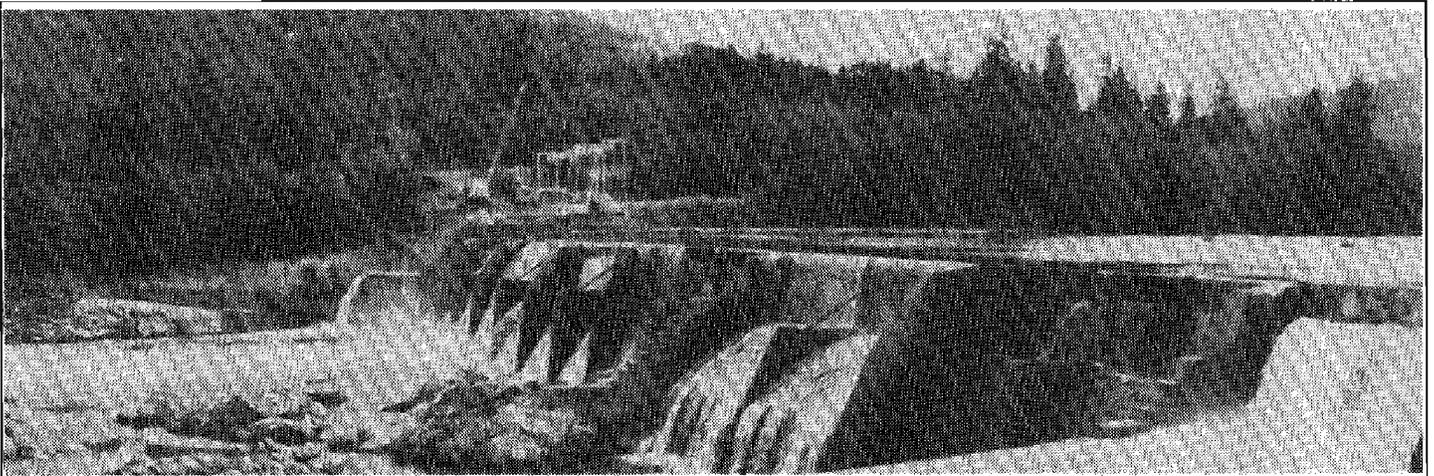


***Fish Passage Improvements
Savage Rapids Dam***



**PLANNING REPORT
AND
FINAL ENVIRONMENTAL STATEMENT**



**JOSEPHINE COUNTY
WATER MANAGEMENT IMPROVEMENT STUDY, OREGON
Rogue River Basin, Oregon**



**U.S. DEPARTMENT OF THE INTERIOR
Bruce Babbitt, Secretary**



**BUREAU OF RECLAMATION
Daniel P. Beard, Commissioner**

PRINTING HISTORY

- **The document *Fish Passage Improvements, Savage Rapids Dam, Oregon, Planning Report and Final Environmental Statement* was released in August 1995.**
- **First reprinting — November 1997; 30 copies. This included the same material as the original PR/FES except that the “Record of Decision” (March 1997) and “Amendment to Record of Decision” (April 1997) were added.**
- **Second reprinting — December 2000, 15 copies.**
- **Third reprinting — January 2004; 15 copies.**

AMENDMENT TO THE RECORD OF DECISION

FOR

**BUREAU OF RECLAMATION
FINAL ENVIRONMENTAL IMPACT STATEMENT**

**FISH PASSAGE IMPROVEMENTS
SAVAGE RAPIDS DAM, OREGON**

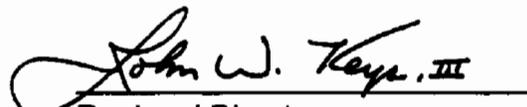
APRIL 1997

The Record of Decision (ROD) signed on March 14, 1997, contains an error pertaining to the Grants Pass Irrigation District's (GPID) position on the Preferred Alternative. The ROD indicates that the GPID appears not to support the Preferred Alternative but instead wishes to pursue other options. GPID has not voted to support any alternative other than the one presented as the Preferred Alternative. In addition, GPID has not requested permission from the Oregon Water Resources Commission to modify its current fish passage plan, which is the same as the Preferred Alternative.

Therefore, on page 4 of the ROD, the last sentence of the first paragraph under VIII. Decision is deleted and replaced with the following sentence: "However, the Preferred Alternative lacks widespread public acceptance."

APPROVED:

Date APRIL 17, 1997


Regional Director
Pacific Northwest Region
Bureau of Reclamation



United States Department of the Interior

BUREAU OF RECLAMATION

Pacific Northwest Region
1150 North Curtis Road
Boise, Idaho 83706-1234

IN REPLY REFER TO

PN-6519
ENV-6.00

MAR 20 1997

Subject: Record of Decision for Fish Passage Improvements at Savage Rapids Dam, Rogue River Basin, Oregon

Ladies and Gentlemen:

Enclosed for your information is a copy of the Record of Decision (ROD) for the subject project. The ROD finalizes Reclamation's study of alternatives to improve salmon and steelhead passage at Savage Rapids Dam.

The ROD identifies the Preferred Alternative, described in the Planning Report/Final Environmental Statement, as the most efficient and environmentally sound alternative for providing safe salmon and steelhead passage at Savage Rapids Dam. As indicated in the ROD, Reclamation will not be pursuing congressional action to authorize or fund the Preferred Alternative because the Grants Pass Irrigation District wishes to pursue a different course of action.

Thank you for your interest in this project. If you have questions about the ROD, please contact Mr. J. Eric Glover, Lower Columbia Area Manager, at (503) 872-2795.

Sincerely,


ACTING FOR
John W. Keys, III
Regional Director

Enclosure

RECORD OF DECISION

MARCH 1997

BUREAU OF RECLAMATION FINAL ENVIRONMENTAL IMPACT STATEMENT

<p>FISH PASSAGE IMPROVEMENTS SAVAGE RAPIDS DAM, OREGON</p>

I. INTRODUCTION

This document constitutes the Record of Decision (ROD) of the Bureau of Reclamation (Reclamation), Pacific Northwest Region, for fish passage improvements at Savage Rapids Dam. The investigation was conducted under authority of Public Law 92-199, enacted December 15, 1971 (85 Stat. 664). Savage Rapids Dam is an irrigation diversion structure constructed by the Grants Pass Irrigation District (GPID) in 1921. It is located on the Rogue River in southwest Oregon.

In 1971, Reclamation was authorized by the Congress to conduct feasibility studies of anadromous fish passage at the dam and improvements to the GPID irrigation system. The anadromous fish of concern are salmon and steelhead. Detailed studies of salmon and steelhead passage were completed in the 1970's and interim fish passage improvements were made between 1977-1981. Studies of irrigation system improvements were deferred at that time because of lack of local support. Additional anadromous fish passage improvements were deferred because of the uncertainty of potential hydropower development at the dam.

In 1988, Reclamation initiated the Josephine County Water Management Improvement Study in response to requests by Josephine County and the GPID. The main objectives of the study were to (1) identify a permanent solution to salmon and steelhead passage problems at Savage Rapids Dam and (2) help resolve conflicts over water uses in Josephine County. The Planning Report/Final Environmental Statement (PR/FES), filed on August 30, 1995, and this ROD focus only on salmon and steelhead passage concerns at the dam and the associated diversion facilities.

II. ALTERNATIVES CONSIDERED

Two action alternatives (Pumping and Dam Retention) and the No Action Alternative were evaluated in the PR/FES. The description of conditions that would exist with the No Action Alternative serves as the baseline for evaluating the effects of the action alternatives.

