FINDING OF NO SIGNIFICANT IMPACT
Benton Irrigation District Conservation Project
PN-FONSI-08-03

Introduction

The Bureau of Reclamation has prepared an Environmental Assessment (EA) for a conservation project on the Benton Irrigation District (BID).

The purpose of the BID conservation project is to make the irrigation system more efficient by implementing water conservation improvements, thereby conserving water for fish benefit. The project will completely abandon the existing system and replace it with a new pump-pressurized, buried pipeline distribution system. Additionally, the project allows water diversions to BID to be relocated from the Sunnyside Diversion Dam to a new River Pump Station located 71 miles downstream on the Yakima River near Benton City.

Alternatives Considered

Two alternatives were developed and evaluated in the Environmental Assessment (EA), the No Action Alternative (as required by the National Environmental Policy Act) and BID Pressurized System Conversion.

The Recommended Alternative

Reclamation has selected the BID Pressurized System Conversion alternative as the recommended alternative for implementation.

Proposal

Reclamation proposes to implement the conservation project which will provide additional water for fisheries benefits.

This project consists of the following:

- Re-locate the BID diversion point from the Sunnyside Diversion Dam to a point on the Yakima River 71 miles downstream.
- Construct a pumping station, with fish screens, on the Yakima River to supply water to the district.
- Convert the existing open canals and laterals to buried pipeline.

Consultation, Coordination, and Public Involvement

Informal consultations under Section 7 of the Endangered Species Act (ESA) have been conducted with the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA Fisheries) to address impacts from this conservation project on listed species and designated critical habitat.

Summary of Review Comments and Reclamations Responses

The draft EA was sent out for public comment and posted on the Pacific Northwest Region Internet site on July 23, 2008. The public comment period closed on August 29, 2008. One comment was received from the Washington State Department of Ecology. The comment pertains to acquiring permits for the construction project. These permits will be acquired by the district prior to project commencement.

Comments were also received from Washington State Department of Fish and Wildlife (WDFW). The primary comment from WDFW dealt with the use of the conserved water to be dedicated for instream flow purposes. WDFW recommended that the conserved water dedicated for fish be storable and its use be determined by the fishery agencies rather than simply using it to increase irrigation season target flows at Parker and Prosser. The current legislation governing the Yakima River Basin Water Enhancement Project directs how the conserved water will be used to increase target flows. While modifications to that legislation are being considered that would allow the WDFW recommendation to be implemented, at least in part, the current law does not permit it. As such the disposition of the conserved water will be as laid out in the EA. WDFW also requested several other minor changes which have generally been made where appropriate.

Findings

This Finding of No Significant Impact (FONSI) is based upon the following:

- Impacts to listed fish would be beneficial for the 71 miles of river below the Sunnyside Diversion Dam.
- No negative impacts to terrestrial species, groundwater, surface water, or soils were identified in the EA.

Based on the environmental analysis as presented in the final EA, Reclamation concludes that implementation of preferred action and associated environmental commitments would have no significant impact on the quality of the human environment or the natural resources in the affected area.

This Finding of No Significant Impact has therefore been prepared and submitted to document environmental review and evaluation in compliance with the National Environmental Policy Act of 1969, as amended.

RECOMMENDED:

[signature]

Upper Columbia Area Environmental Manager

9-24-08

Date

APPROVED:

[signature]

Upper Columbia Office Area Manager Acting

9/25/08

Date

Benton Irrigation District Water Conservation Program Feasibility Study

Final Environmental Assessment

Benton Irrigation District
Benton County, Washington

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

September 2008

Executive Summary

The Benton Irrigation District (BID or District) of the Yakima River Basin Project has requested funds from the Bureau of Reclamation (Reclamation) for water conservation within the district. Funds for the water conservation would come through the Yakima River Basin Water Enhancement Project (YRBWEP).

The District's existing water distribution system is old, difficult and unsafe to operate, expensive to maintain, and increasingly prone to failure. Consequently, the level of service that the District can provide is neither well-matched to the needs of modern irrigation systems nor conducive to good on-farm water management.

The District Water Conservation Plan and Feasibility Study propose to completely abandon the existing system and replace it with a new pump-pressurized, buried pipeline distribution system. The current constant flow system severely limits on-farm conservation or control, but a demand-driven water supply will allow growers to take water when they need it and shut off their on-farm deliveries when they do not. This measure significantly reduces or eliminates losses at all levels, including losses from the Sunnyside Main Canal, the BID main canal and laterals, and on-farm practices. Additionally, the project allows water diversions to BID to be relocated from the Sunnyside Diversion Dam to a new River Pump Station located 71 miles downstream on the Yakima River near Benton City. With the new system, all water diverted will reach the BID irrigated lands.

By moving the diversion point, BID's entire water supply will provide additional base flow over the Sunnyside Diversion Dam throughout the full irrigation season. Flows in the 71-mile stretch between Sunnyside Diversion Dam and the proposed instream diversion intake will increase by 50-60 cfs throughout the irrigation season of April through October. Most significantly, the Project promises to aid the river during the low flow period of June through September.

These flow modifications will lead to improved migration and rearing conditions for Yakima River salmon and steelhead in the reach downstream of Sunnyside Dam. Yakima River instream flow increases downstream of Sunnyside Dam may lead to improved passage conditions through both the Sunnyside Dam and Prosser Dam fish ladders, especially during years of low flow when passage conditions are less than optimum. Steelhead, which are listed in the Yakima basin as threatened, migrate upstream as adults between the months of September and April, so flow improvements in the Yakima River as a result of conservation measures will be helpful to steelhead at the beginning (April) or end (September and October) of the irrigation season, and will be helpful to rearing juvenile steelhead from April through October.

The proposed pressurized system is anticipated to have a net benefit to the environment in and around the Yakima River. In addition to the increased instream flow, the elimination of main and lateral canal spillage would result in a reduction of surface return flows that carry sediments and effluents, improving lower Yakima River water quality. Impacts on temperatures in the lower Yakima River are difficult to anticipate, with effects from this specific project appearing to be either immeasurable or minor.

The District Conservation Plan identifies approximately 9 acres of wetlands that have emerged in depressions adjacent to the BID main canal as a clear result of operational spillage. These areas will lose their artificial water source once implementation of the conservation plan ceases operational flow through the canal and returns this water to the Yakima River. Subsequently, these emergent wetlands will likely disappear without a natural water supply. While these pockets constitute biological wetlands by virtue of their vegetation, hydrology, and soil characteristics, the fact that they were the byproduct of irrigation exempts them from consideration as jurisdictional wetlands under federal or state laws.

The physical components of this conservation plan (e.g., construction of the pump station, booster stations, and pressurized pipe network), and the hydrologic and water quality impacts (mainly increases in Yakima River flows and flow decreases in drains and wasteways) resulting from their construction will be spread over a large area and will be constructed over one summer and winter season in such a way as to cause minimal disruption to both fish migration and farm activities.

Without action, District operations can be expected to continue to experience the same difficulties that currently hinder efficient water management and conservation, and water scarcity and deficit irrigation are assumed to be the rule. Additionally, the impact of a canal failure would be extremely costly, as well as detrimental to crop production and river health. Finally, with the no-action alternative, the river and anadromous fish will receive no increased flow benefit.

Under the proposed action, the only change would be the point of diversion for BID; the district's contract water rights will remain the same.

BENTON IRRIGATION DISTRICT
WATER CONSERVATION PROGRAM
FEASIBILITY STUDY
ENVIRONMENTAL ASSESSMENT

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Chapter 1 Purpose and Need for Action

1.1 Introduction

The Benton Irrigation District (BID or District) requested funds from the Bureau of Reclamation (Reclamation) for water conservation within the district. Funds for the water conservation would come through the Yakima River Basin Water Enhancement Project (YRBWEP).

Congress enacted the YRBWEP, Title XII of Public Law 103-434, on October 31, 1994. Title XII of Public Law 103-434 authorized the Secretary of the Interior, acting through Reclamation, to establish and administer the Yakima River Basin Water Conservation Program, in consultation with the State of Washington, the Yakama Nation, the Yakima River basin irrigators, and other interested parties. Title XII is considered to be Phase II of the Yakima River Basin Water Enhancement Project (YRBWEP). The goal of this program is "to realize sufficient reductions in irrigation water diversions through implementation of water conservation measures so that additional water is available for instream flows for fish and wildlife and the water supplies for irrigation in dry years are improved." (Yakima River Basin Conservation Advisory Group, 1998).

