,732
		Cost	-	-	-	-	238,612,732
		Maint. Approp.	8,546,230	8,950,072	8,776,940	9,589,170	198,415,379
		Cost	7,869,170	8,061,341	9,863,616	7,848,856	195,536,246
		Maint. ARRA				14,138,125	14,138,125
		Approp	-	-	-	66,396	66,396
		Cost	-	-	-	-	-
15.	Lower Snake River Fish and Wildlife Compensation Plan WA, OR, and ID	New Work Approp.	668,000	850,000	375,000	1,435,000	239,686,000
		Cost	899,247	534,336	580,421	359,501	238,252,029
	(Contributed funds)	New Work Contrib.	-	-	-	-	223,965
		Cost	-	-	-	-	223,965
16.	McNary Lock and Dam, Lake Wallula, OR and WA	New Work Approp.	-	-	-	-	375,214,469
		Cost	-	-	-	-	375,214,469
		Maint. Approp.	17,295,783	15,639,490	13,534,382	14,793,392	433,507,162
		Cost	14,612,871	15,729,025	15,580,251	14,597,071	431,748,888
		Maint. ARRA Approp	-	-	-	2,300,000	2,300,000
		Cost	-	-	-	119,748	119,748
	(Contributed funds)	Maint. Contrib.	-	-	-	-	43,707
		Cost	-	-	-	-	43,707
18.	Rural Idaho, ID, Environmental Infrastructure and Resource Protection and Development Program	New Work Approp.	4,157,000	3,200,000	3,814,000	4,350,000	17,895,900
		Cost	875,291	1,738,028	5,579,516	4,530,962	14,965,744
		New Work ARRA Approp	-	-	-	8,447,500	8,447,500
		Cost	-	-	-	-	-

End Notes:

[1/] Includes $750,000 under Category-Class-Subclass code 70C, Continuing Resolution Authority (CRA) Supplemental funds.
[2/] Includes $213,209 under Category-Class-Subclass code 70C, CRA Supplemental funds.
[3/] Includes $500,000 under Category-Class-Subclass code 70C, CRA Supplemental funds.
[4/] Includes $80,851 under Category-Class-Subclass code 70C, CRA Supplemental funds.
[5/] Includes $2,100,000 under Category-Class-Subclass code 70B, War Supplemental funds.
[6/] Includes $793,907 under Category-Class-Subclass code 70B, War Supplemental funds.

TABLE 30-B AUTHORIZING LEGISLATION

See Section In Text	Date Authorizing Act	Project and Work Authorized	Documents
4.		**LUCKY PEAK LAKE, ID**	
	Jul 24, 1946	Dam for flood control, irrigation, and recreation.	PL 79-526, Chief of Engineers Report, dated May 13, 1946.
	Oct 22, 1976	Second outlet for stream flow maintenance. De-authorized in 1990.	PL 94-587
	Dec 22, 1944 as amended	Construction, operation, and maintenance of recreation facilities.	Sec. 4, Flood Control Act of 1944
5.		**MILL CREEK, WALLA WALLA, WA**	
	Jul 28, 1938 as amended	Off-stream storage project upstream from Walla Walla.	H. Doc. 578, 75th Cong., 3rd Session
	Aug 18, 1941	Channel improvement through Walla Walla; concrete-lined channel.	H. Doc. 719, 76th Cong. Sec 377, PL 77-228, Cong. 3rd Session
	Oct 31, 1992	Redesignation of reservoir to the Virgil B. Bennington Lake.	Sec. 118 PL 102-580 102nd Cong.
9.		**COLUMBIA RIVER FISH MITIGATION PROGRAM**	
	Jul 19, 1988	Design, test, and construct fish bypass facilities at Lower Monumental, Ice Harbor, Little Goose, Lower Granite, and McNary Locks and Dams.	PL 100-371
10.		**DWORSHAK DAM AND RESERVOIR, ID**	
	Jul 3, 1958	Preparation of detailed plans.	S. Doc. 51, 84th Cong., 1st Session
	Aug 15, 1963	Redesignation of project as Dworshak Dam and Reservoir.	PL 88-96
	Oct 23, 1962	Dworshak Dam added Units 4, 5, and 6, Idaho. Units 5 and 6 were de-authorized in FY 1990. Unit 4 was de-authorized in FY 95.	PL 87-874
11.		**ICE HARBOR LOCK AND DAM, LAKE SACAJAWEA, WA**	
	Mar 2, 1945	Unit 1 of 4, Lower Snake River Project. Lock and dam for navigation, power, recreation, and incidental irrigation.	H. Doc. 704, 75th Cong., 3rd Session
	Dec 22, 1944 as amended	Construction, operation, and maintenance of recreation facilities.	Sec. 4, Flood Control Act of 1944
12.		**LITTLE GOOSE LOCK AND DAM, LAKE BRYAN, WA**	
	Mar 2, 1945	Unit 3 of 4, Lower Snake River Project. Lock and dam for navigation, power, recreation, and incidental irrigation.	H. Doc. 704, 75th Cong., 3rd Session
	Dec 31, 1970	Designation of reservoir as Lake Bryan.	PL 91-638
13.		**LOWER GRANITE LOCK AND DAM, LOWER GRANITE LAKE, WA**	
	Mar 2, 1945	Unit 4 of 4, Lower Snake River Project. Lock and dam for navigation, power, recreation, and incidental irrigation.	H. Doc. 704, 75th Cong., 3rd Session
14.		**LOWER MONUMENTAL LOCK AND DAM, LAKE HERBERT G. WEST, WA**	
	Mar 2, 1945	Unit 2 of 4, Lower Snake River Project. Lock and dam for navigation, power, recreation, and incidental irrigation.	H. Doc. 704, 75th Cong., 3rd Session
	May 25, 1978	Designation of reservoir as Lake Herbert G. West.	PL 95-285