The Pumping Alternative was identified as the Preferred Alternative in the PR/FES. The Preferred Alternative consists of three parts: (1) replacement of GPID pumping and diversion facilities at the dam with two new pumping plants, one each on the north and south sides of the river; (2) removal of the dam and appurtenant structures and restoration of the site, and (3) forgiveness of the remaining debt to the Federal government amounting to \$290,525 as of 1994 (remaining debt as of 1997 is \$210,035).

The other action alternative, Dam Retention Alternative, would retain Savage Rapids Dam. Numerous modifications would be made to the dam and control structures to enhance salmon and steelhead passage and protection and operation of the dam and diversion facilities. New fish passage and protective facilities that meet current standards of the National Marine Fisheries Service (NMFS) would be constructed and river channel and dam crest modifications would be made. Existing hydraulic turbines and pumps would be replaced and discharge lines for the irrigation diversion would be replaced or rehabilitated with this alternative.

The No Action Alternative is the best estimate of what would happen in the future if an action alternative is not implemented. For this analysis, Reclamation assumed that GPID would continue to operate the current facilities, making repairs and replacements as needed for up to 20 years. It was further assumed that at some point within this time, the State of Oregon or the Federal government would intervene to mandate fish passage and protective improvements.

III. BASIS FOR FORMULATING AND SELECTING ALTERNATIVES

The action alternatives were formulated on the basis that Reclamation involvement must include (1) improved fish passage for steelhead and salmon and (2) facilities for the GPID diversions. The United States considers anadromous fish to be a national resource and has an interest in the continued operation of the GPID which has remaining debt due to the United States from earlier rehabilitation work by Reclamation.

Under Reclamation policy and Federal rules and regulations, all action alternatives must meet the criteria of completeness, effectiveness, efficiency, and acceptability. In testing whether or not alternatives meet these criteria: (1) monetary benefits to the Nation are compared with monetary costs, (2) economic effects of monetary transfers to the region are compared with transfers out of the region, (3) environmental effects are identified, and (4) other social effects are identified. Two action alternatives—Pumping and Dam Retention—were found to meet the four criteria, but at varying levels of effectiveness, efficiency, and local acceptability.

Reclamation is required to select the action alternative that provides the greatest net economic benefits. Net annual benefits to the Nation with the Pumping Alternative would be about double the net annual benefits with the Dam Retention Alternative. The Pumping Alternative was selected as the Preferred Alternative on the basis that it would be more effective by providing greater fish benefits and would be more efficient by costing less.

IV. ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Reclamation believes that the Preferred Alternative, as presented in the PR/FES, is the environmentally preferable alternative.

V. MAJOR ISSUES

- In 1994, the board of directors for the GPID passed a resolution supporting removal of the dam and construction of pumping plants. The State of Oregon based the extension of a supplemental water permit for GPID in part on implementation of the Preferred Alternative. However, the membership of the board of directors has changed and current members of the board do not actively support removal of Savage Rapids Dam (the Preferred Alternative). The new board members are involved in reassessing the GPID position based on financial and legal considerations.
- During the public review process for the PR/FES, it became clear that some members of the public were highly opposed to removal of the dam. The main opposition was based on maintaining the seasonal lake formed by Savage Rapids Dam. However, there is a widespread misconception that removal of the dam would eliminate irrigation in the area, and there seemed to be widespread skepticism that anadromous fish are killed at the dam.
- After completion of the PR/FES, the Oregon Legislature passed a law directing establishment of a task force to review the findings of the report and to make recommendations. That task force has completed its work and recommends a third action alternative which is similar to the Dam Retention Alternative but would replace the hydraulically powered pumps with electrically driven pumps.

The alternative identified by the task force has not been evaluated under National Environmental Policy Act (NEPA) requirements. That evaluation would be required before Reclamation could fully compare the task force alternative with the Preferred Alternative identified in the PR/FES. The cost of the task force alternative has been identified and is greater than that of the Preferred Alternative. However, the task force proposes to add other sources of financing so that the Federal cost share for the task force alternative would be less than for the Preferred Alternative. At this time, the task force has not offered a specific proposal in that regard.

Although benefits of the task force alternative have not been identified, those benefits would be comparable to those identified for the Dam Retention Alternative identified in the PR/FES. As a result, net benefits would be less with the task force alternative than with the Preferred Alternative identified in the PR/FES.

- In March 1995, the NMFS proposed listing a specific stock of coastal steelhead and, in July 1995, proposed listing three evolutionarily significant units of coho salmon on the Pacific coast as threatened under the Endangered Species Act (ESA). Coho salmon and steelhead that pass Savage Rapids Dam belong to fish stocks included in the proposal. In each case, a final decision was to be made within 12 months. However, the proposal on steelhead has been expanded to their entire geographic range along the West Coast. Conflicting data on coho required additional time for study. As a result, final determinations on coho and steelhead listings are scheduled for mid-1997. A final ESA listing determination for either species would require Section 7 consultations with NMFS before implementation of an action alternative at Savage Rapids Dam.

VI. PUBLIC RESPONSE TO FINAL ENVIRONMENTAL STATEMENT

Following the filing of the FES on August 30, 1995, Reclamation received two letters of comment.

- Randy Hinke commented that removal of the Savage Rapids Dam could have some civil defense implications. Reclamation referred the letter to the Federal Emergency Management Agency (FEMA). FEMA responded to Mr. Hinke that there was no policy on national emergency preparedness policy relative to removal or retention of Savage Rapids Dam.
- Lynn and Della Berntson stated in a letter of comment that they were not pleased with any plan to remove Savage Rapids Dam, disagreed with Reclamation's evaluation of the effect of Savage Rapids Dam on salmon and steelhead, and were skeptical of the costs of the two alternatives. They also urged Reclamation to "simply fix the ladder using local contractors." A response was not considered necessary because the comments merely reflected opinion and preference.

VII. ENVIRONMENTAL COMMITMENTS

The environmental commitments, monitoring, and enforcement programs discussed in the PR/FES are neither meaningful nor applicable to Reclamation's decision and are, therefore, not discussed in this ROD.

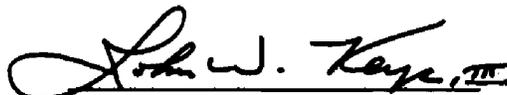
VIII. DECISION

The Preferred Alternative (Pumping Alternative) is the most efficient and environmentally sound alternative for providing safe salmon and steelhead passage at this irrigation diversion. In addition, the Preferred Alternative would reestablish a free flowing reach of river while extending the useful life of the irrigation diversion facilities and protecting the Federal investment. However, it appears that neither the GPID nor the task force appointed by the Governor support the Preferred Alternative; they wish to pursue other options.

Reclamation considers its study of alternatives to improve salmon and steelhead passage at Savage Rapids Dam and the evaluation of those alternatives under NEPA to be complete. Reclamation will not pursue congressional action to authorize or fund implementation of the Preferred Alternative identified in the PR/FES.