Congress authorized YRBWEP in recognition of the "inadequate water supplies for irrigation during drought years and declining anadromous fish populations" in the Yakima River Basin. Phase I of the Project, authorized in 1984, focused on "an immediate improvement of the fish passage and protective facilities to reduce the loss of anadromous fish."

Title XII section 1201 states:

> The purposes of Title XII are:
>
> (1) to protect, mitigate, and enhance fish and wildlife through improved water management; improved instream flows; improved water quality; protection, creation and enhancement of wetlands; and by other appropriate means of habitat improvement;
>
> (2) to improve the reliability of water supply for irrigation;
>
> (3) to authorize a Yakima River Basin Water Conservation Program that will improve the efficiency of water delivery and use; enhance basin water supplies; improve water quality; protect, create and enhance wetlands; and determine the amount of basin water needs that can be met by water conservation measures;
>
> (4) to realize sufficient water savings from the Yakima River Water Conservation Program so that not less than 40,000 acre-feet (AF) of water savings per year are achieved by the end of the fourth year [1998] of the Basin Conservation Program, and not less than 110,000 AF of water savings per year are achieved by the end of the eighth year [2002] of the program, to protect and enhance fish and wildlife resources; and not less

than 55,000 AF of water savings per year are achieved by the end of the eighth year [2002] of the program for availability for irrigation;

(5) to encourage voluntary transactions among public and private entities which result in the implementation of water conservation measures, practices, and facilities; and

(6) to provide for the implementation by the Yakama Nation at its sole discretion of (A) an irrigation demonstration project on the Yakama Reservation using water savings from system improvements to the Wapato Irrigation Project, and (B) a Toppenish Creek corridor enhancement project integrating agricultural, fish, wildlife and culture resources.

Through the YRBWEP Basin Conservation Program, grants are available to eligible entities (e.g. irrigation districts) that fulfill requirements such as furnishing all surface water delivery systems with volumetric measuring devices within 5 years and completing agreements that conserved water cannot be used to expand irrigation. Exceptions for the Yakama Indian Nation are provided.

Participation in the YRBWEP is voluntary. Participating entities can acquire Federal and State funds to assist in the cost of preparation of water conservation plans, feasibility studies, and ultimately in the implementation of approved conservation measures.

The YRBWEP legislation specifies that water savings achieved through implementation of measures under the Basin Conservation Program should increase the YRBWEP instream target flows by 50 cfs for each 27,000 acre-feet of reduced annual water diversions by participants in the conservation program. The 50 cfs increase in target flows for every 27,000 AF of conserved water is derived by assuming that 2/3 of the annual water savings are dedicated to instream flows and 1/3 of the annual water savings is reserved for use at the discretion of the Basin Conservation Program participant (i.e. either used for irrigation or left in the reservoirs and diverted back to water supply in the following year). The total amount of instream flow augmentation (in cfs) resulting from annual water savings is calculated by partitioning the total water savings (2/3 portion of 27,000 AF) over a 180 day time period. This period roughly corresponds to the length of the average irrigation season (e.g. 50 cfs for 180 days = 18,000 AF = 2/3 of 27,000 AF).

BID prepared and submitted a Water Conservation Plan (WCP) according to the Basin Conservation Program Interim Guidelines for the Preparation of Water Conservation Plans. A total of seven conservation programs were formulated, three of which were identified by the BID Board of Directors (Board) for further consideration. The three selected conservation programs were formulated with higher levels of detail, to enable the Board to make a final selection. A fourth alternative was formulated from these three alternatives to become the preferred alternative.

The BID WCP was approved and, based on it, the Board selected the “Pressurized System Conversion” (Project) program to be further developed and evaluated under the Phase 2 Feasibility Investigation. The Board recognized that this program would conserve the most water among the conservation programs considered, thereby providing the most benefit to the Yakima River and the District’s water users. To ensure support of District ratepayers, the District held a referendum in the winter of 2002 that asked voters whether to continue with the water conservation program based on an appraisal of the proposed plan. A majority of ratepayers approved the proposal. Subsequently, the District requested funds and initiated the Phase 2 Feasibility Investigation and accompanying Environmental Assessment of the Pressurized System Conservation Program in the late summer of 2002 and summer 2006, respectively. The Feasibility Investigation was completed in 2004 (Davids Engineering, 2004).

1.2 Purpose and Need

The purpose of the BID Pressurized System Conservation Project is to replace aging district facilities with a more efficient and technically advanced system that will conserve water, dramatically increase the flow volume over the Sunnyside Diversion Dam to a pressurized intake 71 miles downstream, and raise total instream flows in the Yakima River as a result of conservation. In so doing the project will meet the purposes of the YRBWEP legislation.

In addition to its environmental advantages, the Project will benefit BID and its growers by providing pressurized service, increasing water delivered to the water users, reducing the amount of trash in the water, enabling intermittent flow, improving delivery reliability, reducing liability exposure, and decreasing flow lag time.

Finally, the Project proposes to eliminate the rising potential risk of catastrophic irrigation system failure associated with the continuing deterioration of the existing canal system over time.

1.3 Project Location and General Description of the Area

BID is located in Benton City approximately 20 miles west of the cities of Richland, Pasco, and Kennewick (collectively known as the Tri-Cities) at the eastern end of the Yakima Valley on the southern flank of the Rattlesnake Mountain. District boundaries extend from the western boundary at the west line of Section 24 in Township 9 North, Range 25 East to Benton City seven miles to the east (Davids Engineering, 2000). Figure 1 shows the relative location of BID.

Precipitation averages between 8 and 9 inches per year. Annual average maximum and minimum temperatures are 64.81 and 38.47 degrees Fahrenheit, respectively.

Soils are in the Starbuck-Scooteney association based on the 1971 survey (County, 1998). The terrain of the District varies widely from basalt outcroppings to deep sands.

Most surface water occurring in the District, aside from diverted Yakima River flows, results from agricultural drainage. Examples include Corral Creek and the Badlands Lakes. Surface water predominately drains toward the south from the upland plateau to the Yakima River. All water is provided by gravity.

The US Army Corps of Engineers (1978) locates the District within the Prosser groundwater subbasin, a subdivision of the Lower Yakima groundwater basin. This basin lies within the Yakima Basalt aquifer system, characterized by three major formations. The Grande Ronde is the oldest and most voluminous of the formations. The Wanapum Basalt ranges in thickness from a few feet to several hundred feet. This formation is generally overlain by Saddle

Mountains Basalt or by thick sequences of sediments. The Saddle Mountains Basalt is the youngest formation of the Yakima Basalts and is generally overlain by recent alluvial sediments.

The Wanapum formation is the principal aquifer underlying the District, and water levels in this aquifer have been declining throughout most of the lower Yakima groundwater basin (Kirk, 1995). Additionally, a large volume of water is discharged from the Yakima Basalts into the overlying geologic units and then to the Yakima River from vertical leakage (Foxworthy, 1962).

In the Yakima valley, approximately $1 billion worth of irrigated crops are raised annually, comprised mostly of forage crops and fruit orchards.