TABLE 30-B (Continued)		AUTHORIZING LEGISLATION	
See Section In Text	**Date Authorizing Act**	**Project and Work Authorized**	**Documents**
15.		**LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN, WA, OR, AND ID**	
	Oct 22, 1976 as amended	Fish hatcheries and replacement of wildlife habitat.	PL 94-587
	Nov 17, 1986	Changes to land acquisition authority.	H.R. 6 PL 99-662
16.		**McNARY LOCK AND DAM, LAKE WALLULA, OR AND WA**	
	Mar 2, 1945	Lock and dam for navigation, power, recreation, and irrigation.	H. Doc. 704, 75th Cong., 3rd Session
	Dec 22, 1944 as amended	Construction, operation, and maintenance of recreation facilities.	Sec. 4, Flood Control Act of 1944
	Nov 17, 1986	Construction, operation, and maintenance of a second powerhouse. McNary Lock and Dam Second Powerhouse automatically de-authorized on Nov 16, 1991.	H.R. 6, PL 99-662 Sec. 1001, PL 99-362
17.		**SNAKE RIVER TO JOHNSON BAR, OR, WA, AND ID**	
	Jun 13, 1902	Open-river navigation Riparian to Pittsburg Landing.	H. Doc. 127, 56th Cong, 2nd Session
	Jun 25, 1910	Mouth to Riparian.	H. Doc. 411, 55th Cong, 2nd Session
	Aug 30, 1935	Pittsburg Landing to Johnson Bar.	Rivers and Harbors Committee, Doc. 25, 72nd Cong, 1st Session
	Mar 2, 1945	Supersedes previous legislation, mouth to Lewiston, ID, only. See Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Locks and Dams.	H. Doc. 704, 75th Cong., 2nd Session

TABLE 30-C **PRINCIPAL DATA CONCERNING NAVIGATION LOCK, SPILLWAY DAM, POWERPLANT, AND IMPOUNDMENT**

Project		
Dworshak Dam and Reservoir, ID (see Section 10 of text)	**SPILLWAY DAM**	
	Type of Construction	Concrete Gravity
	Completed	September 1974
	Maximum Capacity	150,500 cfs[1/]
	Crest Elevation	1,545 ft[2/]
	Control Gates:	
	Type	Tainter
	Size, Width by Height	50 by 56.4 ft
	Number	2
	POWERPLANT	
	Length	428 ft
	Generating Units:	
	Number Installed	3
	Rating, Each	2 @ 90,000 kW[3/] 1 @ 220,000 kW
	Total Capacity Installed	400,000 kW
	Space for Additional	3
	Rating, Each	3 @ 220,000 kW
	Total Potential Capacity	1,060,000 kW
	Maximum Structural Height	717 ft
	First Power-On-Line	March 1973
	IMPOUNDMENT	
	Elevations:	
	Normal Operating Range	1,600 to 1,445 ft
	Maximum	1,605 ft
	Flood Control Storage	2,000,000 ac-ft[4/]
	Lake Length	53.6 mi[5/]
	Lake Water Surface Area at Elevation 1,600	17,090 ac[6/]
	Length of Shoreline	175 mi
Ice Harbor Lock and Dam, WA (see Section 11 of Text)	**NAVIGATION LOCK**	
	Clear Width	86 ft
	Clear Length	675 ft
	Lift:	
	Minimum	97 ft
	Average	100 ft
	Maximum	105 ft
	Minimum Water Depth Over Sills	16 ft
	Open to Navigation	May 1962
	SPILLWAY DAM	
	Type of Construction	Concrete Gravity
	Completed	January 1962
	Maximum Capacity	850,000 cfs
	Crest Elevation	391 ft
	Control Gates:	
	Type	Tainter
	Size, Width by Height	50 by 52.9 ft
	Number	10