APPROVED:

Date MARCH 14, 1997

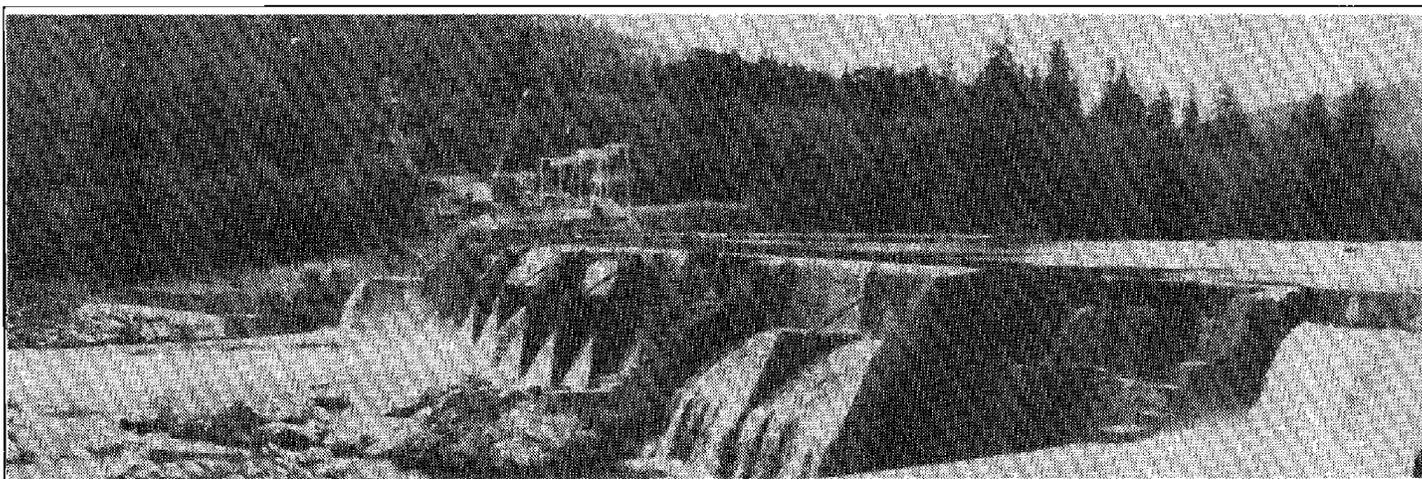


Regional Director
Pacific Northwest Region
Bureau of Reclamation

***Fish Passage Improvements
Savage Rapids Dam***



**PLANNING REPORT
AND
FINAL ENVIRONMENTAL STATEMENT**



**JOSEPHINE COUNTY
WATER MANAGEMENT IMPROVEMENT STUDY, OREGON
Rogue River Basin, Oregon**



**U.S. DEPARTMENT OF THE INTERIOR
Bruce Babbitt, Secretary**



**BUREAU OF RECLAMATION
Daniel P. Beard, Commissioner**

Planning Report/Final Environmental Statement

Fish Passage Improvement Savage Rapids Dam

Prepared by:

Pacific Northwest Region
Bureau of Reclamation
Department of the Interior

This is an integrated Planning Report/Final Environmental Statement (PR/FES) on a proposal for the Bureau of Reclamation to significantly enhance the salmon and steelhead populations of the Rogue River in Oregon. This PR/FES presents the results of agency and public review of the Planning Report/Draft Environmental Statement (PR/DES). Revisions were made to correct errors in the PR/DES and to accommodate other comments; however, no changes were made in the facilities of either action alternative or the evaluation of those alternatives.

Development objectives of significantly improving anadromous fish passage and maintaining a water diversion for the Grants Pass Irrigation District located in Jackson and Josephine Counties severely limited the possible alternatives. The federally preferred alternative and the preferred alternative of fish and wildlife agencies is the pumping alternative. Major plan elements include (1) construction of two electric powered pumping plants, one on each side of the river near the site of the existing dam, with a total capacity of 150 cubic feet per second and (2) demolition of the existing dam and related facilities and disposal of the waste. It is also proposed that the existing debt to the Federal government for rehabilitation work on the dam be forgiven as the dam would no longer exist. The other viable alternative is to leave the dam in place and provide new fish passage and protective facilities that would meet current standards of the National Marine Fisheries Service. New hydraulic turbines, pumps, and discharge lines for the irrigation diversion would be installed with this alternative.

The PR/DES was released to the public on December 15, 1994, and a public hearing on the PR/DES was held on February 16, 1995, in Grants Pass, Oregon. A Federal decision on the proposed project will not be made until at least 30 days after the PR/FES is filed with the Environmental Protection Agency and a Notice of Availability” appears in the *Federal Register*.

For further information, please contact Robert J. Hamilton, Bureau of Reclamation, 1150 North Curtis Road, Boise, Idaho 83706-1234, or call (208) 378-5087.

Statement number: **95-34**

Filing date: **August 30, 1995**

MISSION STATEMENTS

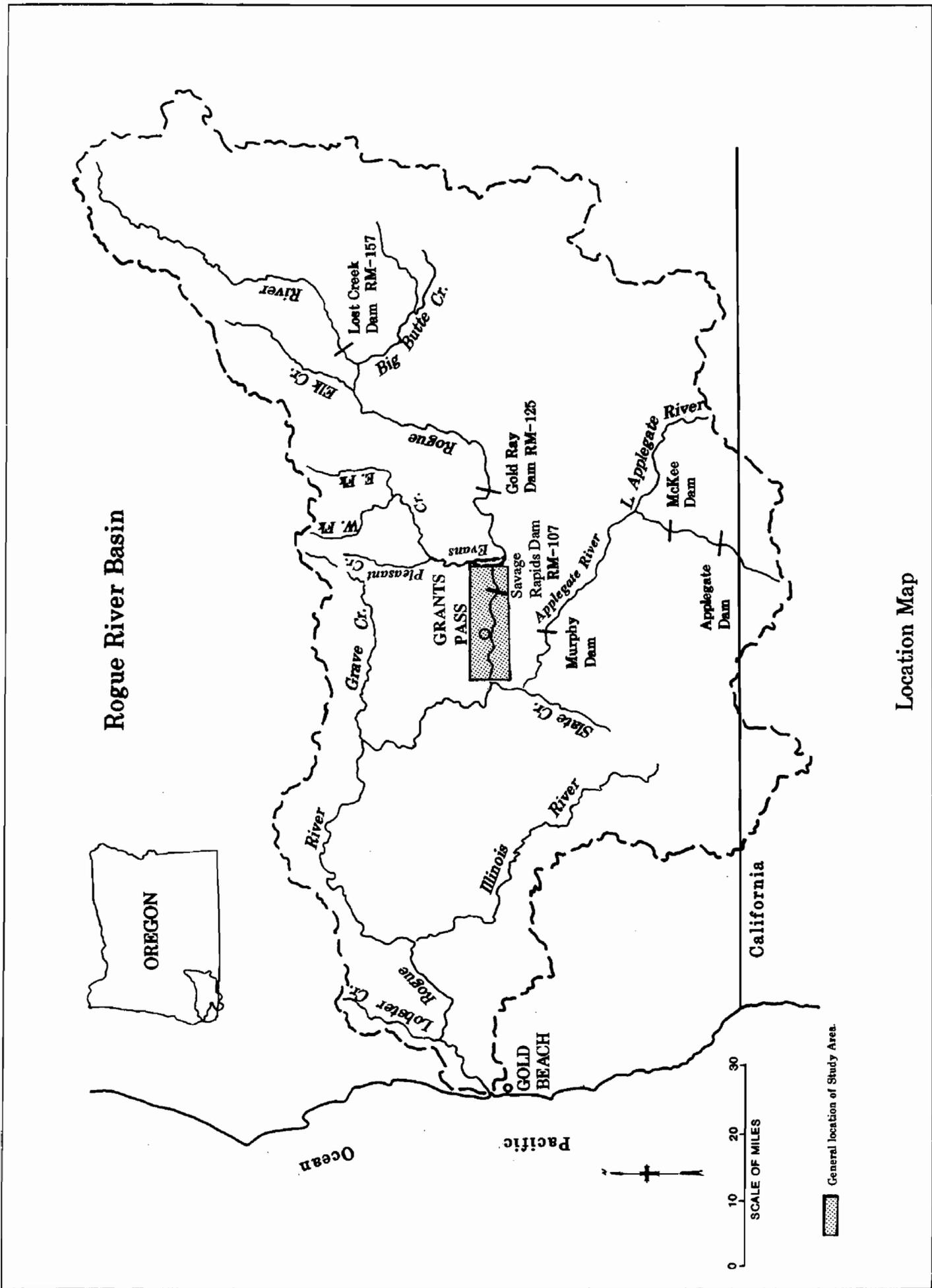
As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