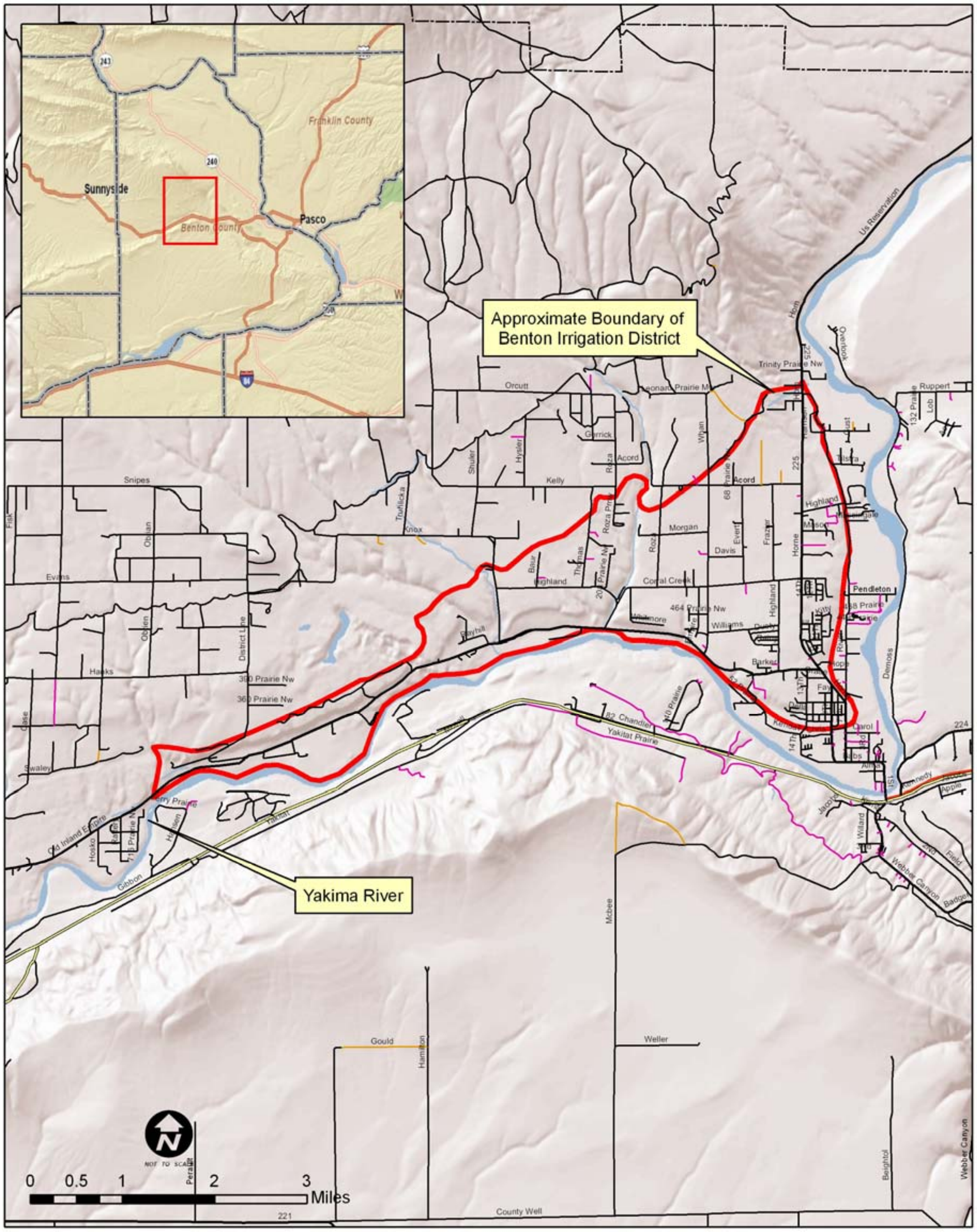

Figure 1-1. Location of the Benton Irrigation District

1.4 Project History and Background

The District was organized on October 7, 1912 as the Sunnyside Irrigation District under Title 87 of the Revised Code of Washington, Section 87.03.020. On September 6, 1966, the District changed its name from Sunnyside Irrigation District to Benton Irrigation District.

The District entered into a contract on October 6, 1914 (1914 Contract) with the United States government to construct irrigation facilities and draw water from the United States Reclamation Service's Yakima Project. The water was to be conveyed through an extension of the existing Sunnyside Main Canal. Construction of major facilities was completed in May 1915 and water deliveries began a month later. BID operated with no major improvements or changes until 1942, when a contract was entered into with the United States to restructure the District's capital debt and to transfer certain facilities to the District.

In 1945, the District Court of the United States entered a Consent Decree, commonly referred to as the 1945 Judgment, which established a Board of Control to operate and maintain the common facilities of the Sunnyside Division of the Yakima Project (common facilities). The Board of Control is comprised of all the entities that receive water from the common facilities, including Sunnyside Valley Irrigation District (SVID), Sunnyside, now Benton, Irrigation District, and a number of other irrigation districts, ditch companies, cities, and Special Warren Act Lands. The Board of Control selected SVID as the operating agent of the common facilities in 1946, a function that SVID has continued until the present.

In 1962, with its facilities approaching 50 years of age, the District entered into a rehabilitation and betterment (R&B) contract with the United States to replace four siphons and two flumes on the main canal, pipe selected sections of the distribution system, install a main canal wasteway and construct a "feeder" system that would collect local water to augment the District's Project water supply. The feeder system was constructed in 1967, and its costs are being repaid under the R&B contract; however, the District did not complete the process needed to establish rights to the collected water. Consequently, the feeder system has never been used. These works constitute the last major improvements made to the District facilities.

1.5 Water Source and Rights

The District receives all of its water from the United States Yakima Project. The initial water delivery contract was executed with the United States in 1914. The contract specifies available District monthly water volumes to a total of 18,520 AF annually. This contracted water volume has since been affirmed in numerous contracts between the District and the United States.

Although the contracted volume of water to be "delivered to the District" has remained constant, the 1945 Judgment directed the Board of Control to include a 12% conveyance loss with the water diverted to BID. This decision acknowledged that a larger volume of water (21,044 AF) must be diverted at the Sunnyside Diversion Dam in order to deliver the contracted volume (18,520 AF) to the District.

The 1914 contract also provides the District with additional water from the natural flow of the Yakima River during October to the extent the District requires and that the Yakima Project manager can make available from water supplies in the Sunnyside Main Canal. The 1945 Consent Decree provided the District with Sunnyside Main Canal flow for irrigation, domestic, stock-water, and power use to the extent available.

In 2003 the District's water rights were confirmed and modified as a result of the Sunnyside Division Water Right Settlement Agreement (Settlement). As agreed in the Settlement and incorporated in the Conditional Final Order (CFO) for the Sunnyside Division in the Aquavella adjudication, all of the water rights confirmed to the United States on behalf of the Sunnyside Division are confirmed for the purpose of "(i)rrigation of a maximum of 99,244 irrigated acres of the total 103,570 irrigable acres within the Sunnyside Division and related uses", and are confirmed to the one unitary place of use for the Sunnyside Division, described as "(i)rrigable acres within the Sunnyside Division exterior boundaries as of the date of this Stipulation, as described in the Attachment 1…and Attachment 2…incorporated herein." . As per the Settlement and CFO, each acre within the Sunnyside Division place of use receives an identical combination of water rights with regard to priority date, that being a mix of 68.9% non-proratable and 31.1% proratable rights. In addition, Reclamation and the parties in the Settlement agreed that Reclamation cross-assigned all of its water contracts as they pertain to water delivery between and among individual Sunnyside Division entities among all Sunnyside Division entities. In a March 27, 2003 Agreement signed by the Sunnyside Division Board of Control, Benton Irrigation District, and the Washington State Department of Ecology; and in the Diversion Reduction Agreement currently being negotiated by the Sunnyside Division Board of Control, Benton Irrigation District, the United States Bureau of Reclamation, the Yakama Nation, and the Washington State Department of Ecology; the parties agree that BID will be entitled to divert, at its proposed new pumped diversion point on the Yakima River near Benton City, the same mix of non-proratable and proratable water that BID has historically enjoyed from the Sunnyside Canal. Thus, the District now holds water rights, delivery contracts, and agreements entitling it to receive 18,520 af of water that is approximately 68.9% non-proratable and 31.1 % proratable under the rules of 1945 Consent Decree.

Under the proposed action, the district's water rights will remain the same; the only change would be the point of diversion for the district. This additional point of diversion for the district must be approved by the Washington State Department of Ecology by filing an application for change for each of the six water rights (for a total of six water right change applications) confirmed to the United States on behalf of the Sunnyside Division for irrigation and related uses from April 1 through October 31 each year.

1.6 Related National Environmental Policy Act and Endangered Species Act Documents

A Programmatic Environmental Impact Statement (PEIS) was completed in January 1999 for YRBWEP (Reclamation, 1999). This Environmental Assessment (EA), where appropriate, will tier sections of the PEIS. Section 1508.28 of the National Environmental Policy Act (NEPA) defines tiering of NEPA documents as "coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basin-wide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared." This PEIS is available for review at the Upper Columbia Area Office.

The Endangered Species Act (ESA) of 1973, as amended in Public Law 93-205, applies to consideration of this Water Conservation Plan. A species of plant or wildlife shall be presumed to be rare or endangered if it is listed in Title 50 CFR Sections 17.11 or 17.12, pursuant to the ESA as rare, threatened, or endangered. The ESA establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants, and the preservation of the ecosystems upon which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the Fish and Wildlife Service (FWS) to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or adversely modify or destroy their critical habitats. If such species are anadromous fish, consultation is required with the National Marine Fisheries Service (NMFS). Actions that might jeopardize listed species include direct and indirect effects, and the cumulative effects of other actions.