TABLE 30-C Continued — **PRINCIPAL DATA CONCERNING NAVIGATION LOCK, SPILLWAY DAM, POWERPLANT, AND IMPOUNDMENT**

Project		
	POWERPLANT	
	Length	671 ft
	Generating Units:	
	Number Installed	6
	Rating, Each	3 @ 90,000 kW 3 @ 111,000 kW
	Total Capacity Installed	603,000 kW
	Maximum Structural Height	226 ft
	First Power-On-Line	December 1961
	IMPOUNDMENT	
	Elevations:	
	Normal Operating Range	440 to 437 ft
	Maximum	446 ft
	Lake Length	31.9 mi
	Lake Water Surface Area at Elevation 440	8,375 ac
	Navigation Channel, Depth by Width	14 by 250 ft
	Length of Shoreline	80 mi
Little Goose Lock and Dam, WA (see Section 12 of text)	**NAVIGATION LOCK**	
	Clear Width	86 ft
	Clear Length	668 ft
	Lift:	
	Minimum	93 ft
	Average	98 ft
	Maximum	101 ft
	Minimum Water Depth Over Sills	15 ft
	Opened to Navigation	May 1970
	SPILLWAY DAM	
	Type of Construction	Concrete Gravity
	Completed	January 1970
	Maximum Capacity	850,000 cfs
	Crest Elevation	581 ft
	Control Gates:	
	Type	Tainter
	Size, Width by Height	50 by 60 ft
	Number	8
	POWERPLANT	
	Length	656 ft
	Width	243 ft
	Generating Units:	
	Number Installed	6
	Rating, Each	135,000 kW
	Total Capacity Installed	810,000 kW
	Maximum Structural Height	226 ft
	First Power-On-Line	March 1970

TABLE 30-C (Continued) PRINCIPAL DATA CONCERNING NAVIGATION LOCK, SPILLWAY DAM, POWERPLANT, AND IMPOUNDMENT

Project		
	IMPOUNDMENT	
	Elevations:	
	Normal Operating Range	638 to 633 ft
	Maximum	646.5 ft
	Lake Length	37.2 mi
	Lake Water Surface Area at Elevation 738	10,025 ac
	Navigation Channel, Depth by Width	14 by 250 ft
	Length of Shoreline	92 mi
Lower Granite Lock and Dam, WA (see Section 13 of text)	**NAVIGATION LOCK**	
	Clear Width	86 ft
	Clear Length	674 ft
	Lift:	
	Minimum	95 ft
	Average	100 ft
	Maximum	105 ft
	Minimum Water Depth Over Sills	15 ft
	Opened to Navigation	May 1975
	SPILLWAY DAM	
	Type of Construction	Concrete Gravity
	Completed	February 1975
	Maximum Capacity	850,000 cfs
	Crest Elevation	681 ft
	Control Gates:	
	Type	Tainter
	Size, Width by Height	50 by 60 ft
	Number	8
	POWERPLANT	
	Length	656 ft
	Width	243 ft
	Generating Units:	
	Number Installed	6
	Rating, Each	135,000 kW
	Total Capacity Installed	810,000 kW
	Maximum Structural Height	228 ft
	First Power-On-Line	April 1975
	IMPOUNDMENT	
	Elevations:	
	Normal Operation Range	738 to 733 ft
	Maximum	746.5 ft
	Lake Length	39.3 mi
	Lake Water Surface Area at Elevation 738	8,900 ac
	Navigation Channel, Depth by Width	14 by 250 ft
	Length of Shoreline	91 mi

TABLE 30-C (Continued) PRINCIPAL DATA CONCERNING NAVIGATION LOCK, SPILLWAY DAM, POWERPLANT, AND IMPOUNDMENT

Project		
Lower Monumental Lock and Dam, WA (see Section 14 of text)	**NAVIGATION LOCK**	
	Clear Width	86 ft
	Clear Length	666 ft
	Lift:	
	Minimum	97 ft
	Average	98 ft
	Maximum	103 ft
	Minimum Water Depth Over Sills	15 ft
	Opened to Navigation	April 1969
	SPILLWAY DAM	
	Type of Construction	Concrete Gravity
	Completed	March 1969
	Maximum Capacity	850,000 cfs
	Crest Elevation	483 ft
	Control Gates:	
	Type	Tainter
	Size, Width by Height	50 by 60 ft
	Number	8
	POWERPLANT	
	Length	656 ft
	Width	243 ft
	Generating Units:	
	Number Installed	6
	Rating, Each	135,000 kW
	Total Capacity Installed	810,000 kW
	Maximum Structural Height	242 ft
	First Power-On-Line	May 1969
	IMPOUNDMENT	
	Elevations:	
	Normal Operating Range	540 to 537 ft
	Maximum	548 ft
	Lake Length	28.7 mi
	Lake Water Surface Area at Elevation 540	6,590 ac
	Navigation Channel, Depth by Width	14 by 250 ft
	Length of Shoreline	78 mi
McNary Lock and Dam, OR and WA (see Section 16 of text)	**NAVIGATION LOCK**	
	Clear Width	86 ft
	Clear Length	683 ft
	Lift:	
	Minimum	67 ft
	Average	75 ft
	Maximum	83 ft
	Minimum Water Depth Over Sills	15 ft
	Open to Navigation	November 1953