THIS REPORT WAS PREPARED UNDER THE AUTHORITY OF THE FEASIBILITY STUDIES ACT OF DECEMBER 15, 1971 (P.L. 92-199), AND THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (P.L. 91-190, AS AMENDED). PUBLICATION OF THE FINDINGS OF THIS REPORT SHOULD NOT BE CONSTRUED AS REPRESENTING EITHER THE APPROVAL OR DISAPPROVAL OF THE COMMISSIONER OF THE BUREAU OF RECLAMATION OR THE SECRETARY OF THE INTERIOR. THE PURPOSE OF THIS REPORT IS TO PROVIDE INFORMATION AND ALTERNATIVES FOR FURTHER CONSIDERATION BY THE PUBLIC, BUREAU OF RECLAMATION, AND DEPARTMENT OF THE INTERIOR.

Abbreviations and Acronyms

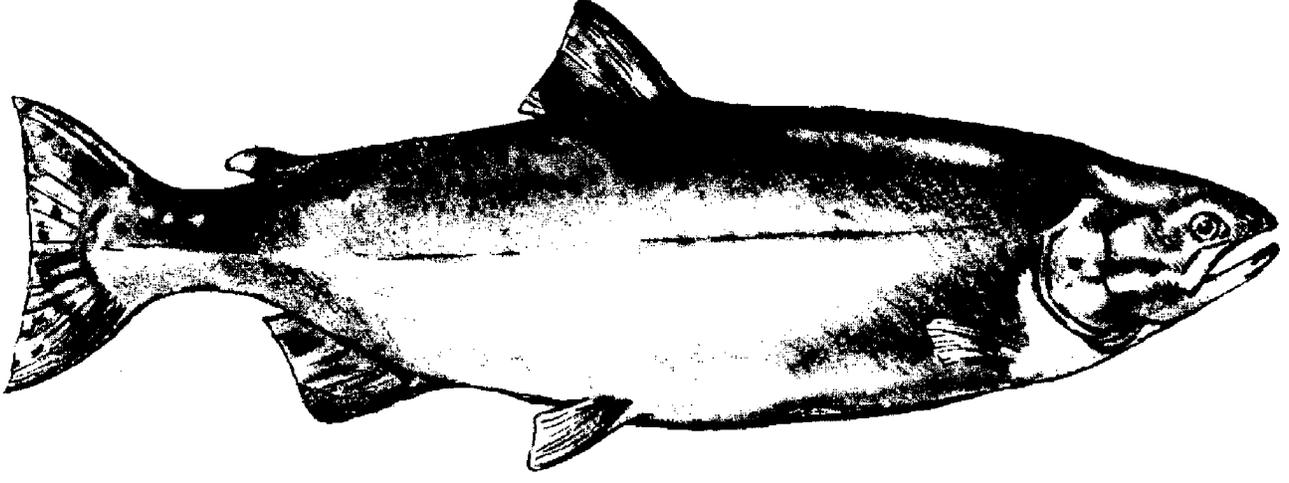
BLM	Bureau of Land Management
cfs	Cubic feet per second
Corps	U.S. Army Corps of Engineers
DNA	David J. Newton Associates, Inc.
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
GPID	Grants Pass Irrigation District
gpm	Gallons per minute
ITA	Indian Trust Asset
JCW MIS	Josephine County Water Management Improvement Study
kW	Kilowatt
kWh	Kilowatt-hours
NED	National Economic Development
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OMR&P	Operation, management, replacement, and power
OWRD	Oregon Water Resources Department
P.L.	Public Law
P&G	Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies
POC	Permit Oversight Committee
PR/ES	Planning report/environmental statement
Reclamation	Bureau of Reclamation
RED	Regional Economic Development
RM	River mile
RV	Recreational vehicle
SHPO	State Historical Preservation Officer
T&E	Threatened and endangered (species)
USFWS	U.S. Fish and Wildlife Service
°F	Degrees Fahrenheit



Rogue River Basin

Location Map

General location of Study Area.



Purpose, Scope, and Authority

Savage Rapids Dam is located on the Rogue River where the river crosses the Josephine/Jackson County line in southwestern Oregon State. The dam is the primary irrigation diversion facility of the Grants Pass Irrigation District (GPID).

The Bureau of Reclamation (Reclamation) initiated the Josephine County Water Management Improvement study in 1988 in response to requests of Josephine County and the GPID. The main objective of the study was to (1) identify a permanent solution to fish passage problems at Savage Rapids Dam and (2) help resolve conflicts over water uses in Josephine County.

The scope of this report is limited to fish passage concerns at the dam and the associated irrigation diversion facilities. Water management concerns, including improved management of irrigation and other water supplies through facilities improvement and water conservation, are addressed in a separate document prepared by a private consultant for the GPID. That document has been reviewed by the Oregon Water Resources Commission and any implementation of development options will be privately financed and funded. Implementation of those development options would constitute non-Federal cost share as defined by Federal policy.

In 1971, Reclamation was authorized by the Congress to conduct feasibility studies of fish passage and irrigation system improvements. Detailed studies of fish passage were completed in the 1970's, and interim fish passage improvements were made between 1977-1981. Studies of irrigation system improvements were deferred at that time because of costs and lack of interest. Additional fish passage improvements were deferred because of the uncertainty of potential hydropower development at the dam.

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

Need for Action

The Rogue River salmon and steelhead trout fisheries in southwest Oregon are nationally renowned for diversity and productivity, and the Rogue River supports the largest wild population of these anadromous salmonids in

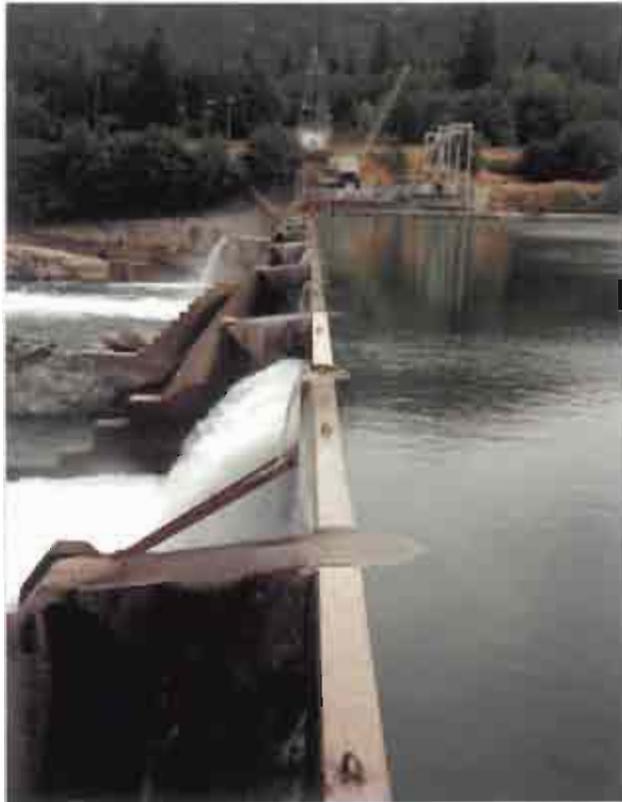
SUMMARY

Oregon. Nonetheless, Pacific Northwest salmon and steelhead fisheries, including those of coastal streams, are severely depressed from historic levels. Some runs of salmon in the Pacific Northwest and California have been listed as threatened or endangered under the Endangered Species Act.