Biological assessments have been prepared and transmitted to both FWS and NMFS concerning impacts to species under their jurisdiction. Both BAs conclude that the action may affect but is not likely to adversely affect listed species.

1.7 Permits Required for Implementation of This Project

Aspects of the final design such as river pump station location and pipeline locations are dependent upon permits and easements. Because of this, the first element of Phase III implementation is to obtain the environmental permits required for construction of the river pump station and to research and obtain easements for the distribution system. Application for permits of the river pump station will start once the design of the station is completed.

Easements will be required for access to the river pump station and for the distribution system. Obtaining easements will require conducting ownership evaluations, having an informational meeting for the public, preparing easement documents, and acquiring and recording easements. Easements will be acquired when design of the system is completed.

Required permits include the following:

Yakima River

- Water Right Change Approvals (Six) to Add a Point of Diversion to each of the Six Water Rights confirmed to the United States on behalf of the Sunnyside Division for irrigation and related uses from April 1 through October 31 each year.
- Hydraulic Project Approval (HPA)
- Clean Act Water Act Permits:
  - Section 401
  - Section 404
- Washington Department of Natural Resources Aquatic Permit
- Benton County Shorelines Permit

Piping

- Benton County Road Crossing Permits
- Benton City Road Crossing Permits

Chapter 2 Alternatives Including the Proposed Action

This chapter addresses the proposed action alternative as well as the No Action alternative. All other alternatives, considered in the BID Water Conservation Plan, were screened out prior to the Feasibility Investigation. The rationale was based on the Conservation Advisory Group (CAG) and BID Board agreement that only complete conversion to a pressurized system had sufficient water conservation benefit to be worthwhile. In addition, the facilities at the District are sufficiently aged such that they will require replacement in the near term.

2.1 No Action Alternative

The No Action alternative assumes that BID will continue to operate under its present operating criteria with no system improvements. Figure 2-1 shows a map of the current facilities.

The District's existing water distribution facilities, including the main canal, siphons, headgate, checks, laterals, weir boxes, and the district headquarters are in fair to poor condition. While water deliveries are made and crops are successfully grown, the system is old, difficult and unsafe to operate, expensive to maintain, and prone to failure. Consequently, the level of service that the District can provide is neither well-matched to the needs of modern irrigation systems nor conducive to good on-farm water management. Operations and maintenance costs are high, and the risk of system failure is significant and probably increasing over time.

The BID WCP identified several problems with the existing system. Some of these are directly related to water conservation, while others are associated with general operations, maintenance, and administrative functions. These problems include:

1. Water losses from the system are high, requiring that roughly five acre-feet (af) of water be diverted from the Yakima River for every two af consumed by crops in BID.

2. The system is incapable of providing a level of service that encourages and facilitates good on-farm water management. The system can only be operated in a continuous flow mode, which forces inefficient utilization of both water and labor and imposes additional costs on growers.

3. System capacity constraints and inadequate service contribute to deficit irrigation, which suppresses crop yields and economic output in the District. According to YRBWEP provisions, 1/3 of the conserved water can be retained by the District and, in this case, used to offset the existing crop evapotranspiration (ET) deficit, or to reduce the district's water supply shortfall during years of prorationing (drought years) in the Yakima Basin.

4. The existing poor condition of many District facilities results in high operations and maintenance costs.

5. The lack of safety features, particularly the lack of fencing, hand railing, and canal escape features at the inverted siphons pose a liability risk to the District.

6. The lack of main canal spillways upstream of the inverted siphons results in main canal failures. In 1997 and again in 1998, the main canal failed upstream of siphon #4. When the weed racks on the siphon plug, water backs up in the canal and overflows, causing breaches.

Without action, District operations can be expected to continue to experience the same difficulties that currently hinder efficient water management and conservation, and water scarcity and deficit irrigation are assumed to be the rule. Additionally, the impact of a canal failure would be extremely costly, as well as detrimental to crop production and river health. Finally, with the No Action alternative, the river and anadromous fish will receive no benefit from increased flows.

2.2 BID Pressurized System Conversion

The District Water Conservation Plan proposes to completely abandon the existing system and replace it with a new pump-pressurized, buried pipeline distribution system, shown in Figure 2-2. This measure significantly reduces or eliminates losses at all levels, including losses from the Sunnyside Main Canal, the BID main canal and laterals, and on-farm practices. Additionally, the project allows water diversions to BID to be relocated from the Sunnyside Diversion Dam to a new River Pump Station located 71 miles downstream on the Yakima River near Benton City.

The new pump-pressurized, buried pipeline distribution system is comprised of a single River Pump Station and two smaller booster pump stations. The River Pump Station includes two sets of pumps, pumping against low and high heads. Each set of pumps has its own independent pipeline distribution system. One of the booster stations lies near the Chandler Canal and serves ten nearby District deliveries. The second booster pump station will serve the upper elevations of the District located along the existing BID main canal.

The existing gravity system will be replaced with new pressurized mainlines and laterals. This project provides pressurized service to growers, reduces the trash in the water, enables intermittent flow, improves delivery reliability, increases operating flexibility and canal safety and reduces liability exposure and flow lag time.

