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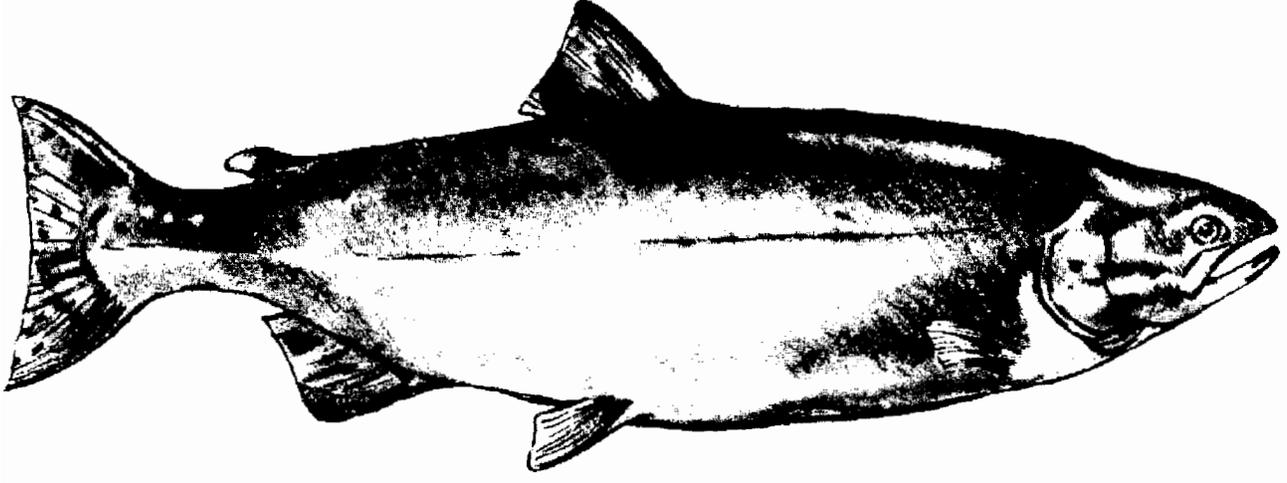
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Chapter I— Introduction

LOCATION

This planning report/environmental statement focuses on Savage Rapids Dam, located at river mile (RM) 107 on the Rogue River where it crosses the Josephine/Jackson County line about 5 miles east of the city of Grants Pass in southwest Oregon (see Location Map).

PURPOSE, SCOPE, AND OBJECTIVE

The Bureau of Reclamation (Reclamation) initiated the Josephine County Water Management Improvement Study (JCWMIS) in 1989 to (1) identify a permanent solution to fish passage problems at Savage Rapids Dam and (2) help resolve conflicting water issues in Josephine County, of which Grants Pass Irrigation District (GPID) is a major water user. These two issues are intimately related, especially where Savage Rapids Dam is concerned. However, it has been the intent throughout this study, to maintain a two pronged approach so that study delays in one area would not hold up study and report findings in the other area. This report addresses fish passage concerns only; irrigation diversion facilities are addressed to the extent that those facilities are related to fish passage facilities.

The JCWMIS developed and evaluated data at an appropriate level of detail to support a decision on future actions. This document summarizes the findings by presenting a description and analysis of alternatives which could permanently correct fish passage problems at Savage Rapids Dam and by evaluating the environmental impacts of those alternatives in accordance with the requirements of the National Environmental Policy Act (NEPA). This document may serve as the vehicle to request congressional authorization to implement a preferred fish passage plan.

AUTHORITY

Authority to conduct this investigation is provided in Public Law (P.L.) 92-199, 85 Statute 664 enacted December 15, 1971.

PREVIOUS INVESTIGATIONS

Prior to 1971, Reclamation's involvement with Savage Rapids Dam and the GPID was limited to congressionally authorized emergency repairs and various modifications to the dam in 1953-54 and in 1957-58.

In December 1971, Congress passed P.L. 92-199 which authorized the Secretary of the Interior to conduct a feasibility study of the Grants Pass Division, Rogue River Basin Project, Oregon. The Senate Committee report indicated that the study should include (1) a study of the fish passage at Savage Rapids Dam and (2) a study of the need to replace the existing distribution system of GPID.