At the time of this writing, none of the anadromous fish in the Rogue River system were listed under the Endangered Species Act (ESA). However, on March 16, 1995, the National Marine Fisheries Service (NMFS) proposed the "Klamath Mountains Province Steelhead" (all steelhead stocks between Cape Blanco, Oregon and Cape Mendocino, California) for listing as threatened under the ESA. This includes the steelhead runs of the Rogue River. On July 19, 1995, NMFS proposed three distinct populations of Coho salmon (from the San Lorenzo River in California to the Columbia River) for listing as threatened under the ESA; this includes the coho run of the Rogue River. In addition, all other anadromous trout species of Oregon, Idaho, Washington, California, and Montana and Pacific salmon (sea-run cutthroat trout and pink, chum, sockeye, and chinook salmon) are currently the subject of comprehensive status reviews which are expected to be completed in 1995 and 1996. Depleted stocks of salmon, especially coho, prompted the Pacific Fishery Management Council to prohibit all ocean fishing for salmon in 1994 along the Washington and northern Oregon coasts and banned all fishing for coho. For 1995, coho fishing is again banned and ocean fishing for other salmon is open but the allowable catch is severely restricted compared to historic levels.

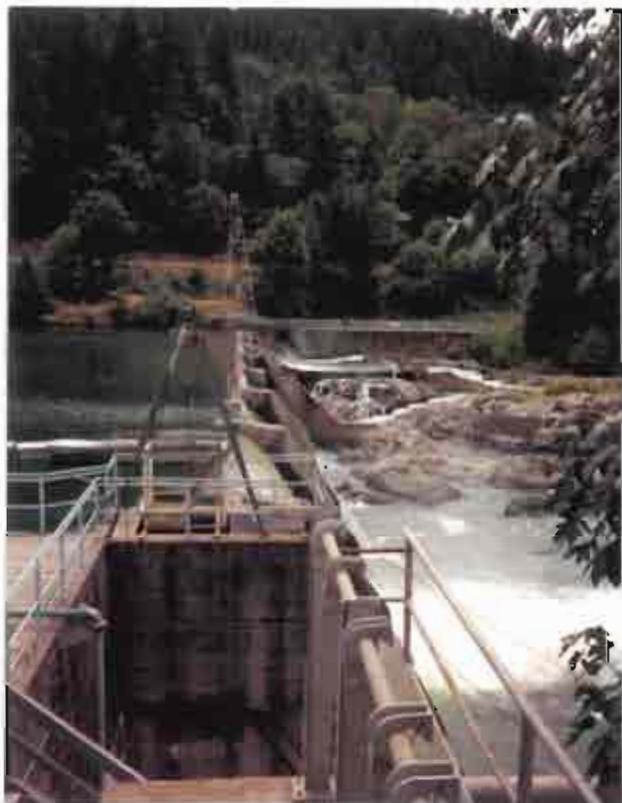
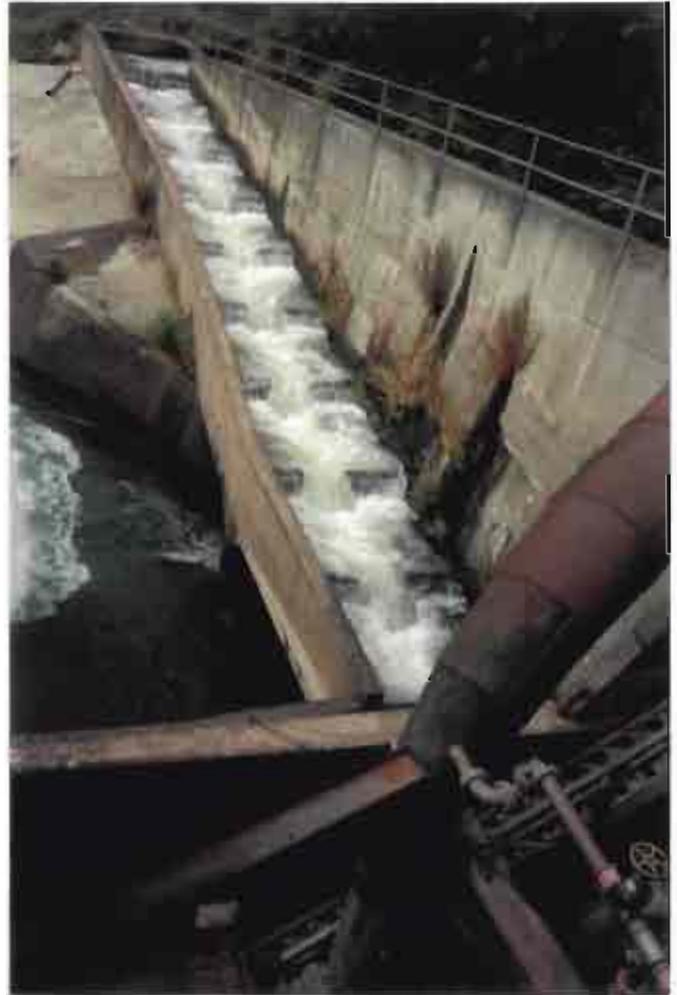
Fish passage at Savage Rapids Dam has been an issue since the dam was constructed in 1921 by the GPID. The concrete structure has a structural height of 39 feet, and a fish ladder was constructed on the north side at the time the dam was completed. A ladder on the south side was completed in 1934. Rotating fish screens were an initial part of the gravity diversion. Early attempts to screen the pumping diversion were unsuccessful, and this diversion remained essentially unscreened until 1958. Fish passage improvements made in the late 1970's have helped reduce losses, but fish passage problems continue. The existing fish screens do not meet current criteria of the NMFS.

Irrigation diversion and fish passage facilities are intimately related, and any change in facilities must consider both fish passage and irrigation diversions. The existing diversion facilities, including the hydraulically driven pumps, are old and nearing the end of their useful lives. These facilities are not capable of operating at the reduced rates expected to be required in the near future and need to be upgraded.



View of Savage Rapids Dam looking north from the left abutment (left).

The north fish ladder (below).



View of Savage Rapids Dam looking south from the right abutment (left).

Alternatives

Two permanent action alternatives were identified in the 1970's studies, and these were reviewed. Public involvement activities and consultation with Federal and State fish and wildlife and other agencies confirm that only two general concepts are viable. These concepts are: (1) construct electric pumping facilities and remove Savage Rapids Dam, and (2) retain Savage Rapids Dam and construct new fish passage and protective facilities to current standards and improve or replace irrigation diversion facilities for the long term. The concerns of most fishery, irrigation, recreation, and other interests are met by one of these alternatives.

