

RECLAMATION

Managing Water in the West

Yakima River Basin Fish Passage Phase I and II Fish Screen Construction

Project Completion Report



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

Boise Idaho

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Yakima River Basin Fish Passage

Phase II Fish Screen Construction

Project Completion Report

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Pacific Northwest Region
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Yakima Fish Passage Program

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Yakima Fish Passage Program

Background and Authorization

On December 5, 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act (Public Law 96-501). The Act created the Northwest Power Planning Council (now the Northwest Power and Conservation Council). The Council was charged with the responsibility to prepare a Regional Conservation and Electric Power Plan and to develop a program to protect, mitigate, and enhance fish and wildlife including related spawning grounds and habitat on the Columbia River and its tributaries.

The Council adopted its Fish and Wildlife Program on November 15, 1982. Section 800 of the Program addresses measures in the Yakima River Basin. The Yakima measures were intended to help mitigate hydroelectric impacts in the basin and provide off-site mitigation to compensate for fish losses caused by hydroelectric project development and operations throughout the Columbia River Basin. The Bonneville Power Administration (BPA) was designated as a major source of funding for such off-site mitigation measures and was requested to initiate discussions with the appropriate Federal project operators and the Council to determine the most expeditious means for funding and implementing the program.

The primary measures proposed for rapid implementation in the Yakima River basin were the installation of fish passage and protective facilities. Sec. 109 of The Hoover Power Plant Act of 1984¹, authorized the Secretary of the Interior to design, construct, operate, and maintain fish passage facilities within the Yakima River Basin. Under Phase I of the program, improvements to existing fish passage facilities and installation of new fish ladders and fish screens at 16 of the largest existing diversion dams and canals were begun in 1984 and were completed in 1990.

The Yakima Phase II fish passage program is an extension of the Phase I program. In 1988, the Yakama Nation (YN) submitted an application to amend Sections 803(b) and 1403(4.5) of the Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program to begin preliminary design on the Phase II fish screen

¹ This is the complete text of *Sec. 109 of Public Law 98-381, August 17, 1984, The Hoover Power Plant Act of 1984.*

“Sec. 109. The Secretary of the Interior, acting pursuant to Federal reclamation law (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof and supplementary thereto) and in accordance with the Pacific Northwest Electric Power Planning and Conservation Act (94 Stat. 2697) is authorized to design, construct, operate, and maintain fish passage facilities within the Yakima River Basin, and to accept funds from any entity, public or private, to design, construct, operate, and maintain such facilities.”

program. Based on citizen and agency endorsement, the Council approved the amendment in 1989. The Council authorized BPA to provide funding for Phase II screens through the Fish and Wildlife Program. BPA then asked the Bureau of Reclamation to provide engineering and design expertise to the Phase II projects.

These are the basic underlying authorities for fish passage work in the Yakima River Basin:

- The Reclamation Act of June 17, 1902, 32 Stat. 388 and Acts amendatory thereof and supplementary thereto.
- The Yakima River Basin Water Enhancement Project legislation (Title XII of P.L. 103-434, October 31, 1994) which, among other things, made fish, wildlife, and recreation an additional purpose of the project.
- Section 109 of the Hoover Power Plant Act of 1984 (P.L. 98-381, 98 Stat. 1333) which gives Reclamation authority to design, construct, operate, and maintain fish passage facilities within the Yakima River Basin.
- The Pacific Northwest Electric Power Planning and Conservation Act (P.L. 96-501, 94 Stat. 2697).

Yakima Phase I Fish Passage Construction

The Northwest Power Planning Council recognized the potential of restoring greatly depleted fish runs in the Yakima River Basin when it established the Columbia River Basin Fish and Wildlife Program. Under-used habitat existed in the Yakima River. However, largely as a result of inadequate and outdated passage facilities at many diversions and shortages of water at critical periods of the year, anadromous fish runs had decreased to only 1500 returning adult salmon and steelhead trout in the late 1970's.

Efforts to improve or replace the outdated fish passage facilities began in 1983 with the formation of an interagency Technical Work Group. Twenty sites were initially identified for inclusion in the Phase I Fish Passage Improvement Program. Priorities were made, fish criteria were developed, and predesign and final design work were pushed ahead. Construction activities began on the first major facilities in the fall of 1984 with construction progressing at a very hectic pace continuously until 1990 with additional major new facilities entering service each year. Construction at sixteen of the initial sites was completed under the Phase I program. The other four sites were either deferred to the Phase II program or were completed by other means.