Reclamation and the Bureau of Sport Fisheries and Wildlife (now the U.S. Fish and Wildlife Service (USFWS)) undertook the first phase of the study. Because of the immediate need to improve fish passage, the intent was to develop an interim solution to fish passage in the first phase and to consider all water related problems and integrate solutions with a permanent solution to fish passage problems in the second phase. The results of the first phase of the study were published in a special report in 1974. Congress authorized the measures proposed in the report and appropriated funds for construction in P.L. 93-493. The *Final Environmental Statement, Anadromous Fish Passage Improvements, Savage Rapids Dam, Rogue River Basin Project, Grants Pass Division-Oregon (INT-FES 76-26)* (Reclamation 1976) was completed and made available to the public on May 18, 1976.

Not all of the interim measures identified in the report were implemented. Some work was done on the south fish ladder, but a solicitation for bids to replace the north fish ladder received only one response and that bid exceeded available funds. In November 1979, it was decided to use the remaining funds to replace the north side fish screens, deferring further work on the fish ladders until a permanent resolution of the fish passage issue could be achieved.

A formulation working document (Reclamation 1979) provided some information on the second phase of the study. Following public review, it was concluded that prospects were poor for a Federal project to improve irrigation and that part of the study should be dropped. The fisheries part of the study, however, was continued until 1984 when further work was deferred because of uncertainty regarding potential development of hydropower at the dam. The State had passed a law in 1967 that did not

allow further diversion of water for hydropower generation on the Rogue River from river mile (RM) 157 to the mouth. However, there were efforts to amend the law to allow hydropower development at Savage Rapids Dam. A pending Federal Energy Regulatory Commission (FERC) application to develop a hydroelectric generating plant at the dam led fish passage planners to assume that the applicant would have to correct the fish passage problems within the requirements of the FERC license. Eventually it became clear that the State of Oregon would not amend existing legislation to allow hydropower development at the dam. This stopped the FERC application and provided impetus to proceed with finding a permanent solution to fish passage problems.

In early March and April of 1987, Josephine County, GPID, and the city of Grants Pass solicited the Commissioner of Reclamation and the Oregon congressional delegation to provide funds for Reclamation to reopen investigations authorized by P.L. 92-199. The Congress provided funding in fiscal year 1989 for the current investigation which was initiated at that time.

JOSEPHINE COUNTY WATER MANAGEMENT IMPROVEMENT STUDY (JCWMIS)

Two purposes were identified for the JCWMIS (1) resolution of fish passage problems at Savage Rapids Dam and (2) provide assistance in the development of a master water plan for Josephine County including GPID. Two events shifted the focus of the water management activities primarily to GPID facilities and water use. After a final proof survey reduced GPID water rights by about half and after a period of negotiation, the State of Oregon granted a temporary supplemental water right permit to GPID in 1990 (see attachment B). This permit required GPID to study and report on a wide range of water management options that nearly duplicated the water management focus of the JCWMIS. At the same time, budget problems caused Josephine County to limit participation in the study. A decision was made to report separately on the water management activities and the fish passage activities. Reclamation prepared and distributed a progress report on the fishery portion in May 1992 and a report on the water management portion in December 1992.

Early in the study GPID hired a consultant, David J. Newton Associates, Inc. (DNA), to help with the water management aspects of the study. As the JCWMIS progressed, the separation of the fish passage and water

management portions of the study became more distinct. Although Reclamation has provided technical help in both fish passage and water management efforts, GPID and DNA eventually became the focus for directing and reporting on the water management activities.

On January 5, 1994, the GPID Board voted to remove Savage Rapids Dam if certain conditions, mainly funding, could be met (see Attachment E). In March 1994, GPID and its consultant, DNA, submitted a water management plan (Newton 1994) to the Oregon Water Resources Commission which addresses each of the stipulations of its temporary permit, including proposed implementation of conservation measures. That report has been reviewed by the Oregon Water Resources Commission. It is anticipated that any water conservation/management options would be privately financed. Accordingly, Reclamation does not intend to prepare a report on water management options for consideration by Congress.

As a result, this document focuses exclusively on fish passage and the required facilities to maintain irrigation diversions and those study activities related to formulation and evaluation of the fish passage alternatives.

RELATED ACTIVITIES

There are serious concerns regarding the declining numbers of salmon and steelhead along the Pacific coast. Some runs of salmon are now listed as threatened or endangered under the Endangered Species Act (ESA). Most notable are the salmon runs in the Snake and Sacramento River systems. The potential exists for similar listings in the Rogue and other coastal rivers and for listing steelhead throughout its range.