Most of the fish and wildlife agencies and interests want the dam removed, and most GPID patrons appear to prefer the least cost alternative (Pumping Alternative). Some recreation and other interests and most residents that own land or businesses located along the shoreline of the seasonal reservoir formed by Savage Rapids Dam want to retain the dam and favor the Dam Retention Alternative.

Preferred Alternative (Pumping Alternative)

Environmental groups, the NMFS, the U.S. Fish and Wildlife Service (USFWS), and the Oregon Department of Fish and Wildlife support removal of Savage Rapids Dam. In January 1994, the GPID Board passed a motion to remove Savage Rapids Dam and replace it with pumping plants¹. Economic analysis indicates that the pumping alternative has greater net benefits and is, therefore, the federally Preferred Alternative².

On October 28, 1994, the Oregon Water Resources Commission, completed a review of the water conservation and fish passage plans recommended by GPID and accepted those plans. The Commission granted an extension of the temporary water permit until October 15, 1999. This permit is necessary to continue full service to GPID lands and the

¹The motion included several conditions, many relating to funding and financing the project (see Attachment E).

²The Water Resource Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* requires Federal water agencies to select the plan with the ". . . greatest net economic benefits compatible with protecting the Nation's environment . . ." as the preferred alternative.

SUMMARY

extension is contingent on implementing the plan to resolve fish passage including removal of Savage Rapids Dam.

The Preferred Alternative would eliminate all salmon and steelhead fish passage problems at Savage Rapids Dam and would increase salmon and steelhead escapement at the site by about 22 percent. (Escapement is the number of adults that return to spawn.) This 22 percent increase amounts to 26,700 spawners¹ which would result in a harvest increase estimated at 87,900 fish (sport and commercial fisheries) with an annual monetary value of \$4,998,600. New electric pumping facilities would extend the life of GPID diversion facilities; however, a monetary irrigation benefit was not identified.

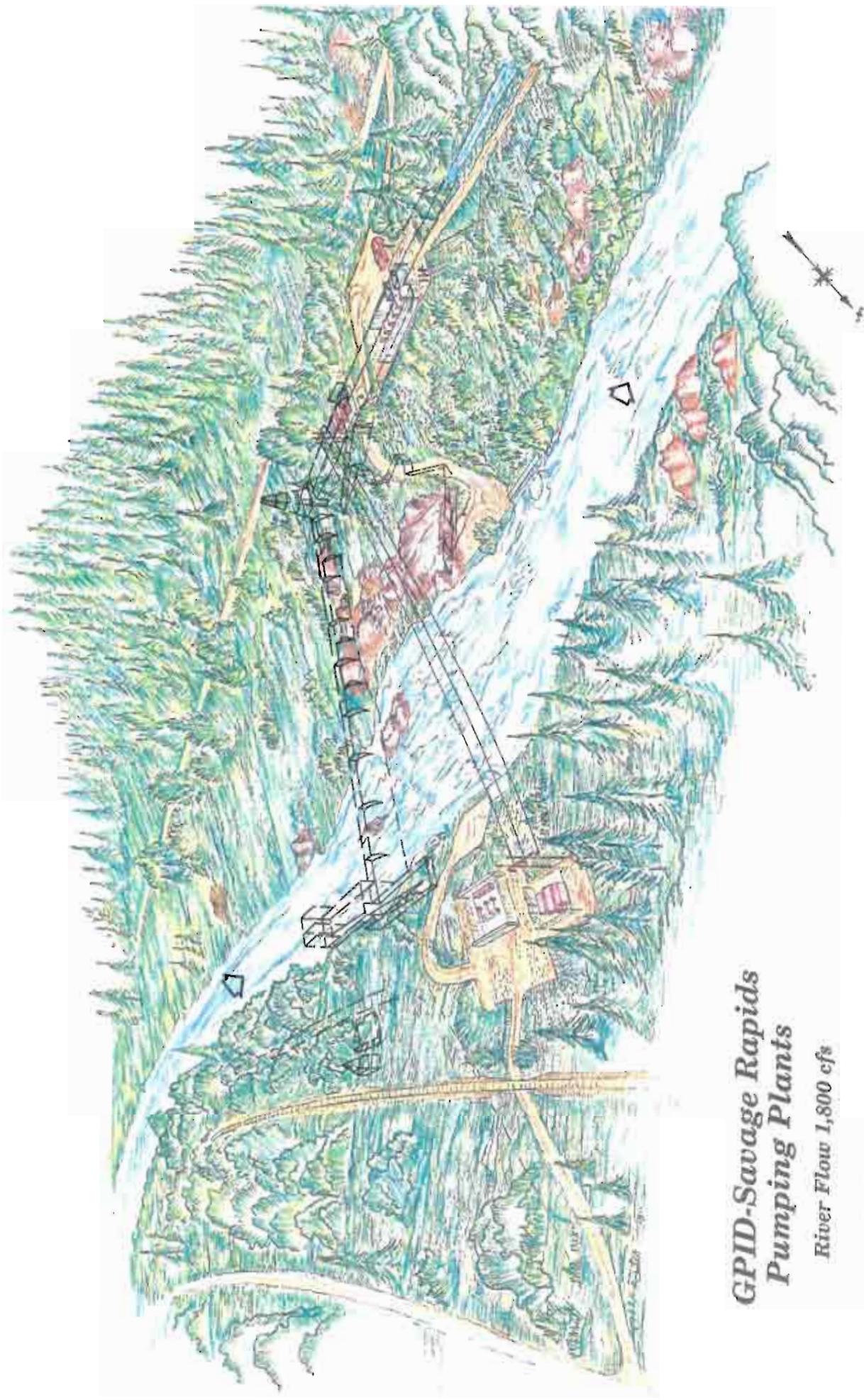
An electric powered pumping plant would be constructed on each bank just downstream from Savage Rapids Dam. Savage Rapids Dam and associated instream facilities would be removed (see artists conception - GPID Savage Rapids Pumping Plants). In addition, the remaining debt owed to the Federal Government for past construction on Savage Rapids Dam would be forgiven.

The north pumping plant would have a capacity of 32 cubic feet per second (cfs) and pump water to the existing Tokay Canal and Evans Creek Lateral. The south pumping plant would have a capacity of 118 cfs and pump water to the existing Savage Lateral, South Highline Canal, and Gravity Canal. Total diversion capacity of the pumping plants would be 150 cfs.

The outdoor type pumping plants would have vertical turbine pumps which operate in a wet sump. Noise abatement walls would surround the units and focus noise upward to reduce the noise level at the site and to help obscure the pumping plants from view. Electric power would be supplied to the plants from an existing 12-kilovolt distribution line on the south side of the river; an overhead powerline would extend from the south plant across the river to the north plant. Annual consumption of power is estimated at 5,675,800 kilowatt-hours (kWh).

Concrete box culverts that extend horizontally from the pumping plants to the river would carry water from the river to the pumping plant sumps. The box culverts at the river openings would be covered by vertical fish screens that meet current criteria; the screens would be protected by

¹The Oregon Department of Fish and Wildlife has recently estimated the escapement increase at 7,600-29,400 fish.



GPID-Savage Rapids Pumping Plants

River Flow 1,800 cfs

— — Facilities to be removed

Artist concept does not show nearby residences.

trashracks. The vertical screens, which would be oriented essentially parallel to the riverflow, would be 4 feet high and 22 feet long for the north plant and 75 feet long for the south plant.

New discharge pipelines from the pumping plants to existing facilities would be buried and follow the alignment of existing pipelines to the extent possible.