Construction History

New facilities began entering service in the spring of 1985 with the completion of Sunnyside Canal fish screen, right bank fish ladder at Sunnyside Diversion Dam, west branch fish ladder at Wapato Diversion Dam, and the fish ladder at the City of Yakima (Naches-Cowiche) Diversion Dam. Fish screens on the Wapato Canal, Toppenish Creek-Satus Unit Canal, Richland Canal, and Columbia Canal and fish ladders at Prosser Diversion Dam (right bank), Sunnyside Diversion Dam, and Horn Rapids Diversion Dam had all entered service by the spring of 1986. Fish screens on Chandler Canal and Toppenish Creek Diversion, fish ladders on east branch of Wapato Diversion Dam, an adult fish barrier on Roza Powerplant Wasteway, and a major juvenile evaluation facility at Chandler fish screen were completed by the spring of 1987.

The massive fishscreen facility at Roza Canal Headworks, the fishscreens at Westside Canal and the fish ladders at Marion Drain went into service in the spring of 1988. Fish ladder modifications at Roza Diversion Dam were essentially complete in the summer of 1988. Roza surplus discharge facilities were completed in the spring of 1989. Construction of an adult trapping facility at Roza Diversion Dam was completed in 1995. First brood for the new Cle Elum Hatchery was collected in the fall of 1996. Extensive modifications to the trapping facility were made following the first season of operation to correct deficiencies and operational problems uncovered during the initial startup of the facility.

An adult trapping facility at the right bank ladder at Prosser Diversion Dam was completed in the fall of 1988 and went into operation in the spring of 1989. Construction of a new center ladder and extensive modifications to the left bank ladder at Prosser were completed in the fall of 1989.

Construction was essentially done on fishscreens in the KRD Canal and replacement of the fish ladder at Easton Diversion Dam in the spring of 1989. A new trashrack at the KRD Canal headworks was built in the fall of 1989. Some minor modifications were made to the Easton ladder in the spring of 1990 to correct some design deficiencies. The small fishscreens at the Knudson diversion on Taneum Creek were completed in the fall of 1990.

A fish screen and fish ladder at the Ellensburg Town Canal Diversion were completed in the fall of 1989.

Construction of fish screens and fish ladders at the Taneum and Bruton diversions on Taneum Creek was also completed in the fall of 1989.

Completion of Phase I

Completion of these facilities essentially concluded the Phase I development of the program. A screen maintenance shop with features necessary to provide proper maintenance of the new screening facilities was completed in 1991. Extensive modifications to improve operations at the Chandler juvenile facility and Roza adult collection facility were made over a period of several operating seasons. Modifications at other sites are being made as experience gained in operation and maintenance of the facilities reveals areas that need improvement.

Project Cost

Total estimated construction cost of Phase I fish passage improvements is about \$60,700,000. About 2/3 of this cost was funded through Reclamation appropriations. BPA rate payer funds paid for most of the remaining 1/3, with some cost share from other entities (PP&L, BIA, City of Yakima, WDOE) at specific sites. The new facilities have been found to require much more operation and maintenance care than originally anticipated. Reclamation performs the O&M out of the Yakima Project Field Office.

The new state-of-the-art facilities have been shown to greatly enhance survival rates of both migrating upstream adults and of juvenile smolts on their downstream migration to the ocean. Lack of adequate streamflows at critical times is now viewed as the major hindrance to the continued recovery of the fish runs.

Yakima Phase II Fish Screen Construction

Construction History²

The Yakima Phase II fish passage program is an extension of the Phase I program that corrected fish passage conditions at 16 major diversions in the Yakima River Basin. In 1988, the Yakama Nation (YN) submitted an application to amend Sections 803(b) and 1403(4.5) of the Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program to begin preliminary design on the Phase II fish screen program. Based on citizen and agency endorsement, the Council approved the amendment in 1989. The Council authorized BPA to provide funding for Phase II screens through the Fish and Wildlife Program. BPA then asked the Bureau of Reclamation to provide engineering and design expertise to the Phase II projects. Original budget

² *Bonneville Power Administration FY 2002 Provincial Project Review, Columbia Plateau Province, Project ID 199107500, Yakima Phase II Screens – Construction, Part 2. Narrative, Section 9.e., p 6.*

projections in 1989 (with no site specific information) were for an estimated \$10,000,000 program.