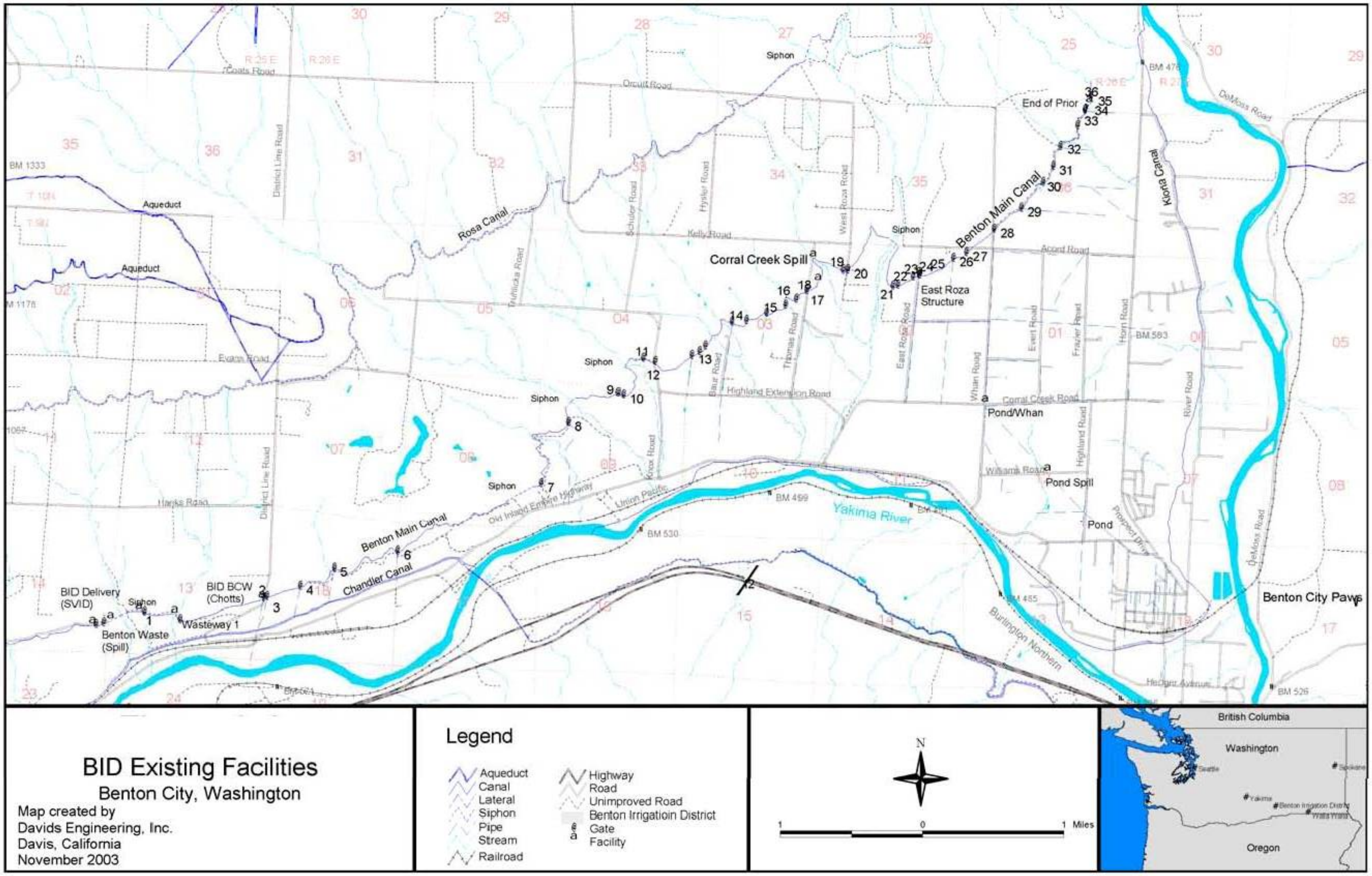

Figure 2-1. Layout of Current BID Facilities

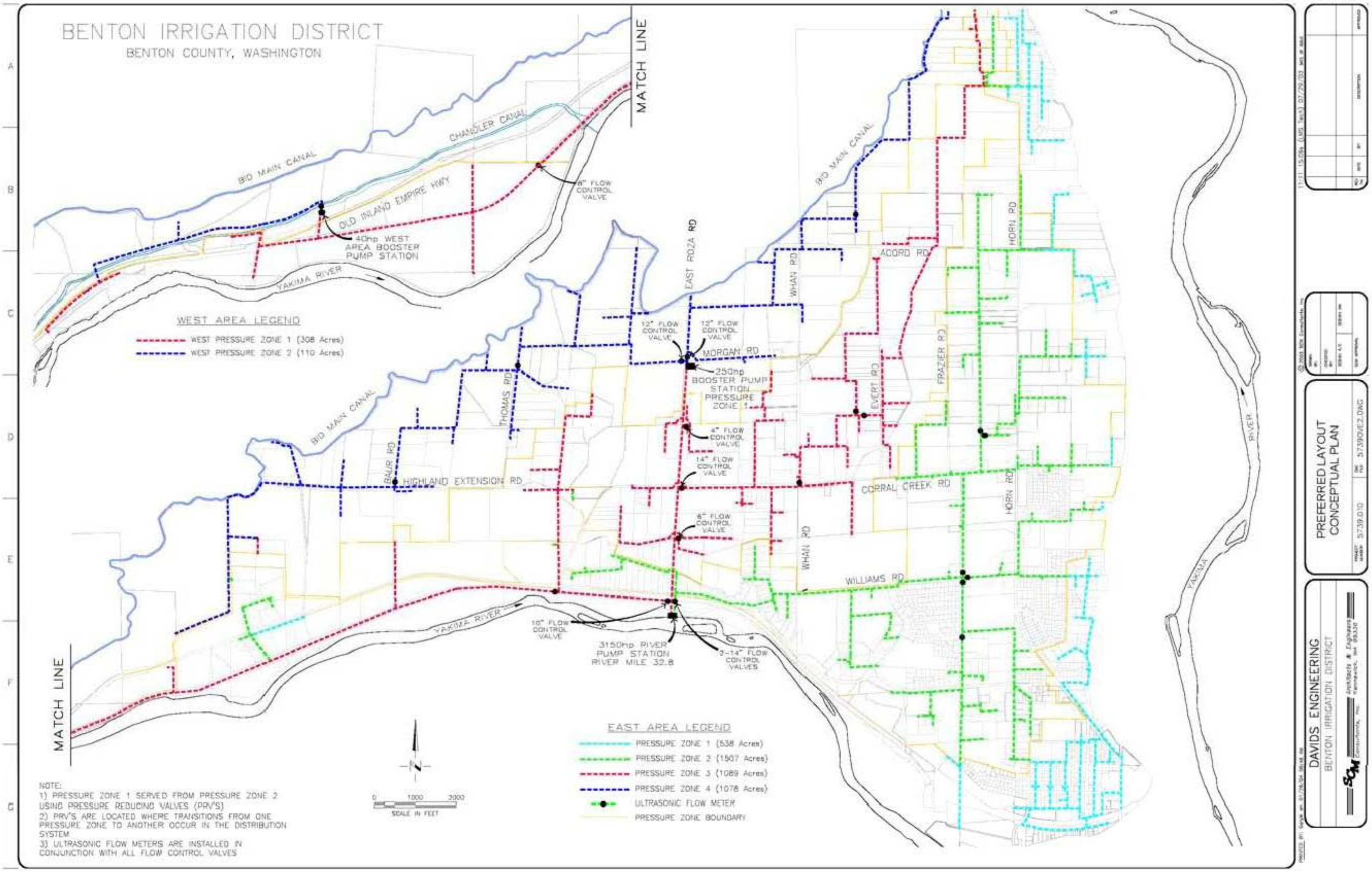

Figure 2-2 Preferred Layout of the Proposed Pressurized Pipe Irrigation System.

2.2.1. Diversion Relocation/River Pump Station

BID's water is currently diverted from the Yakima River at the Sunnyside Diversion Dam and conveyed approximately 60 miles via the Sunnyside Main Canal to the BID Main Canal headgate. This project relocates the BID diversion 71 miles downstream to a new River Pump Station at River Mile 32.8.

The physical relocation of the diversion point results in an additional flow of 21,044 af (the average annual BID diversion) in the Yakima River between Sunnyside Diversion Dam and the new River Pump Station during the irrigation season. This 71-mile section encompasses an important reach of the river with respect to instream flows impacting anadromous fish out-migration and seasonal steelhead rearing habitat. In non-proratable years, the project could consequently provide an average increase in river flow of 58 cfs over the Sunnyside Diversion Dam during the irrigation season. The new River Pump Station will divert no more than 15,623 af for BID irrigation water, and the remaining 5421 af would remain in the Yakima River providing an instream flow benefit for approximately 9 miles down to the Kiona Wasteway.

The main features of the proposed River Pump Station are: intake screens, an air burst cleaning system, intake pipe and pump wells, a building housing electrical controls and low-pressure and high-pressure pump banks. The fish screens will meet all State of Washington and NMFS fish screen criteria. Each pump bank consists of four pumps totaling 1,050 horsepower (hp) and 2,100 hp for the low- and high-pressure pump banks, respectively.

2.2.2 Construction

Construction of the in-stream intake siphon will commence at one of the three preferred sites the July following final approval and design of the Project. This time of year was chosen because it will have the least amount of impact on fish rearing and out-migration in the river below Sunnyside Diversion Dam. Activities will include the erection of a temporary coffer dam around the construction site to allow the area to be dewatered while still permitting adjacent river flow, excavation for the placement of the intake and fish screens, construction of a concrete foundation for the intake and fish screens and then construction of those facilities. Construction of the River Pump Station itself will occur at a location removed from the river bank to avoid water quality impacts and future flood risks.

Construction associated with the distribution of pressurized pipes throughout the BID irrigation area will be located relative to parcel boundaries, roads, and existing facilities. Routes were chosen to minimize the costs of obtaining rights-of-way (ROW) and easements, to minimize the lengths and sizes of pipe that were required and to minimize the disruptions caused to farm operations during system construction. These objectives were satisfied by using county road ROW where possible. Where it is not possible to use county road ROW, pipelines will be run on existing BID ROW or along parcel boundaries to avoid splitting farm units. In this way, the number and cost of easements will be minimized and the system can be constructed with minimal disruption of farm operations.

Due the variability of soil depth within BID, the depth of pipe burial and pipe material used will depend upon soil conditions.

2.2.3 Booster Pump Stations

To provide the necessary pressure to the on-farm turnouts, two booster pump stations are included in the project design. A station located near the intersection of Whan Road and Morgan Road provides enough pressure to serve lands at higher elevations near the existing BID main canal. This pump station consists of three pumps totaling 250 hp and a control building. A second booster station, located near the Chandler Canal, serves just over 400 acres in the western portion of the District. This pump station consists of a single 40 hp pump and a control building.

2.2.4 Pressurized Distribution System & Components

The major components of the pressurized distribution system include pipes, flow meters, flow control valves, and pressure reducing valves (PRV).

The system will use PVC pipe up to 24-inch nominal diameter where deep soils allow the pipe to be buried at sufficient depth. Steel pipes are used in shallow soil areas and for nominal diameters greater than 24 inches.

Flow control valves are located at strategic points along the distribution system to regulate flow. Pressure Zone 1 is served through pressure reducing valves from Pressure Zone 2. In addition, pressure-reducing valves are located where transitions between pressure zones occur in the distribution system.

Ultrasonic flow meters will be installed in conjunction with all flow control valves to allow accurate adjustment of the flow control valves. Additional ultrasonic flow meters will be located throughout the system so that the flow will be measured to areas not larger than 400 acres.