Increasing concerns are being expressed by government agencies and environmental interests for preserving wild stocks in the Rogue River system. This has led to more stringent management of fishing opportunities including reductions and limitations on ocean harvest. As these activities increase and as concerns mount, the issue of fish passage at Savage Rapids Dam becomes more intense.

Federal

The U.S. Army Corps of Engineers (Corps) completed two dams and reservoirs on the Rogue River system, Lost Creek Dam (1977) and Applegate Dam (1980). A third structure, Elk Creek Dam, is

approximately 50 percent complete and underwent a court-ordered review to determine its future. This review was accomplished through a formal environmental impact analysis (Corps 1991). In a February 6, 1992, Record of Decision (Corps 1992), the Corps declared its decision to complete the dam and operate it strictly for flood control purposes under the "no conservation pool alternative," described in the supplemental Environmental Impact Statement (EIS). Court actions are still in progress and construction to complete the structure has not proceeded.

The completed Corps dams provide significant flood control in the Rogue River system, and Lost Creek Dam provides significant flow control of the Rogue River past Savage Rapids Dam.

State

State actions have a significant bearing on all future water management activities in the Rogue River basin.

Diack v. City of Portland

A 1988 State court ruling in *Diack v. City of Portland* proclaimed that no actions can be taken which affect the instream flow of those sections of Oregon's waterways which have been designated as wild and scenic. The Rogue River from its confluence with the Applegate River, just west of the city of Grants Pass, to Lobster Creek Bridge, 88 miles downstream, was included as a component of the national wild and scenic rivers system in 1968. In addition, the State has placed this reach within the State system of wild and scenic rivers. In response to the *Diack* decision, the State set standards of acceptable instream flows for the lower Rogue River (OWRD 1991b).

GPID Proof Survey

In 1982, the State completed a final proof survey of the water right permit issued to GPID. This is a process in perfecting a water right and is preparatory to issuing a water right certificate. Because GPID is now irrigating less than half the land claimed in its water right permit, the State issued a water right certificate for about 50 percent of GPID's historic diversion. GPID appealed, and in response, a temporary supplemental

water right permit was granted in April 1990 which allows additional diversion diversions until October 1, 1994. This permit was extended to October 15, 1999 (see attachment G).

This temporary permit carried several stipulations (see Attachment B). One of the stipulations was the formation of an oversight committee to advise and help the district comply with the other terms of the permit. The permit oversight committee (POC) consisted of representatives of GPID's board, non-voting GPID members, the city of Grants Pass, Josephine County, Oregon Water Resources Department (OWRD), the Oregon Department of Fish and Wildlife (ODFW), the Oregon Water Resources Commission, Natural Resources Conservation Service (NRCS)¹, Reclamation, and WaterWatch of Oregon.

Reclamation was asked by both GPID and the State to provide technical assistance in evaluating options for complying with the water permit requirement for improving fish passage at Savage Rapids Dam. Through this permit, Oregon has officially recognized Reclamation as a major participant in the effort to resolve fish passage problems at Savage Rapids Dam.

Flow Measurement

Effective December 31, 1991, OWRD no longer jointly funds the U.S. Geological Survey to measure riverflows and levels at 92 stations. This amounts to more than one-third of the approximately 250 measuring stations throughout the State. Responsibility for collecting data from these stations has now shifted to local water user entities including GPID.

Ballot Measure 5

On November 6, 1990, Oregon voters passed a property tax cutting plan known as "Ballot Measure 5." The effects of the measure are widespread as it effectively limits funding of State and local taxing entities. The measure has seriously affected irrigation districts by changing the rules and costs for "buy outs." Maintaining the financial integrity of such districts was previously accomplished by granting the districts the legal authority to prevent water users who had access to district water from buying out, or withdrawing, from the district. Under Measure 5, anyone can buy out of

¹Renamed from the former Soil Conservation Service

an irrigation district, and this introduces uncertainty into district management and budget processes. Since passage of the measure, over 200 patrons of GPID have bought out of the district.

County

The Josephine County Water Master's Office and GPID are cooperating in a surface water measurement study. Reclamation has supplied flow meters, measuring flumes, and water level recorders, while the district provides measurement flumes and has provided the staff for installation and monitoring within the general GPID service area. The Watermaster has helped with calibration of flow measurement devices.

Specific goals and policies of the county, which include zoning regulations to preserve agricultural land and the rural character of the county are outlined in the Josephine County Comprehensive Plan.