Sixty-six medium and smaller size diversions were originally identified in the Phase II program. About 2/3 of these sites are on tributaries of the Yakima River, the rest are main stem diversions. Many of the sites were already screened but did not meet current standards and criteria for effective fish passage protection. Fish screens at 37 of the Phase II diversion sites have been modified or rebuilt by Reclamation since construction was started in fiscal year 1992. Most of these sites were funded by Bonneville Power Administration. The Yakima-Tieton screens were funded by Reclamation. In addition, the WDFW Yakima Screen Shop modified or replaced about 8 smaller Phase II screens. Eight sites have been eliminated from the program due to changed agricultural practices and apparent abandonment. Another 8 sites have been proposed for transfer to the YTAHP program and three Teanaway sites were combined in a consolidated pumping plan. Two sites have been delayed indefinitely.

Completion of Phase II

Fiscal Year 2006 (FY 2006) was the last year of construction on the Phase II program. The major FY 2006 activity was completion of the Fogarty fish screen. A Phase II celebration event was planned and organized by Bonneville Power Administration staff to recognize the significant accomplishment of the Phase II program since its beginnings in 1990. Reclamation assisted with preparations and participated in the event on September 22, 2006 at Eschbach Park near Naches, WA. See the 10/18/06 article by Erika Lopez in the [PN Region Streamline Employee Newsletter](#).

O&M Agreements on several earlier Phase II sites were completed in FY2003, FY2004 and FY2005. The last Phase II O&M Agreement (for the Fogarty site) was signed in October 2005. O&M Agreements with all willing water users are now in-place at the Phase II sites.

Designer's Operating Criteria documents (DOC's) are complete for most of the Phase II sites except Selah-Moxee, Packwood, Fogarty and a few of the earlier sites. Work on these remaining DOC's and the Phase II Summary Report was delayed due to FY 2006 funding limitations. All Phase II DOC's and the Phase II Summary Report will be complete in September 2007.

Project Cost

Construction of all Phase II fish screens was funded by BPA, with the exception of Yakima-Tieton fish screen which was funded by Reclamation. Phase II construction expenditures from 1990 through 2007 total to about \$18,300,000. The difference between actual expenditures and the original estimate reflects the realities of site specific

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requirements, unanticipated additional project features, additional design and surveying work not originally included, 15 years of inflation, project delays due to permitting and rights-of-way issues, and other changes. About \$16,900,000 is from BPA and \$1,400,000 from Reclamation. In addition, BPA has funded construction of the WDFW sites at a cost of about \$3,300,000 and has spent over \$10,000,000 on easements, cultural surveys, etc. WDFW has also funded portions of the construction at several sites with state funds.

Program accomplishments have been affected by funding limitations; difficulties in securing rights-of-way; changed site conditions; difficulties in negotiating plans that are acceptable to irrigators, regulatory agencies, and management agencies; unresolved water rights issues; proposed consolidation projects; environmental concerns; legal issues; etc. The Technical Work Group, composed of federal, state and local agencies, Yakama Nation, irrigation entities and others worked by consensus to develop innovative solutions to these complex issues. Table 1 summarizes project accomplishments by year.

Table 1 - Phase II Program Accomplishments³

Year	Accomplishment
1990	Planning Report completed including site inventory, preliminary schedule and site priorities, and estimated funding needs
1992	First construction contracts awarded and screen construction completed at Kiona and Naches-Cowiche diversions
1993	Screen construction completed at Glead, New Cascade, WIP Lower, Snipes/Allen, and Bruton Ditch diversions
1994	Screen construction completed at Taylor, Congdon, Kelley/Lowery, and Bachelor Creek diversions, plus New Cascade headgate mods and Bachelor/Hatton consolidation pipeline and Bachelor Creek adult barrier
1995	Screen construction completed at WIP Toppenish Pump diversion, Boise Cascade diversion converted to groundwater
1996	Screen construction completed at Naches-Selah and Fruitvale diversions
1997	Screen construction completed at WIP Upper, Yakima-Tieton, Union Gap, Bull, Ellensburg Mill, Clark, and Lindsey diversions, plus access bridge at WIP Upper and Vertrees No. 2 diversion converted to ground water pumping
1998	Screen construction completed at Younger and Old Union diversions, Foster-Natchez diversion converted to pump from Scott Ditch
1999	Screen construction completed at Johncox diversion
2000	Moxee/Hubbard diversion converted to pump from Roza wasteway, City of Yakima screen bypass modified, Knudson diversion-Taneum Creek channel mods completed
2001	Screen construction completed at LaFortune/Powell and Wilson Creek/Bull Ditch diversions