2.2.5 Farm Turnout

The pressurized distribution system design contains a water turnout for every existing irrigable parcel within the District's boundaries as of May 1, 2003. Each farm turnout includes one gate valve that can be shut off and locked by the District. Each water user is expected to use this valve or add an above ground valve for convenient operation. Where possible, these turnouts will be located so that the water user can connect to the existing on-farm system conveniently.

2.2.6 Project Land Use and Cropping

With the project in place, the amount of land devoted to orchards is expected to increase to slightly over 30 percent of the irrigable area, while forage crops are predicted to decrease to less than 71 percent. Among the orchards, today's market forces are resulting in an increase in cherry acreage and a reduction in apple acreage.

2.2.7 Water Savings from Conservation Activities

<u>Relocating Point of Diversion 71 Miles Downstream</u>

The primary water conservation benefit of the BID Conservation Plan results from moving the BID point of diversion to a location on the Yakima River 71 miles downstream of the Sunnyside Diversion Dam. Reclamation will deliver BID's water to Sunnyside Diversion Dam as it has always done. Reclamation, BID and SVID have agreed that this water will not be diverted into the Sunnyside Main Canal but rather will be allowed to pass over Sunnyside Diversion Dam in volumes commensurate with BID's contract. This action will increase the flow volume between the Sunnyside Diversion Dam at RM 103.8 to the location of the new Pump Station near Benton City (RM 32.8) by an annual volume of 21,044 AF (Table 2). The 21,044 AF consists of the 18,520 AF BID contract volume plus the 2,524 AF conveyance water allowance through the Sunnyside Main Canal. This 71-mile section encompasses an important reach of the river with respect to instream flows impacting anadromous fish outmigration and seasonal steelhead rearing habitat. The project will consequently provide an average increase in river flow of 58 cfs over the Sunnyside Diversion Dam during the six-month irrigation season.

Although the full 21,044 AF of BID water will be left instream until it reaches the new BID River Pump Station at RM 32.8 for an average increase in 58 cfs, the net benefit to the river at RM 32.8 will be approximately 18,520 AF (50 cfs average flow increase) because the 2,524 AF (8 cfs average) of conveyance loss water will be subtracted from the total water amount to represent the return flow that would have made it back to this point on the Yakima River under the old BID irrigation system.

Reduced Irrigation Diversion Resulting From System Improvements

Due to water conservation activities from installing a fully piped and pressurized water delivery system, the new Yakima River Pump Station will only be required to divert an average volume of 15,623 AF (42 cfs average) to make water deliveries on District lands. When this 15,623 AF (42 cfs) of water is diverted from the 18,520 AF (50 cfs) of net benefit water that is expected to reach the new BID diversion point, a total of 2,897 AF (or 8 cfs) of net benefit water will remain in the river below the River Pump Station. This annual volume of 2,897 AF (8 cfs) will no longer be diverted from the Yakima River and will increase instream flows in the mainstem Yakima River to the point where Kiona Wasteway drains into the Yakima River at RM 23.8. The 2,897AF volume savings downstream of the new point of diversion consists of the YRBWEP acquired conservation water resulting from Conservation Plan system improvements (see YRBWEP Conservation Savings below). The 2,897 AF in water savings will be dedicated to instream flow increases in the river as a result of water conservation improvements on the District. Mainstem streamflows between the new point of diversion and the Kiona Wasteway (approximately 9.0 miles) will therefore increase by an average of 8 cfs during the irrigation season (Table 2-1).

Irrigation system improvements to be implemented in the BID Conservation Plan will allow the District to run more efficiently and incur less water loss from canal and lateral operational spill, seepage, and evaporation. Improvements in system design allowing for water use efficiency improvements will result in reduction or elimination of evaporation, seepage, and operational spills from the irrigation delivery network. The anticipated water savings have been calculated to be approximately 2,897 AF. This amount of water will no longer be accumulating and discharging into the Kiona Wasteway. By reducing the Kiona Wasteway return flow contribution to the Yakima River, instream benefits will be reduced by an average of 8 cfs in the mainstem Yakima River. Therefore, streamflow increases in the lower river from Kiona Wasteway (RM 23.8) to the confluence with the Columbia River will be 0 AF due to YRBWEP conservation savings being offset by return flow decreases (Table 2-1).

River Reach	Reach Length (miles)	Total Volume Change in Yakima River (AF)	Net Average Flow Change in Yakima River (CFS)
Sunnyside Diversion Dam (RM 103.8) to Proposed River Pump Station (RM 32.8)	71.0	21,044	58
Reduction in Net Flow Benefit Due to Return of Conveyance Water to Yakima River	-	-(2,524)	-(8)
Net Flow Increase at the River Pump Station (RM 32.8) Due to Loss of Conveyance Water	-	18,520	50
Diversion of BID Water Right at the River Pump Station (RM 32.8)	-	-(15,623)	-(42)
Proposed River Pump Station (RM 32.8) to Kiona Wasteway (RM 23.8)	9.0	2,897	8
Reduced Return Flows from Kiona Wasteway from System Improvements	-	-(2,897)	-(8)
Kiona Wasteway (RM 23.8) to Confluence of Yakima and Columbia Rivers	23.8	0	0*

Table 2-1. Incremental Flow Changes in Affected Yakima River Reaches and at Specific Project Locations After Implementation of the BID Conservation Plan

* This number may be slightly negative depending upon the use of the districts' 1/3 of conserved water.

YRBWEP Conservation Savings

Anticipated water conservation savings from the new pump-pressurized system improvements will total approximately 4,346 AF annually. Of this total, 1/3 (1,448 AF) will be available for BID use or returned to the basin TWSA calculation, while 2/3 of the conserved water (2,897 AF) will be dedicated to YRBWEP instream flow improvements in the Yakima River. This volume of conserved water will largely result from elimination of evaporation, spillage, and seepage in the BID main canal and laterals. Although not quantified for this analysis, it is expected that future water conservation will occur on the District as surface irrigators convert to sprinkler and drip irrigation systems, leading to further on-farm water savings.

2.2.8 Cost

The money to be spent on the local infrastructure of the pressurized system alternative in the 2005 Feasibility Study was estimated to be $15,967,929 ($2.9 million of which will derive from local cost share), with water savings of 21,044 af through a critical reach of the Yakima River and 6,870 af savings (excluding Benton Waste) thereafter to Kiona Wasteway.

2.3 Alternatives Considered but Eliminated from Further Consideration

2.3.1 Instream Siphon Alternative

Shallow wells along the Yakima River might still provide an inexpensive source of water for this area. Shallow wells would be hydraulically connected to the Yakima River so BID's contract with Reclamation to provide surface water should still be applicable. Drilling shallow wells adjacent to the river eliminates the expense of installing and operating river intake screens. This option might still be considered during final design; however, at the feasibility level there was insufficient information for determining whether the subsurface materials along the river would yield sufficient water.

2.3.2 Layout 1

This alternative calls for the addition of a re-regulation reservoir, four thousand feet of additional steel pipe, and four pumps installed in Chandler Canal. This alternative was eliminated due to additional costs and infrastructures.

2.3.3 Layout 2

This alternative would have all the water pumped from the river pump station, except for a small pump in the West Area. The location of the river pump station would be located farther upstream than the preferred alternative. The pumping power would be greatly increased over the other alternatives because just one pumping station would be utilized. Larger pipe would be required to service the West Area. This alternative was eliminated due to additional costs and infrastructures.

2.3.4 Layout 3

This alternative would operate with three pressure zones with the same pump station location as Layout 1. One booster pump in the East Area, and one booster pump in the West Area would be required under this layout. This alternative was eliminated due the lack of water service flexibility.

Chapter 3 Affected Environment

3.1 Issues Considered but Eliminated from Further Analysis

Recreation was analyzed in the YRBWEP PEIS and no impacts were found, therefore it is not discussed here.

3.2 Surface Water Hydrology

The Basin Conservation Plan (Conservation Advisory Group, 1999) lists the following four problems for the Yakima River reach from Sunnyside Diversion Dam to Chandler Power Plant Discharge:

- Additional base flow needed over Sunnyside Diversion Dam;
- Additional flow needed during out-migration;
- Hourly and daily fluctuations; and
- Seasonally high water temperatures.

3.2.1 Sunnyside Diversion Dam

Water for delivery to BID is diverted at the Sunnyside Diversion Dam near Parker, Washington (River Mile [RM] 103.0). The Sunnyside Division diverts between 600 to 1,300 cubic feet per second of water during the irrigation season (Reclamation, 2002). Return flows from the Sunnyside Division reenter the Yakima River at several locations including Sulphur Creek Wasteway (RM 61) and Spring Creek Wasteway (RM 41.8). All return flows from the Division reenter the river above the Kiona gage (RM 29.9).