The Josephine County Water Resources Department sponsored a jointly funded study with the city of Grants Pass and Reclamation to ". . . clarify groundwater resources in the Grants Pass area . . ." Findings of a review were reported in 1991 (Haskett 1991), and on December 18, 1992, a contractor for the city and the county published the results of the investigation (Newton 1992).

Local

The city of Grants Pass is studying ways to rehabilitate streams passing through the city. The primary focus of its efforts has been Gilbert Creek, which receives supplemental flows from the GPID irrigation system. Restrictive zoning within the stream corridor and restoration of the streambank are activities now underway.

Grants Pass contracted with Brown & Caldwell, a consulting engineering firm, to provide a facilities plan for the city. Current emphasis is on the city's sewer treatment facilities with plans to upgrade and enlarge them within the next few years.

The city of Grants Pass and Josephine County have developed flood control plans which use GPID's distribution system to intercept and carry storm runoff. Most storms with the potential to cause flooding occur between irrigation seasons.

To enhance fish habitat, GPID and local interests have constructed flumes where the South Highline Canal crosses Fruitdale Creek, Allens Creek, and Sand Creek. The flumes were constructed over the creeks to separate canal flows from creek flows while providing an opportunity to release canal water into the creeks to enhance instream flow.

STUDY CONDUCT

Initial scoping for the JCWMIS began in 1988 and continued into 1989. A multidisciplinary planning team, appointed by Reclamation, met throughout 1989 with State, County, GPID and others in scoping activities and helping to identify tasks and roles. Because of changes in study participation and direction, the study was rescoped and some study roles changed in 1990.

Public involvement activities have been largely a local responsibility overseen by Reclamation. Initially, Josephine County developed an overall community involvement process in 1989 for use in developing the County master water plan. This formed the basis for public involvement, but most activities after 1990 were managed by GPID and its contractor, DNA.

The following, listed in alphabetical order, made significant contributions to the JCWMIS:

- City of Grants Pass
- Grants Pass Irrigation District
- Jackson County (Parks Department)
- Josephine County (Planning, Water Resources, and Parks Departments)
- National Marine Fisheries Service
- Oregon Department of Fish and Wildlife
- Oregon Water Resources Department
- Natural Resources Conservation Service
- U.S. Fish and Wildlife Service
- WaterWatch of Oregon

In addition to the entities listed above, environmental interests, citizens, and businesses of Josephine and Jackson Counties provided valuable assistance in the study. Additional information on public involvement is in Chapter VIII.

GPID OVERVIEW

Area

Savage Rapids Dam and the GPID service area are within the lower part of the middle Rogue River basin which includes most of Josephine County and a large part of Jackson County. The middle Rogue is surrounded by mountains, and more than three-fourths of the basin is forest or timberland. The Rogue River is a designated wild and scenic waterway from its junction with the Applegate River just west of Grants Pass downstream to Lobster Creek Bridge about 10 miles upstream from the mouth at the Pacific Ocean.

Nearly one-half of the total basin area and most of the basin population is contained in the central valley region. Medford, Oregon, the largest city in the region, is located about 30 miles southeast of Grants Pass. Because of this population concentration, most of the basin's economic development has also taken place within the central valley and is based on the lumber and wood products industries, agriculture, and recreation. Most of the usable land within the valley is well developed and fully utilized within the limits imposed by climatic conditions, soils, topographic features, and availability of water. Urban growth has significantly encroached on commercial agricultural land.

Climate

The area has generally mild, wet winters and hot, dry summers. The city of Grants Pass, located in the central valley, receives about 30 inches of precipitation annually, most of which falls during October through May. On the average only 2 inches of precipitation fall during June through September.

GPID Facilities¹

The GPID, organized in 1916, serves lands in Josephine and Jackson Counties (see Grants Pass Irrigation District map). The original projected service area included about 18,400 acres along Evans Creek and both sides of the Rogue River from the town of Rogue River to west of the city of Grants Pass. In the 1930's, the service area was cut to about 12,600 acres because the higher elevation lands were not economical to serve. Since that time, the service area has gradually declined to about 7,400 acres, largely because of residential and commercial encroachment. Under Reclamation's current land classification criteria, most of the service area, although arable, would now be classed as nonagricultural due to increased per unit service costs associated with many smaller land parcels.