³ *Bonneville Power Administration FY 2002 Provincial Project Review, Columbia Plateau Province, Project ID 199107500, Yakima Phase II Screens – Construction, Part 1 Administration and Budgeting, Section 2 Past Accomplishments, p 3.*

Year	Accomplishment
2002	Screen construction completed at Selah-Moxee diversion
2004	Screen construction completed at Packwood diversion
2006	Screen construction completed at Fogarty diversion
2007	All DOC's completed and Project History and Final Completion Report published.

Operation and Maintenance

All of the Yakima Phase I and Phase II fish facilities are part of the Power Council Fish and Wildlife Program developed under the Northwest Power Act. The Hoover Power Plant Act of 1984 authorized Reclamation to design, construct, operate, and maintain fish passage facilities within the Yakima River Basin. However, funding of Phase I and Phase II facilities is different.

Phase I

O&M of Phase I fish facilities is a Reclamation responsibility, funded through appropriations. Most of the Phase I facilities are Reclamation facilities with a few owned by other entities (BIA, City of Yakima, PP&L, other private canal companies). Reclamation has O&M Agreements at all the non-Reclamation Phase I facilities that outline the responsibilities of Reclamation and the diversion owners. Basically, the canal owners only pay up to what they historically would have paid with their old fish screens. Reclamation picks up all other fish facility O&M costs. Ownership of Phase I fish facilities is vested in the United States.

Phase II

BPA is the funding source for O&M of all Phase II fish facilities except for Yakima-Tieton. On all Phase II sites, BPA obtained ownership in the name of the United States and transferred custody to Reclamation in the Phase II Master O&M Agreement⁴ (MOA) along with all the responsibilities of ownership (except cost).

BPA enters into annual contracts with Reclamation and with WDFW to implement the provisions of the MOA. One of the provisions of the MOA states that "All or part of those tasks and responsibilities for individual facilities may, as mutually agreed by the three parties, be reassigned to WDFW." Accordingly, the O&M tasks at most Phase II

⁴ A three party MOA (Reclamation# 1425 4 MA 10 00840) was signed in 1994 by WDFW, BPA, and Reclamation to establish the O&M procedures for the Phase II fish passage facilities.

sites have been assigned to WDFW except for Yakima-Tieton and several sites located on the Yakama Reservation.

Reclamation is currently operating under BPA contract number 32813⁵ (Project 1995-033-00) which covers the period from May 1, 2007 through April 30, 2008. The contract requires an annual meeting of the three parties to critique the O&M program for the previous year and to develop and review plans for future years. Then Reclamation prepares a written Annual Work Plan (AWP) to document the agreements made at the meeting. The AWP becomes part of the interagency contract. Any of the three parties can also request an unscheduled meeting to resolve problems, coordinate work, or otherwise address issues arising out of the contract.

Reclamation has individual O&M Agreements with each of the Phase II canal owners that follow the same format as the Phase I agreements.

The Three Party MOA

Following are a few pertinent sentences from the MOA between Reclamation, BPA, and WDFW:

“This agreement shall become effective upon the date of last signature, and shall continue in effect until terminated as mutually agreed, or after one year has passed after written notice of termination by any one of the parties.”

“Where mutually agreeable between Bonneville and Reclamation, the custody of individual facilities may be transferred to Reclamation.”

“In the event this Memorandum of Agreement is terminated, custody of all transferred facilities shall revert to Bonneville.”

“All tasks and responsibilities assigned under this Agreement shall be performed at Bonneville’s expense.”

The City of Yakima General Diversion Dam – An example

The City of Yakima General Diversion Dam has both Phase I and Phase II elements and provides a good comparison of the differences between Phase I and Phase II O&M responsibilities and funding.

City of Yakima Diversion – City of Yakima Screen and Naches-Cowiche Ladder

At the Naches Cowiche (City of Yakima General) Diversion Dam the city funded and built the dam, fish ladder, and City of Yakima fish screen. Because the City of Yakima

⁵ This contract was pending as of 5/22/2007.

screen and the Naches Cowiche fish ladder are Phase I facilities of the Power Council Fish and Wildlife Program, the ownership and responsibility for O&M of the fish ladder and fish screen were transferred from the city to Reclamation in a signed O&M Agreement (Contract No. 7 07 10 WO629, Dec 29 1986). The city retained ownership and O&M responsibility for the dam, but title to the fish facilities was vested in the United States and the facilities became features of the YRBWEP. The O&M is integrated and coordinated with other features of the Yakima Project.