The proposed action is expected to affect flows in the reach of the Yakima River from the Sunnyside Diversion Dam near Parker to a location 71 miles downstream during the irrigation season from about the end of March through mid-October. A smaller instream impact is expected to affect the river thereafter. Flows in this each of the Yakima River are regulated by reservoir operations and diversions for irrigation during this period. In the spring, from about March through early June, flows are generally on the rise, with March volumes at Parker normally in the range of 2,000 to 4,000 cfs, although higher or lower flows may occur depending upon snowpack and runoff conditions. Conditions are similar at Kiona, though flows tend to be slightly higher in the 4,000 to 5,000 cfs range. From March through late May flows are generally increasing due to spring runoff not captured in the reservoirs.

Peak discharge usually occurs from April through early June. Depending on the water year, peak flows can vary from around 1,500 – 2,000 cfs to over 10,000 cfs with flows in the 3,000 to 6,000 cfs range occurring most frequently. Beginning in late May to mid-June, streamflows decline to baseflow conditions. When natural flows can no longer meet diversion entitlements, storage control begins, and flows at Parker are managed to meet the target flows set as part of YRBWEP. These target flows vary from 300 to 600 cfs, year to year, depending upon Total Water Supply Available (TWSA). The target flows are maintained through the end of the irrigation season on

October 31. During this period flows at Kiona are higher, in the 1,500 to 2,000 cfs range. Flows in the fall and winter at Parker and Kiona would not be affected by the proposed action.

The current BID system is operated on a continuous flow basis with proportional distribution. All water users are expected to take a small, continuous stream (24 hours a day) throughout the entire season, based on continuous flow delivery tables. Different tables are used for the month(s) of April, May and June, July and August, September, and October. The primary day-to-day operational objective is to keep the water "spread out;" that is, distributed to each user in relatively small, continuous streams, more or less in proportion to their acreage. Problems arise when growers shut off or decline to take their water because this results in excess flow and potential spillage elsewhere in the system.

Table 3-1 outlines the total contracted water diversion volume from the Sunnyside Diversion Dam, which comprises the sum of BID contract entitlements from the Yakima Project and allowances for conveyance losses, accounting for the inefficiencies in the current system. Pursuant to BID's contract, the 1945 Consent Decree, and the Sunnyside Division adjudication settlement agreement, the District is allowed a total diversion of 21,044 af between April and September, with additional available water in October, as determined by Reclamation.

Month	**1914 Contract (af)**	**Conveyance Losses[1] (af)**	**Diverted Volume at Sunnyside Canal Headgates**
April	2,410	328	2,738
May	2,960	403	3,363
June	3,700	504	4,204
July	3,690	503	4,193
August	3,350	457	3,807
September	2,410	329	2,739
Totals	18,520	2,524	21,044

Table 3-1. BID Contract Entitlements from the Yakima Project (Excluding additional water that may be deemed available in October).

[1] The contracts between the District and the United States stipulate the volume of water to be "delivered to the headgates" of the District. In this regard, conveyance losses are not a part of the District's contracted water entitlement. Conveyance losses of 12 percent were specified at a later date (1945) to allow a diversion volume adequate to deliver contracted water entitlements to BID.

The Yakima Adjudication Court (Aquavella) determined the extent and validity of all the Sunnyside Division water rights upon entry of the court's August 14, 2003 CFO. The court confirmed an April 1 through October 31 season of use for BID's water rights. The court did not confirm any additional quantity of water for BID in October. Therefore, BID is limited to a total diversion of no more than 21,044 af per year of water from April 1 through October 31 each year.

YRBWEP target flows provided in title XII of P.L. 103-434 are in effect from April 1 through October 31 each year. Target flow increases derived from YRBWEP-funded conservation projects are effect April 1 through October 31 each year.

3.2.2 Flow Fluctuations

Diversions at the Sunnyside Diversion Dam reduce base flows which amplifies flow fluctuations below the Sunnyside Diversion Dam. At times, the hourly flow fluctuation can exceed 20 percent of the base flow, which may be great enough to strand juvenile steelhead, dewater invertebrate habitat, or increase water temperatures to lethal levels in some areas. Inflows below the Sunnyside Diversion Dam gradually dampen the fluctuations so that, by Grandview, fluctuations are negligible. (Reclamation, 2000)

3.2.3 Wasteways

The major BID wasteway is the end of the Benton Main Canal where it spills to the Kiona Canal and Wasteway, which returns both surface and subsurface water from District lands directly to the Yakima River. This wasteway lies at the eastern end of the District boundary.

3.3 Groundwater Hydrology

The Wanapum formation is the principal aquifer underlying the District, and water levels in this aquifer have been declining throughout most of the lower Yakima groundwater basin (Kirk, 1995). Additionally, a large volume of water is discharged from the Yakima Basalts into the overlying geologic units and then to the Yakima River from vertical leakage (Foxworthy, 1962).

The Prosser groundwater aquifer underlies the Sunnyside Division. This aquifer receives much of its recharge from irrigation return flow and canal seepage. The main discharge from this portion of the aquifer is through open drains and directly discharges into the Yakima River. Groundwater is a minimal source of irrigation water in the division.

3.4 Water Quality

The U.S. Environmental Protection Agency (EPA) has determined that agricultural runoff is the major source of water quality degradation in Washington State's rivers and streams, with hydrologic habitat modification considered to be the second most important cause of water quality impairment in the State (EPA, 1998). Normal and emergency Yakima Project operations and maintenance activities alter flow volume and water levels, affect normal temperature regimes, and periodically increase suspended sediment and turbidity outside the range of State water quality criteria. Large volumes of agricultural return water enter the lower Yakima River and add a variety of contaminants to the river, including nutrients, bacteria, pesticides, and sediment.

This section of the Yakima River is listed on the Washington State 303(d) list for violating several water quality parameters including: pesticides, PCBs, temperature, FC, pH, DO, and turbidity (Morace et al., 1999). Agricultural return flows are a main source of degraded water quality. Pesticides and PCBs are lethal to fish and also bio-accumulate, resulting in human consumption advisories for fish captured in this reach. High water temperatures and elevated pH can also exacerbate the effects of toxic chemicals and either stress fish, which may result in death from secondary causes, or kill them directly. Elevated turbidity indicates high sediment loading and results in the armoring of spawning gravel, siltation of redds, and decreased macro-invertebrate production. The high nutrient loading and warmer water temperatures create habitat conditions more favorable to non-native species, some of which are predators upon anadromous salmonids.

Several water quality impairments associated with agricultural nonpoint source pollution are believed to contribute to suppressed fish populations. Problems linked to return flows include deposition of fine-grained sediment on fall Chinook spawning beds in the lower Yakima Basin, false-attraction flows associated with discharge plumes from agricultural drains, and pesticide concentrations above safe, chronic exposure levels. Agricultural diversions also contribute to low flows in some portions of the lower basin but return flows increase flows in other areas. High temperatures in the lower basin may also constitute a partial thermal block for fish passage and reduce available habitat for native cold-water species.

Of the four drainages in the Lower Yakima Basin that have been classified as major contributors of suspended sediment (Moxee Drain, Granger Drain, Sulphur Creek, and Snipes/Spring Creek), none lie within the District. It is possible that no major drainages within the District have been targeted because all of the irrigated land is devoted to perennial crops such as pasture, orchards (typically with cover crops), and vineyards. Because this cropping pattern includes no row crops and because many of the parcels within the District are sprinkler or drip irrigated, agriculture within the District is unlikely to generate the volume of runoff or the concentration of sediment found at other locations in the lower Yakima Basin. BID return flows are also small relative to the major contributors, and this may be another reason they have not received much attention. Recent improvements in farming practices have improved water quality by reducing sediment entering the river.

3.4.1 Water Temperature

Water temperature in the lower Yakima River has consistently been acknowledged as a factor affecting anadromous salmon during particular life stages – specifically, high temperatures at the mouth of the river have been implicated as a possible cause for the delay of adult steelhead migrations.