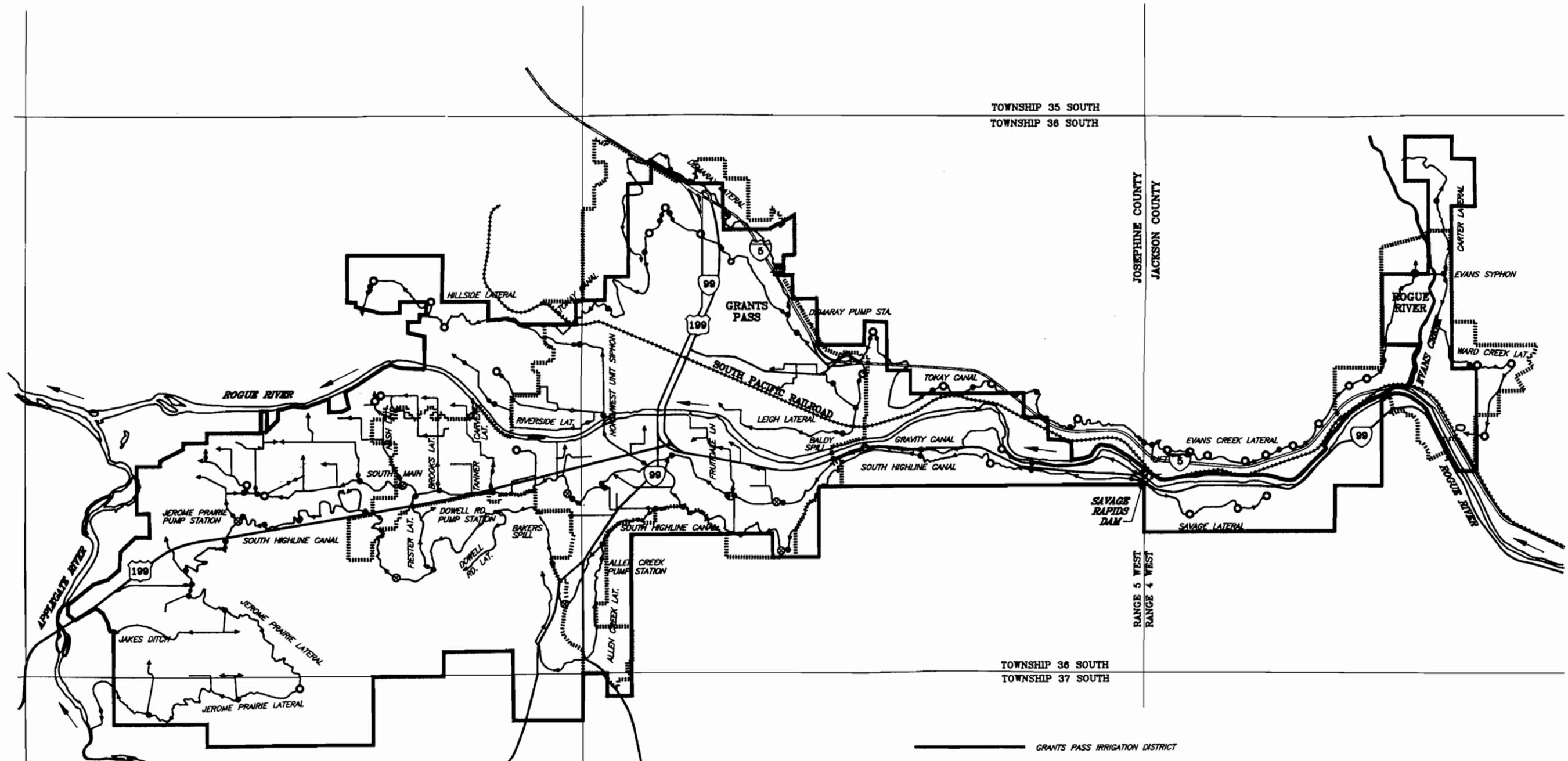
All of GPID's original facilities were privately constructed. Major facilities consist of Savage Rapids Dam, a main pumping plant consisting of three hydraulically-driven pumps located on the right abutment, nearly 160 miles of canals and four relift pumping plants. The district diverts about 180 cubic feet per second (cfs) of water from the forebay formed by the Savage Rapids Dam. About two-thirds of GPID's water supply is pumped from the Rogue River at Savage Rapids Dam into gravity canals using hydraulically powered pumps (GPID has a nonconsumptive right for about 800 cfs to power its turbine pumps). The remaining water supply is diverted to the Gravity Canal through headworks located on the left abutment of the dam.