Supplement 1 to the agreement (Dec 29, 1986) designated the city to perform daily maintenance chores at the facilities as a payment in kind, with Reclamation to perform annual and extraordinary maintenance and replacements. The city can elect to correct flood problems or vandalism damage, etc. and be reimbursed by Reclamation if approved by Reclamation. Exhibit A to Supplement 1 grants easement rights to the United States.

Supplement 2 to the agreement (Dec 23, 1991) covers wingwall modifications on the right abutment of the dam with all costs to be borne by the United States and expands the easement to include the wingwall.

Supplement 3 to the agreement (Aug 19, 1999) covers new bypass structures and bypass pipe for the City of Yakima fish screen with all costs to be borne by the United States and expands the easement to include the bypass structure and pipe.

City of Yakima Diversion – Naches-Cowiche Screen

The Naches Cowiche fish screen is a Phase II facility. Contract No. 2 07 10 W0865 (Nov 20, 1991) is the O&M Agreement between the Naches Cowiche Canal Company and Reclamation. Ownership of the Naches Cowiche fish screen and appurtenant structures was obtained by BPA and is vested in the United States. The facilities became features of the YRBWEP and the O&M is integrated and coordinated with other features of the Yakima Project.

As directed by BPA, custody of the Naches-Cowiche screen was transferred from BPA to Reclamation, and all O&M duties at the screen were transferred from Reclamation to WDFW. BPA provides the O&M funding for the Naches-Cowiche screen. The Naches-Cowiche Canal Company owns and operates the Naches-Cowiche canal and irrigation facilities.

Review of Maintenance Program

Reclamation performs detailed maintenance examinations at all of the Phase I and Phase II fish passage facilities in the Yakima Basin. These inspections are conducted by a team of experienced engineering, operations, and maintenance personnel from Reclamation's Regional Office in Boise, ID, and from the Upper Columbia Area Office and Yakima

Field Office in Yakima, WA. The Review of Maintenance (ROM) inspections are scheduled on a rotating basis such that an individual site is inspected about every third year.

The inspection teams prepare detailed reports evaluating the overall condition of the facilities. They make note of any operational problems, structural, mechanical, electrical, hydraulic or other concerns. Each inspection report includes recommended corrective actions to be taken by the operations and maintenance staff to correct any noted deficiencies or problems. Copies of the Phase II reports are distributed to all interested parties including BPA, Reclamation staff, fisheries agencies, and canal owners.

In addition to the Reclamation ROM reports, Pacific Northwest National Laboratory (PNNL) conducts regular evaluations of each of the Phase II sites during the operating season to ensure that operation of the facilities meets established agency hydraulic and biological criteria for fish protection. The combination of the Reclamation ROM inspections and the PNNL evaluations provides valuable and timely information that helps all involved parties to provide cost effective protection of anadromous and other fish.

Appendix

Table 2 - GPS Locations of Yakima Phase I Fish Passage Facilities

01 Easton ladder	N47 14' 30.63"	W121 11' 17.00"
02 Kittitas screens	N47 14' 23.60"	W121 11' 08.00"
03 Knudson screens	N47 05' 11.36"	W120 45' 51.06"
04 Taneum ladder	N47 04' 52.83"	W120 44' 51.02"
05 Taneum screens	N47 04' 51.87"	W120 44' 44.84"
06 Bruton screens & ladder	N47 04' 55.08"	W120 44' 01.30"
07 Westside screens	N47 05' 42.11"	W120 42' 20.61"
08 Town ladder	N47 03' 50.22"	W120 39' 07.62"
09 Town screens	N47 03' 50.73"	W120 39' 03.69"
10 Roza screens	N46 44' 59.31"	W120 27' 57.71"
11 Roza ladders	N46 44' 56.60"	W120 27' 53.56"
12 Roza wasteway barrier	N46 36' 22.87"	W120 28' 33.82"
13 Yakima/Tieton old screens	N46 40' 12.88"	W121 00' 19.23"
14 Naches/Cowiche ladder	N46 37' 53.53"	W120 35' 13.46"
15 City of Yakima screen	N46 37' 52.45"	W120 35' 11.02"
16 Wapato East ladder	N46 31' 30.31"	W120 28' 23.25"
17 Wapato West ladder	N46 31' 28.56"	W120 28' 37.50"
18 Wapato screens	N46 31' 01.17"	W120 28' 38.93"
19 Sunnyside ladders	N46 29' 55.56"	W120 26' 40.21"
20 Sunnyside screens	N46 29' 47.13"	W120 26' 23.03"
21 Topp/Cr screens	N46 18' 40.96"	W120 47' 18.15"
22 Maron Drain ladder	N46 19' 13.88"	W120 13' 31.86"
23 Topp/Satus scr/lad	N46 18' 42.07"	W120 13' 13.95"