Construction of the Preferred Alternative would take about 5 years. Actual construction would begin with the pumping plants and end with removal of Savage Rapids Dam. Instream construction would be timed and coordinated with Federal and State fish and wildlife agencies to have the minimum effect on salmon and steelhead migration.

Construction of the Preferred Alternative is estimated at \$11,205,000 based on January 1993 prices. The estimated project cost, which includes interest during construction (8 percent interest over a 5-year construction period) is estimated at \$13,255,000. Annual operating costs are estimated at \$233,700 and include \$192,600 for electric power. In addition, the debt associated with earlier modifications to Savage Rapids Dam (amounting to \$290,525 in 1994) would be forgiven.

The Preferred Alternative would eliminate the existing seasonal reservoir and change the environment of the river from the site of Savage Rapids Dam to the upper end of the reservoir (about 3.5 miles upstream). This reach would become a free-flowing river with the loss of 110 acres of seasonal flatwater and associated flatwater recreation. Landowners along the reservoir reach (essentially all of the land is privately owned) could be expected to extend their developments further toward the new high waterline. The seasonal view of a reservoir and recreation associated with the seasonal reservoir would be eliminated. Lost recreation opportunities associated with flatwater would be offset by increased opportunities associated with a stable riverine environment. It is not expected that the Preferred Alternative would have significant or measurable effects on the quantity of long-term recreation opportunities, land values, land use, or water quality.

For this analysis, all costs of the Preferred Alternative were assigned to an anadromous fishery function since (1) all of the identified monetary benefits¹ are associated with the anadromous fishery function and (2)

¹Although replacing old irrigation facilities with new facilities would have benefits, monetary irrigation benefits accruing with a 20-year period of analysis would be difficult to identify and would be minor.

SUMMARY

removal of the dam would require replacement of irrigation diversion facilities lost due to removal of the dam. It was assumed that, in accordance with past practices, all costs for the anadromous fishery function would be nonreimbursable (to be borne by the Federal Government).

Dam Retention Alternative

With the Dam Retention Alternative, Savage Rapids Dam would be retained but modifications would be made to the structure, equipment, and the river channel. Existing pumping facilities would be replaced with new facilities, including discharge lines, new fish ladders would replace the current north and south side facilities, and new fish screens would be provided at the pumping plant intake and at Gravity Canal.

This alternative was formulated because landowners along the seasonal reservoir and some long-time residents, business interests, and other interests prefer to retain, rather than remove, Savage Rapids Dam. This alternative was also formulated to test the relative economic and environmental impacts of retaining Savage Rapids Dam while improving fish passage. The Dam Retention Alternative, however, has higher construction costs than the Preferred Alternative, and GPID patrons appear unwilling to pay the additional cost of the Dam Retention Alternative.

The Dam Retention Alternative would eliminate most of the salmon and steelhead passage problems and increase salmon and steelhead fish escapement at the site by about 17 percent. The increased escapement of 20,700 spawners¹ would result in an increased sport and commercial fishery harvest of 69,100 fish with an annual monetary value of \$3,870,900. New pumping facilities would extend the life of GPID diversion facilities, but provide no monetary irrigation benefits.

The Dam Retention Alternative includes numerous modifications to Savage Rapids Dam, replacement of associated facilities and equipment, and changes to the river channel. The north and south fish ladders, fish screens, diversion turbines and pumps, discharge lines, and the radial gates and gate controls would be replaced. Bays 8 and 9 at the center of the dam would be modified to direct flows to a new plunge pool, and the river channel on the south side below the dam would be reshaped. A juvenile

¹The Oregon Department of Fish and Wildlife have recently provided new estimates that range from 5,400 to 29,400. They indicate that the 29,400 estimate is highly optimistic.

fish counting facility would be constructed and public access to the south fish ladder would be improved. In addition, numerous operation and maintenance deficiencies would be corrected.

The new fish ladders would be fully functional over the anticipated range of riverflows at full pool elevation and at the lowered pool elevation that is maintained between irrigation seasons. Fish ladder designs provide for improved attraction flows which, along with improvements to the river channel, would attract adult fish through the range of anticipated flows.

Vertical fish screens for the pumping diversion would consist of four units 8 feet wide by 32 feet high. Fish screens for the gravity diversion would consist of five rotary drum screens. New fish screens would have 1/8-inch clear openings and would be angled to provide an approach flow (right angle to screen) velocity of less than 0.4 feet per second. Sweeping flow (parallel to the screen surface) velocity would be twice that of the approach flow velocity.

Single-runner turbine units and single stage double-suction pumps would replace existing units and would supply a maximum of 32 cfs to the Tokay Canal and 59 cfs to the Highline Canal. New discharge pipelines, with the exception of the pipeline embedded in the dam, would be buried; the embedded pipeline would be rehabilitated.

Construction of the Dam Retention Alternative would take about 6 years. Actual construction would begin with the staged removal and replacement of the existing fish ladders so that one ladder would always be operational. Instream construction would be timed and coordinated with Federal and State fish and wildlife agencies to have the minimum effect on salmon and steelhead migration.

Construction of the Dam Retention Alternative is estimated at \$17,634,000 based on January 1993 prices. The project cost, assuming 8 percent interest over a 6-year construction period, is estimated at \$21,343,000. Annual operating costs are estimated at \$104,800.

For this analysis, all of the costs associated with fish passage, protection facilities, counting, and viewing were assigned to the anadromous fishery function and the remaining costs were assigned to the irrigation function. Capital costs assigned to the fishery function are \$14,786,000, and costs assigned to irrigation are \$2,848,000. It was assumed that all anadromous

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fishery costs would be nonreimbursable, to be borne by the Federal Government. It was further assumed that irrigation costs would be privately financed by GPID without cost to the Federal government.

No Action Alternative

The No Action Alternative is the best estimate of what would happen in the future if an action alternative is not implemented. The description of conditions that would exist with the No Action Alternative serves as the baseline for evaluating the effects of the action alternatives.

Due to uncertainties, several reasonable scenarios could be constructed. For this analysis, Reclamation assumed that GPID would continue to operate the current facilities, making repairs and replacements as needed and that salmon and steelhead losses at Savage Rapids Dam would continue at current or near current levels for up to 20 years. It is unlikely that these conditions would continue beyond a period of 20 years. At some time, the State or Federal government would intervene to mandate fish passage and protective improvements. The effect at that time on GPID and the community could be dramatic depending on the solution implemented. Because of these uncertainties, Reclamation's analysis of effects is based on a 20-year period instead of the 100-year project life normally used in Reclamation analyses.

Evaluation

Features, accomplishments, and monetary and other effects are summarized in the Summary Table. There are major differences in costs and monetary benefits between the two action alternatives:

- **Costs:** The construction cost of the Preferred Alternative is significantly less (about two-thirds) than that of the Dam Retention Alternative; \$11,205,000 compared to \$17,634,000. Comparisons of project costs and annual equivalent costs for the two alternatives are similar in that those for the Preferred Alternative are significantly less than those for the Dam Retention Alternative.

- **Fishery Benefits:** The annual benefits (after a 5-year period of build up) of the Preferred Alternative are significantly greater (1.29 times) than that of the Dam Retention Alternative; \$4,998,600 compared to \$3,870,900.

The benefit/cost ratio (annual equivalent benefits and costs using a discount rate of 8 percent over a 20-year period) of the Preferred Alternative is significantly greater than that of the Dam Retention Alternative; 3.2 to 1 compared to 1.7 to 1.