In 1949, GPID enlisted Federal assistance for modifications to the dam and existing fish screens and for constructing a siphon under the Rogue River. The siphon was completed in 1950 and repair and rehabilitation work on the dam was completed in 1955. Fish passage improvements were made in the late 1970's. In 1990, GPID spent \$50,000 to repair the cableway. More repairs are likely in the near future.

Savage Rapids Dam

Savage Rapids Dam, completed in 1921, is a concrete structure 464 feet long, with a maximum height of 39 feet (see photo I-1). Features consist of the north fish ladder, a pumping plant, a 16-bay overflow spillway

¹Several conventions are used in describing facilities. Left and right always assume the observer is looking downstream. The downstream end of a fishway (fish ladder) is the entrance (where adult fish enter) and the upstream end is the exit (where adult fish exit).



TOWNSHIP 35 SOUTH
TOWNSHIP 36 SOUTH

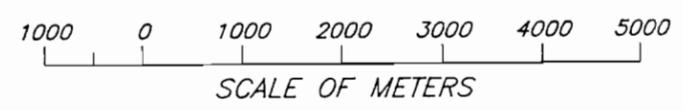
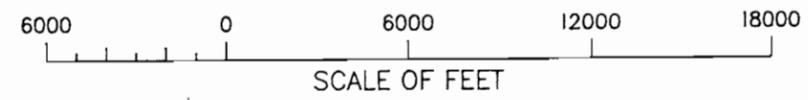
JOSEPHINE COUNTY
JACKSON COUNTY

TOWNSHIP 36 SOUTH
TOWNSHIP 37 SOUTH

RANGE 7 WEST
RANGE 6 WEST

RANGE 6 WEST
RANGE 6 WEST

RANGE 5 WEST
RANGE 4 WEST



- GRANTS PASS IRRIGATION DISTRICT
- ⋯⋯⋯ URBAN GROWTH AREA
- ⊙ GAGED SPILLWAY - RETURN FLOW TO ROGUE RIVER
- UNGAGED SPILLWAY - RETURN FLOW TO ROGUE RIVER
- END OF CANAL SEGMENT
- ◆ MEASURING STATION
- ◆ MEASURING STATION NOT INSTALLED

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
JOSEPHINE COUNTY WATER MANAGEMENT IMPROVEMENT - OREGON
GRANTS PASS IRRIGATION DISTRICT

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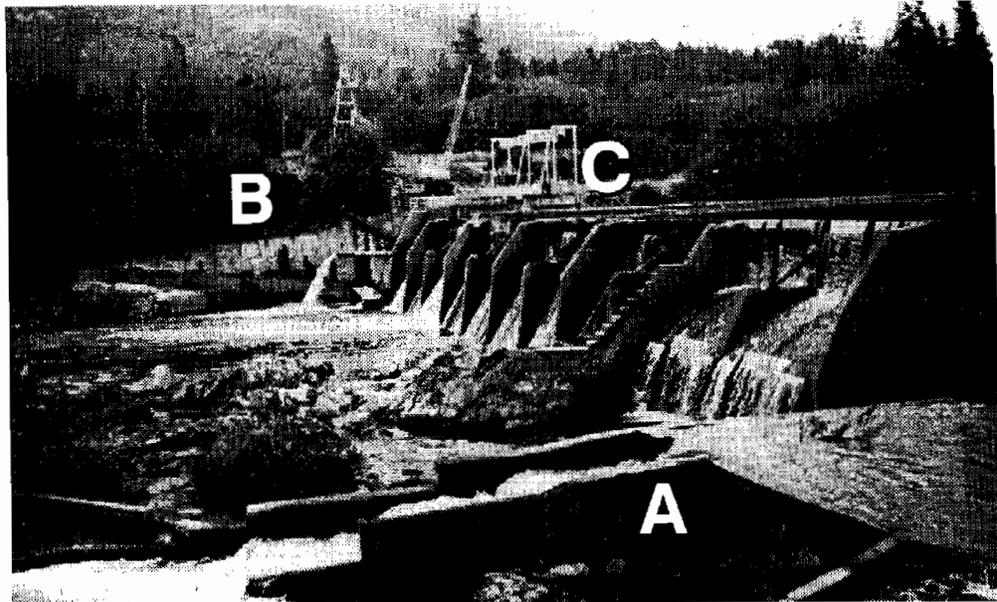
BOISE, IDAHO MAY 1992

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section, two radial gates at bays 10 and 11, the south fish ladder, and the Gravity Canal headworks.