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24 Prosser Right ladder & trap	N46 12' 44.04"	W119 46' 17.88"
25 Chandler screens	N46 12' 54.88"	W119 45' 27.49"
26 Chandler JV & ponds	N46 12' 54.92"	W119 45' 27.46"
27 Richland screens	N46 22' 35.24"	W119 24' 43.60"
28 Columbia screens	N46 22' 39.53"	W119 25' 02.11"
29 Wanawish Lf. Ladder	N46 22' 45.73"	W119 24' 59.47"
30 Wanawish Rt. Ladder	N46 22' 41.14"	W119 25' 05.02"

Table 3 - GPS Locations of Yakima Phase II Fish Passage Facilities

39 YFO Building	N46 37' 02.23"	W120 28' 41.60"
42 Naches/Cowiche screens	N46 44' 52.48"	W120 48' 03.52"
43 Glead screens	N46 41' 29.30"	W120 39' 12.62"
44 New Cascade screens	N47 02' 58.56"	W120 38' 06.48"
45 Roza adult trap	N46 45' 00.30"	W120 27' 50.94"
46 Lower WIP screens	N46 32' 28.15"	W120 36' 36.47"
47 Toppenish Pump Screens	N46 19' 54.46"	W120 33' 15.32"
48 Snipes/Allen Screens	N46 26' 34.45"	W120 20' 50.35"
49 Taylor Screens	N46 41' 28.09"	W120 29' 32.77"
52 Congdon screens	N46 40' 31.54"	W120 39' 15.67"
53 Kelley/Lowery screens	N46 44' 11.94"	W120 44' 06.90"
54 Bachelor/Hatton screens	N46 37' 48.33"	W120 46' 02.23"
55 Bachelor Creek fish barrier	N46 33' 04.67"	W120 30' 24.22"
56 Naches/Selah screens	N46 44' 52.54"	W120 48' 05.11"
57 Yakima/Tieton screens	N46 40' 11.90"	W121 00' 14.80"

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58 Fruitvale screens	N46 37' 29.52"	W120 33' 58.86"
59 Union Gap screens	N46 37' 30.53"	W120 33' 49.66"
62 Clear Creek Ladder	N46 37' 45.30"	W121 15'
63 Cold Spring PP	N45 51' 46.70"	W119 10' 40.60"
64 Clark Screen	N46 44' 11.47"	W120 44' 04.42"
65 WIP Upper Screens	N46 31' 45.49"	W120 46' 41.47"
71 Bull Diversion screens	N46 58' 50.70"	W120 34' 01.45"
72 Lindsey screens	N46 51' 18.49"	W120 57' 24.78"
73 Ellensburg Mill screens	N47 01' 20.71"	W120 36' 31.45"
74 McAusland Screens	N47 02' 56.92"	W120 38' 53.26"
75 Old Union Screens	N46 37' 29.50"	W120 33' 08.86"
76 Younger screens	N47 11' 16.70"	W120 55' 34.14"
77 John Cox screens	N46 32' 45.99"	W120 53' 10.72"
78 Fogarty Screens	N46 57' 30.60"	W120 33' 15.48"
81 Selah/Moxee Screens	N46 42' 26.00"	W120 28' 33"
82 Lafortune/Powell	N46 43'15.90"	W120 42'06.80"
83 Wilson/Bull	N46 58'42.14"	W120 32'56.40"
Packwood Screen	N47 02'57.00"	W 120 38'53.18"