TABLE 30-C (Continued) PRINCIPAL DATA CONCERNING NAVIGATION LOCK, SPILLWAY DAM, POWERPLANT, AND IMPOUNDMENT

Project	
SPILLWAY DAM	
Type of Construction	Concrete Gravity
Completed	October 1953
Maximum Capacity	2,200,000 cfs
Crest Elevation	291 ft
Control Gates:	
Type	Vertical Lift
Size, Width by Height	50 by 51 ft
Number	22
POWERPLANT	
Length	1,348 ft
Generating Units:	
Number Installed	14
Rating, Each	70,000 kW
Total Capacity Installed	980,000 kW
Maximum Structural Height	220 ft
First Power-On-Line	November 1953
IMPOUNDMENT	
Elevations:	
Normal Operating Range	340 to 335 ft
Maximum	356.5 ft
Lake Length	64 mi
Lake Water Surface Area at Elevation 340	38,800 ac
Navigation Channel, Depth by Width	14 by 250 ft
Length of Shoreline	242 mi

[1/] cubic feet per second
[2/] feet
[3/] kilowatt
[4/] acre-feet
[5/] miles
[6/] acres

SNAKE RIVER DOWNSTREAM FROM JOHNSON BAR LANDING, OR, WA, AND ID

TABLE 30-D **(SEE SECTION 17 OF TEXT)**

Project	Estimated Cost (Corps of Engineers Funds Only)	New Work to September 30, 2009 Approp.	Cost	Maintenance to September 30, 2009 Approp.	Cost	Percent Compl	Constr. Started
Ice Harbor Lock and Dam							
Initial Project	$374,617,095	$172,587,480	$172,587,480	$251,584,377	$246,400,459	112	FY 56
Code 710 Rec	914,256	914,256	914,256	0	0		FY 57
Facilities						100	
Power Units 4-6	36,748,021	36,748,021	36,748,021	0	0	100	FY 71
Fish Bypass Program	88,085,000	90,017,312	90,017,312	0	0	102	FY 91
Totals	500,364,372	300,267,069	300,267,069	251,584,377	246,400,459	109	
Little Goose Lock and Dam							
Initial Project	342,480,476	201,690,215	201,690,215	177,195,335	174,642,672	110	FY 63
Power Units 4-6	60,941,807	60,941,807	60,941,807	0	0	100	FY 74
Fish Bypass Program	85,508,000	72,879,621	72,879,621	0	0	85	FY 89
Totals	488,930,283	335,511,643	335,511,643	177,195,335	174,642,672	104	
Lower Granite Lock and Dam							
Initial Project	555,186,593	353,803,981	353,803,981	264,258,297	257,046,299	110	FY 65
Code 710 Rec	63,800	63,800	63,800	0	0		FY 84
Facilities						100	
Power Units 4-6	46,212,534	46,212,534	46,212,534	0	0	100	FY 74
Fish Bypass Program	58,620,000	38,724,967	38,724,967	0	0	66	FY 88
Totals	660,082,927	438,805,282	438,805,282	264,258,297	257,046,299	105	
Lower Monumental Lock and Dam							
Initial Project	339,994,773	186,951,361	186,951,361	212,553,504	195,602,642	113	FY 61
Power Units 4-6	51,661,371	51,661,371	51,661,371	0	0	100	FY 75
Fish Bypass Program	90,134,000	81,411,763	81,411,763	0	0	90	FY 90
Totals	481,790,144	320,024,495	320,024,495	212,553,504	195,602,642	107	
Open River Lewiston to Johnson Bar Landing	34,613	34,613	34,613	401,583	401,583		
Open River Pasco to Lewiston	0	0	0	4,350	4,350		
Totals Existing Project	2,131,202,339	1,394,643,102	1,394,643,102	905,997,446	874,098,005	106	
Previous Projects Pasco to Lewiston	400,150	400,150	400,150	186,570	186,570		
Totals Authorized Project	$2,131,602,489	$1,395,043,252	$1,395,043,252	$906,184,016	$874,284,575		