The two existing 16-foot by 7-foot radial gates have a combined capacity of about 6,000 cfs. The radial gates are operated by hydraulic cylinders controlled remotely from the hoist house of the cableway. The radial gate bay structures have concrete flow shields over them to protect the gates from debris that might flow over the dam. These gates were rehabilitated in the 1950's and designed to last about 30 years. The radial gates are normally closed but are opened to lower the reservoir surface level.

At the beginning of the irrigation season, usually in late April, the radial gates are opened to lower the reservoir pool, allowing installation of the stoplogs. Three metal stoplogs are placed in each of the 16 bays to raise the reservoir water surface elevation 11 feet above the concrete crest of the dam to an elevation of 964 feet above mean sea level. Once this is done, the radial gates are partially closed to fill the reservoir without completely interrupting riverflow. Approximately 1,000 cfs are allowed to pass until the filling is completed and the fish ladders are functioning.



A - South fish ladder
B - North fish ladder
C - Support structure for bulkhead gates and fish screens of the pumping plant

Photo I-1--Savage Rapids Dam

The radial gates generally remain closed during the irrigation season and are opened in the fall to remove the stoplogs. After the stoplogs are removed, the radial gates are closed to maintain the reservoir level at the dam crest. This allows the south fish ladder to function during the winter months.

The reservoir is fully emptied or dewatered only when work is required on the radial gates, or when excessive sediment accumulation in front of the turbine-pump inlet must be removed mechanically.

Canals

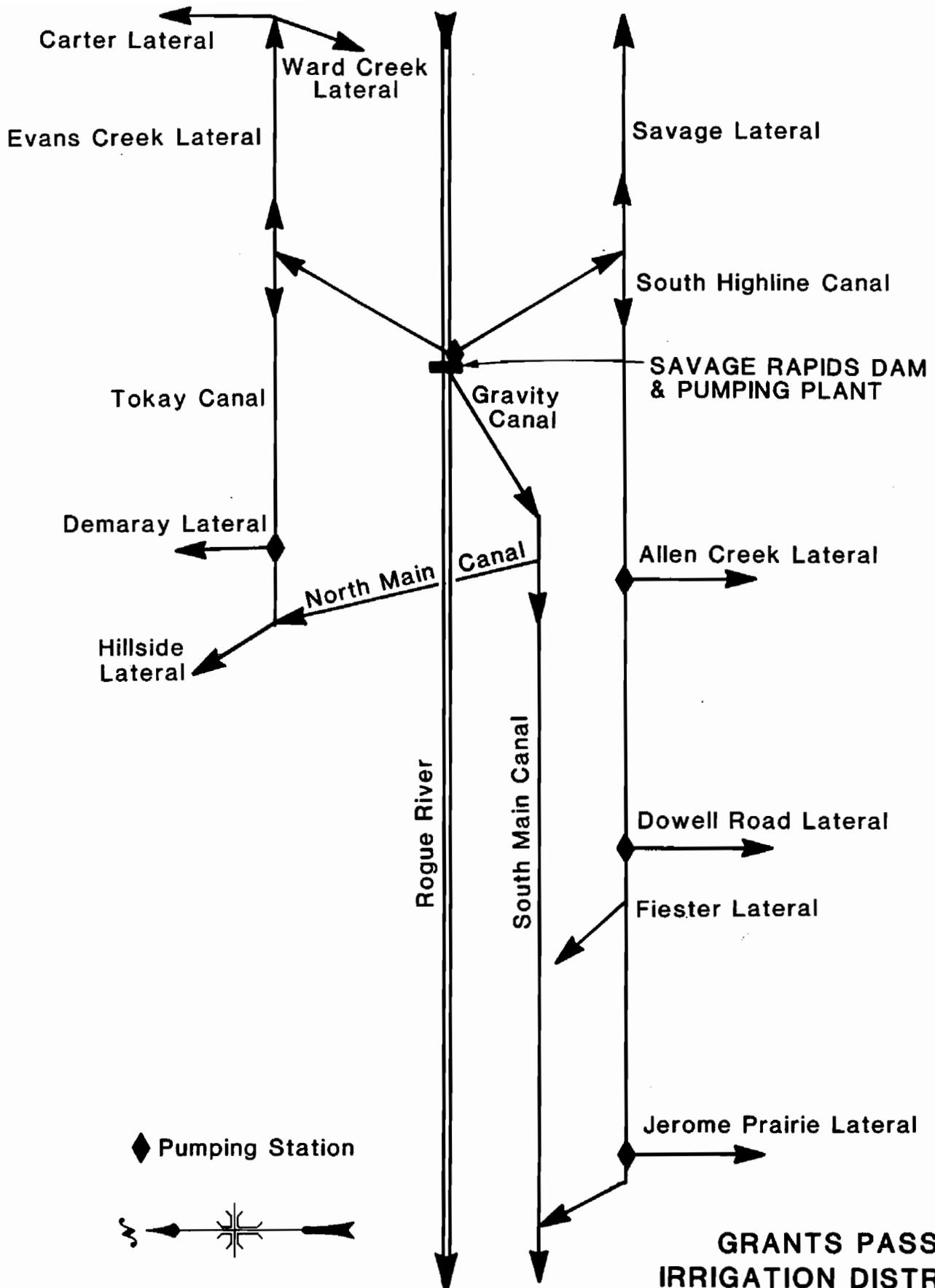
The main canals and laterals are South Highline Canal, Savage Lateral, Gravity Canal, Tokay Canal, and Evans Creek Lateral (see Grants Pass Irrigation District Schematic). Savage Lateral and Evans Creek Lateral carry water generally east into Jackson County, and the other canals carry water generally west into Josephine County. Gravity Canal serves the lowlands along the river on the south side of the river. Service to higher elevation lands on both sides of the river is provided by the other canals.