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Table 4 – Phase I Sites

STATUS OF YAKIMA RIVER FISH PASSAGE FACILITIES IMPROVEMENT PROGRAM									
P H A S E I									
05-Apr-90									
SITE	DESIGNER	Q cfs	H ft	CONSTRUCTION		ESTIMATED COST (\$ million)	SPENT TO DATE	FUNDING FROM	STATUS
				START	END				
Sunnyside									
Screen	Hosey & Assoc	1300		Oct-84	Sep-85	2.9	2.9	BPA	Operational
Ladders	IECo & USBR		8	Oct-84	Mar-85	2.0	2.0	BPA	Operational
Crest Raise	USBR-Boise			Sep-85	May-86	0.1	0.1	BPA	Operational
Naches-Cowiche (City of Yakima)									
Ladder & Screen	IECo	20	8	Nov-84	Sep-85	0.5	0.5	City of Yakima	Operational
Horn Rapids									
Richland Canal Screen	IECo	80		Apr-85	Nov-85	0.4	0.4	BPA	Operational
Ladders & CID Screen	JUB	300	4	Sep-85	Jul-86	1.6	1.6	State & USBR	Operational
Wapato									
West Branch Ladder	USBR-Boise		14	Nov-84	Jun-85	1.2	1.2	BIA	Operational
Screens	IECo	2000		Oct-85	Mar-86	2.8	2.8	BPA	Operational
East Branch Ladders	USBR-Boise		12	Jul-86	Dec-86	1.8	1.8	BPA	Operational
Toppenish Creek/Satus Unit									
Ladder & Screens	IECo	650	6	Oct-85	Mar-86	1.6	1.6	BPA	Operational
Chandler Canal									
Screens & Juvenile Facility	USBR-Denver	1500		May-86	Mar-87	7.7	7.7	USBR	Operational
Prosser									
Right Bank Ladder	IECo		9	Oct-85	May-86	1.2	1.2	USBR	Operational
Right Bank Trap	USBR-Boise			May-88	Nov-88	0.9	0.9	USBR	Operational
Left & Center Ladders	Ebasco		9	Sep-88	Sep-89	2.6	2.6	USBR	Operational
Roza									
Screens	USBR-Denver	2200		Dec-85	Feb-88	11.4	11.4	USBR	Operational
Ladders	USBR-Denver		34	Oct-87	May-88	2.5	2.5	USBR	Operational
Roza Powerplant Wasteway Barrier	IECo	2000		Oct-86	Mar-87	0.8	0.8	USBR	Operational
Satus Creek Ladder	USBR-Boise		2	Aug-86	Sep-86	0.0	0.0	BPA	Operational
Toppenish Creek Screen	USBR-Boise	72		Sep-86	Mar-87	0.3	0.3	BPA	Operational
Marion Drain Ladder	USBR-Boise		6	Nov-87	Mar-88	0.2	0.2	BPA	Operational
Westside Screen	USBR-Boise	114		Oct-87	Mar-88	0.6	0.6	BPA	Operational
Easton									
Screens	USBR-Denver	1170		Mar-88	Mar-89	5.0	4.7	USBR	Operational
Ladder	Ebasco		45	Jun-88	Mar-89	2.8	2.7	USBR	Operational
Town Ladder & Screen	USBR-Boise	260	3	Sep-88	Mar-89	1.6	1.6	BPA & USBR	Operational
Taneum Creek Diversions									
Ladders & Screens	USBR-Boise	98	3	3/24/88	3/25/88	0.9	0.8	USBR	Operational
Snipes/Allen Screen									Deferred to Phase II
Old Reservation Canal Screen									Deleted from program
Thorp Mill Ditch Screen									Combined with Westside
Stevens Ditch Screen									Previously done by state
Wapatox Screen & Ladder									Under study by PP&L
Operating Facilities						6.2	1.4	USBR	
Pre-design & Other						0.6	0.6	USBR	
Advance Planning Funding						0.6	0.6	USBR	
		Total Estimated Cost				60.7	<<<<<<		
		Total Spent To Date (31 Mar 1990)					55.3	<<<<<<	