There is a significant difference between the two alternatives in financing and funding of the construction costs:

- **Preferred Alternative:** All construction costs would be nonreimbursable, i.e., financed and funded by the Federal Government.
- **Dam Retention Alternative:** In addition to construction costs financed and funded by the Federal Government, there would be \$2,848,000 of construction costs to be financed and funded by the GPID.

The action alternatives have significant environmental effects and differences in only two areas:

- **Fish:** The estimated increase in salmon and steelhead escapement is significantly greater for the Preferred Alternative; a 22 percent increase compared to a 17 percent increase for the Dam Retention Alternative.
- **Seasonal Reservoir:** The existing seasonal reservoir of 110 acres and associated flatwater recreation would be eliminated with the Preferred Alternative. This river reach would revert to a free flowing status with that visual aspect, and the area between the old high waterline and the new high waterline would slowly revegetate. It is anticipated that increased stream recreation would offset losses of flatwater recreation. With the Dam Retention Alternative, the seasonal operation of the reservoir would remain unchanged.

Based on the analysis of environmental impacts, there do not appear to be any other significant long-term environmental effects of either action alternative. Short-term environmental effects would be associated with the

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construction period but are not considered significant. The lack of significant environmental impacts is in part due to the fact that Savage Rapids Dam and the seasonal reservoir are located in an urban/suburban setting with highways along each side and a railroad along one side. All of the shoreline lands are privately owned, with many ownerships highly developed. As a result, human disturbance in the area is common at all times.

There are no Indian Trust Assets that would be affected by either action alternative. Neither of the action alternatives would have any effect on any river reach within the national Wild and Scenic River system. Neither of the action alternatives would have an adverse impact on minorities or low-income populations and communities.

Neither of the action alternatives are likely to adversely affect currently listed endangered or threatened species. However, there is potential for the listing of one or more Rogue River salmon or steelhead runs in the future. Both of the action alternatives would have a beneficial effect on salmon and steelhead through improved fish passage as described above and in the Summary Table.

The only irreversible and irretrievable commitment of resources is loss of 110 acres of seasonal flatwater and an annual electric power consumption of 5,675,800 kWh with the Preferred Alternative.

Features, accomplishments, costs and benefits, environmental effects, and other evaluations are summarized in the Summary Table on the following pages.

Summary Table

Item	Preferred Alternative	Dam Retention Alternative
Features		
Fishery	Remove Savage Rapids Dam.	Replace existing fish ladders and screens and radial gates. Modify dam crest, excavate new plunge pool, and reshape portions of the river channel. Construct fish counting facility and improve public access for viewing fish and improve safety.
Irrigation	Construct two electric pumping plants to replace those removed with the dam. Construct new supply lines from the pumping plants to the existing canals. ¹	Replace existing turbines and pumps. Replace existing pipelines from pumps to canals; rehabilitate line through the dam. Correct existing operation and maintenance deficiencies.
Accomplishments		
Fishery	22 percent increase in salmon and steelhead escapement (26,700 fish) with increased harvest of 87,900 fish.	17 percent increase in salmon and steelhead escapement (20,700 fish) with increased harvest of 69,100 fish.
Irrigation	Increased life of diversion facilities	Increased life of diversion facilities
Costs and Benefits		
Construction cost (January 1993 price level)	\$11,205,000	\$17,634,000
Federal investment (project cost) ²	\$13,255,000	\$21,343,000
Annual equivalent project cost ³	\$1,350,000	\$2,173,800
Annual operating costs	\$233,700	\$104,800
Total annual equivalent costs	\$1,583,700	\$2,278,600
Annual equivalent benefits ⁴	\$4,998,600	\$3,870,900
National economic development effects		
Benefit/cost ratio	3.2 to 1	1.7 to 1
Net annual benefits	\$3,414,900	\$1,592,300
Regional development effects		
Net short-term regional benefits	\$15,200,000	\$23,900,000
Net short-term employment	120 jobs	190 jobs
GPID construction cost	\$0	\$2,848,000

¹Irrigation is not considered a function of this alternative as the pumping plants are a replacement for facilities removed for fish passage. ²Includes construction cost and interest during construction at 8 percent. ³Based on a discount rate of 8 percent over a 20-year period. ⁴ Fishery benefits only; based on a discount rate of 8 percent, a 20-year period, and a 5-year build-up of benefits.

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Summary Table

Item	Preferred Alternative	Dam Retention Alternative
Environmental effects		
Ecological components	Major positive effect on salmon and steelhead. Loss of 110 acres of flatwater, replaced by a stable riverine aspect. Positive effect on aquatic insects and overall productivity and riparian vegetation of 3.5-mile reach of Rogue River upstream of Savage Rapids Dam. No measurable effect on wildlife.	Major positive effect on salmon and steelhead.
Physical components	Slight negative effect on air quality and water quality during construction. Increased noise levels during construction and small increase during operation.	Slight negative effect on air quality and water quality during construction. Increased noise level during construction.
Cultural components	No effect	No effect
Recreational components	Loss of 110 acres of flatwater recreation. Replaced with free flowing river recreation.	No effect.
Social well-being effects		
Community	Short term employment increase. Major improvement in salmon and steelhead sport fishery. Riverside landowners will lose a seasonal lake and gain a stable river environment.	Short term employment increase. Major improvement in salmon and steelhead sport fishery.
Health and safety	Eliminates flatwater boating hazards, increases whitewater boating hazards. Traffic hazards increased during construction.	Traffic hazards increased during construction.
Displacements	Changes in recreation and some businesses. Riverside property owners would lose seasonal lake recreation.	None
Energy	Increased energy usage (equivalent to needs of 380 households); not considered significant	None
Indian Trust Assets	None	None
Wild and Scenic Rivers	None	None

Conclusions

It is concluded that:

1. Fish passage and protective facilities at Savage Rapids Dam are inadequate and cause a large loss of salmon and steelhead production.
2. A Preferred Alternative (Pumping Alternative) which includes removal of the existing dam has been developed. In accordance with the Water Resource Council's Principles and Guidelines, this alternative provides the greatest net economic benefits consistent with protecting the Nation's environment. This alternative would eliminate all fish passage problems and provide optimum salmon and steelhead passage at the site.
3. The Preferred Alternative is fully compatible with the recommendations of the U.S. Fish and Wildlife Service and the Oregon Department of Fish and Wildlife.
4. A Dam Retention Alternative has been developed. This alternative would provide substantial improvement in fish passage and eliminate most loss of salmon and steelhead at the site.
5. The Preferred Alternative and the Dam Retention Alternative would have no adverse long-term effects. Neither of these alternatives would adversely affect Indian Trust Assets or affect any river reach included in the national system of Wild and Scenic Rivers.

Recommendations

Pending completion of ongoing State initiatives concerning Savage Rapids Dam, it is recommended that:

1. The Preferred Alternative be authorized under the provisions of the Federal Reclamation laws for construction by the Secretary of the Interior substantially in accordance with the plans of this report, with such modifications or additions as the Secretary may find necessary and desirable to carry out the purposes of the plan.
2. Construction costs of the Preferred Alternative be nonreimbursable; the purpose of the alternative is to benefit anadromous fish and irrigation facilities included in the plan are merely replacement for facilities lost through removal of the dam.
3. The Federal Government forgive the remaining debt owed to the United States by the Grants Pass Irrigation District for rehabilitation of facilities, recognizing that removal of the dam also removes the facilities associated with that debt.