Gravity Diversion

The largest diversion (73 cfs) is through the headworks on the south side of the dam to Gravity Canal. Two slide gates control flows into the head of the canal.

Rotary Drum Screens

Two rotary-drum screens are located on Gravity Canal about 130 feet downstream from the headworks. Each screen is 5 feet in diameter by 8 feet long. A single paddle wheel provides the power to operate the two screen (see photo I-2).



**GRANTS PASS
IRRIGATION DISTRICT
SCHEMATIC**



Photo I-2.—Gravity Canal rotary fish screen, partially closed for flow control by wooden stoplogs on the right side of the screen. The paddle wheel used to drive the rotating screens is also visible in the photo.

Pumping Operation

Pumping facilities, located at the right abutment (north side) of the dam, consist of two hydraucone turbines and three centrifugal pumps. The turbines operate at a hydraulic head of 29 feet. The left turbine drives a centrifugal pump with a capacity of 67 cfs which lifts water 90 feet to a distribution box on the south side of the river (South Highline Canal). The right turbine drives two pumps, connected in series, which provides a capacity of 40 cfs to lift water 150 feet to the distribution box on the north side of the river (Tokay Canal).

The hydraulic turbines and pumps operate at full or nearly full capacity throughout the irrigation season. Curtain gates operated by an electric hoist provide some control of flow to the turbines and pumps.

Sediment Control

Four sluice gates at the turbine structure are used to flush sediment deposits which build up in front of the screen structure. The combined capacity of the sluice gates is 2,000 cfs.

Pumping Plant Fish Screens

Designed to prevent small fish from entering the turbines and pumps, the fish screen structure consists of two vertical traveling screens, 8 feet wide and 32 feet high. They do not meet current National Marine Fisheries Service (NMFS) criteria. These screens operate when the pumps and turbines are running during the irrigation season. In the past few years, the screens have been damaged twice, resulting in stoppage of irrigation deliveries for significant periods of time.

North Fish Ladder

Approximately 150 feet long, the north fish ladder is a concrete structure with rectangular pools 8 feet long and 9 feet wide. The entrance is located near the base of the dam next to the exit of the discharge flow of the turbines. The exit of the fish ladder is located adjacent to the intake of the pumping plant.

South Fish Ladder

Approximately 100 feet long, the south fish ladder is a concrete structure containing 10 pools (see photo I-3.) Several fish resting pools and attraction channels extend from the Rogue River to the fish ladder entrance at the base of the dam (see photo I-4.). The ladder is somewhat unusual in that the ladder exits to Gravity Canal rather than directly to the reservoir. Fish moving upstream in the fish ladder exit the ladder into Gravity Canal just upstream of the rotary fish screens and must continue upstream through the headgates of the canal to exit to the river.

The south fish ladder also serves as the conveyance for downstream migrants which enter the headworks of the Gravity Canal. At the rotary screens, the downstream migrants move to a bypass which empties into the fish ladder which passes the migrants on downstream.

Photo I-3.—Downstream view of south fish ladder.



Photo I-4.—Fish resting pools at the downstream end of the south fish ladder.