Figure 1– Phase II Summary of Site Disposition

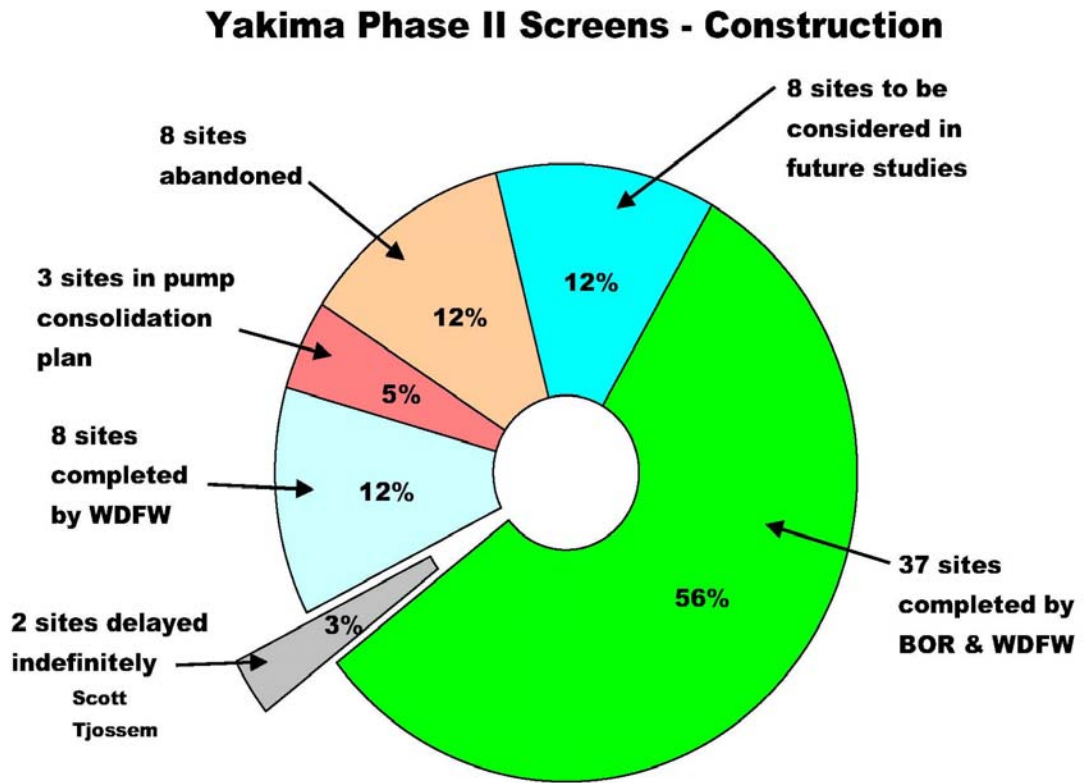


Table 5 – Phase II Status Summary

Construction Complete	Date	In-Service
Kiona Screen	1992	Abandoned due to flood - replaced by pump system
Naches-Cowiche Screen	1992	Problems with bypass outfall may require channel mods
Gleed Screen	1993	Significant debris and flow distribution problems
New Cascade Screen	1993	
WIP Lower Screen	1993	
Snipes/Allen Screen	1993	
Bruton Ditch Screen & Ladder Mods	1993	Ladder only provides marginal passage at best. Need to replace.
Taylor Screen	1994	
Cogdon Screen	1994	
Kelley/Lowery Screen	1994	
New Cascade Headgate Mods	1994	
Bachelor Creek Screen, Adult Barrier & Pipeline	1994	
WIP Toppenish Pump Screen	1995	
Boise Cascade - eliminated from program	1995	Sufficient groundwater flow to close headgate permanently
Naches-Selah Screen	1996	
Fruitvale Screen	1996	
Vertrees No. 2 Sprinkler System to replace river diversion	1997	Converted to shallow groundwater pumping
WIP Upper Screen & Access Bridge	1997	
Yakima-Tieton Screen	1997	Fish ladder scheduled for award in fall 2007
Union Gap Screen	1997	
Bull Screen	1997	Replaced by Wilson Creek/Bull Ditch Screen in 2001
Ellensburg Mill Screen	1997	
Clark Screen	1997	
Lindsey Screen	1997	
Foster-Natchez pump & pipeline to replace river diversion	1998	Pumps from Scott Ditch
Younger Screen	1998	
Old Union Screen	1998	
John Cox Screen	1999	
Moxee/Hubbard Pump to replace river diversion	2000	Pumps from tailrace at Roza Powerplant
City of Yakima Screen Bypass Mods	2000	
Knudson Div-Taneum Cr Channel Mods	2000	
Lewis Screen	2001	
LaFortune/Powell Screen	2001	
Wilson Creek/Bull Ditch screen & ladder	2001	
Selah-Moxee Screen	2002	
Packwood Screen	2004	
Fogarty Screen	2006	