Factors contributing to these increased water temperatures include reduced flows in some reaches, which results in shallower depths that provide less insulation from warm air and solar radiation, the loss of shade-producing vegetation along the river shore, and warm return flows stemming from surface irrigation runoff. Subsurface return flows though can act to cool the river. Exactly how these factors interact is not well understood. Vaccarro (1986) found that altering reservoir operations, diversions and return flows in fairly substantial ways had little effect on high summer water temperature in the lower Yakima River. Similarly, in modeling done for the Yakima River Basin Water Storage Feasibility Study (2008), increasing base flows over Sunnyside Diversion Dam to 1,500 cfs had little effect on summer temperatures.

3.5 Soil Quality and Erosion

The soils of the basin were formed from alluvium, eolian sand, lake sediment, loess, and residuum derived from basalt and sandstone. The soils are sandy to clayey in texture and vary from shallow to deep. The soils are generally very productive with low organic matter, medium textures, good water holding capacity, and good structure. Soil quality is generally good with only minor areas of salinity and/or sodicity and few toxic trace element problems.

Erosion ranges from slight to severe, depending on soil texture and topography. Dawson and Domka (1987) reported that farming practices in the Yakima Basin in the mid 1980s led to over 90,000 acres exceeding the soil loss tolerance values defined as the maximum soil loss that can be sustained without reducing the long-term productivity of the soil. Irrigation practices in the lower basin have improved dramatically since the time of the Dawson report, mostly from converting from rill irrigation to sprinklers.

Erosion caused by surface water is generally low on irrigated slopes of less than 2 percent. Steeper slopes can be irrigated with low to moderate erosion under drip or sprinkler irrigation systems. Row crops under furrow irrigation are the largest source of erosion, although over-irrigation from sprinklers can also cause serious erosion.

Blowing soil is a hazard in the basin on the sandy, droughty soils with low organic matter and crop residue.

Most of the soils are well-drained; however, drainage is restricted in some of the low- lying areas, resulting in excessive salts and a high water table. Agricultural drains have been installed in some areas to lower the water table. In other areas the water-logged areas are used for pasture or have developed into wetlands.

3.6 Fisheries

The reach between the Sunnyside Diversion Dam and Marion Drain is approximately 21.2 miles long and is considered one of the most structurally complex and diverse sections of the Yakima River. This reach is considered one of the main areas where the anadromous salmonid pre-smolts spend the winter before migrating out of the Yakima River. It is also an important area for fall Chinook and coho spawning and adult steelhead holding through the winter. More information may be found in the Yakima Project Operations and Maintenance Biological Assessment (USBR 2000).

In the fall and winter during the non-irrigation season, flows display the natural pattern, but are reduced in magnitude by nearly a third. During the late winter and early spring, anadromous salmonid smolts move into this area for rearing and fall Chinook and coho fry begin to emerge. Reduced flows limit the habitat availability at a time of high anadromous salmonid abundance. Spring peak flows are also reduced (50+ %), affecting emigration for anadromous salmonid smolts and limiting rearing habitat. During the irrigation season, flows are quite variable through the reach increasing from 300-600 at the Sunnyside Diversion Dam to 1,000 to 1,500 cfs near Granger as a result of irrigation return flows.

As discussed in Section 3.1, flow fluctuations from river operations upstream are amplified below the Sunnyside Diversion Dam. At times, the hourly flow fluctuation can exceed 20 percent of the base flow, which may be great enough to cause stranding of juvenile fish, dewatering of invertebrate habitat, and increased water temperatures. Inflows below the

Sunnyside Diversion Dam gradually dampen the fluctuations so that, by Grandview, fluctuations are negligible.

3.6.1 Species Affected

The Pacific salmon species produced in the Yakima River Basin include steelhead, spring Chinook salmon, fall Chinook salmon, and coho salmon. These fish spawn and rear within the basin, migrate to the ocean to grow to adult size, and return to the Yakima system to spawn. Each species uses specific areas within the basin for its respective life stages. This discussion focuses on those aspects of salmon and steelhead migration, spawning, and rearing that could be affected by changes in instream flows, river operations, or water quality as a result of this proposed project. It focuses on the reach of the Yakima River from Sunnyside Diversion Dam to about Kiona and changes to flows and water quality during the irrigation season from the end of March through October. The river below Prosser Dam (RM 47.0) is important for fall Chinook spawning, migration, and rearing. The reach below Sunnyside Dam is used by spring Chinook and steelhead for juvenile rearing, primarily in the fall and winter when temperatures are suitable or in areas of upwelling groundwater or cooler tributary inflow. Fall Chinook spawning and rearing also occurs in this reach. Adult upstream and juvenile downstream migration of all species occurs from Sunnyside Diversion Dam to the mouth of the Yakima River.

3.6.2 Fall Chinook

Adult Migration – The spawning run of Yakima River fall Chinook at Prosser begins in early September, peaks in late September, and is usually finished by the second week of November. Run timing variability is related to flow but not water temperature; higher flows accelerate passage (NPPC 2001).

Spawning and Incubation – Spawning begins immediately after arrival of adults in early October and is complete by the end of November. In the lower mainstem some spawning occurs later from late December to early January. It is estimated that about 70 percent of fall Chinook spawning occurs below Prosser Diversion Dam. Incubation occurs from mid October through April.

Emergence and Rearing – The emergence period ranges from mid February to late April with a peak in late February to early March. In the cooler mainstem, emergence doesn't begin until late March, extending into the third week of April (NPPC, 2001).

Fry Colonization – Fry colonization begins March 1 and extends through May 31. Fry rearing above Prosser are not seen in significant numbers at the juvenile bypass facilities at Prosser until smolts are observed in the last week of April or first week in May (Fast et al. 1986).

Smolt Outmigration – All fall Chinook outmigrate as subyearlings. Ten percent of the smolts have passed Prosser Diversion Dam by May 9; 50 percent by June 6 and 90 percent by July 1. There is considerable variability in outmigration timing, with the migration ending as late as July 15.

3.6.3 Spring Chinook

Adult Migration – Adult migration into the Yakima River begins in early April continuing through late June. Cumulative passage of spring Chinook spawning run at Prosser Diversion Dam for 1983 through 2000 indicates the dates of 10, 50, and 90 percent cumulative passage are April 10, May 13 and June 3. There is considerable variability from year to year, as the run has been 90 percent complete as early as May and as late as June 24.

Spawning and Incubation – Spring Chinook do not spawn in the reaches potentially affected by this proposed action.

Fry Colonization and Overwintering –Highest juvenile densities in summer are found well below the major spawning areas in the upper parts of the Yakima basin but above Sunnyside Dam. There are juvenile spring Chinook rearing in the lower Yakima River below Sunnyside Dam in the summer. Densities are low relative to the upper basin (TRPA 1995), which is to be expected given the distance from the spawning grounds. An extensive downstream winter migration of pre-smolts occurs from October 1 through January 31 in response to falling water temperatures in late fall. From 10 to 35 percent of brood year juveniles migrate below Prosser Dam during winter, with the remaining juveniles overwintering in deep, low velocity portions of mainstem Yakima between Marion Drain and Prosser Dam.

Smolt Outmigration – Outmigration of smolts ranges from March through the end of June, with peaks occurring the second week of April.

3.6.4 Coho

Adult Migration – In 2002 the adult spawning run passing the counting facilities at Prosser Diversion Dam began the second week of September and continued through November (YKFP, 2003).

Spawning and Incubation – Most coho spawn from early October through late December in proximity to their acclimation and release points. In the past, spawning occurred in the middle Yakima River below Sunnyside Dam (from RM 95–RM 104) near previous hatchery release sites. Spawning also has occurred in side channels in the mainstem Yakima between Roza Dam and Wapato (~ RM 100) and in Yakima Canyon (RM 129–RM 146), in the mainstem and tributaries of the Naches River, Marion Drain, and Toppenish Creek. Spawning sites also include Spring Creek and Sulphur Creek wasteways. Incubation occurs from November 1 through March. More recently, hatchery Coho are outplanted in the upper Yakima and Naches Rivers in order for them to reestablish in more favorable conditions.

Emergence and Rearing – Emergence occurs from March through April. Coho juveniles rear for one year in the Yakima River, from April 1 to the following April 1. It is unknown if coho juveniles enter the mainstem of the lower Yakima River during any portion of this year-long rearing period.

Smolt Outmigration – In 2002, coho outmigration past Prosser Diversion Dam began March 25, peaked mid-May and was completed by mid-June (YKFP, 2003).

3.7 Wetlands

Wetlands are critical ecological systems of importance to fish and wildlife. Existing wetlands include wet meadows, seeps, small shallow ponds and lakes, marshes, and riparian wetlands along streams. Many of the existing wetlands have been formed from artificial water sources such as reservoirs, sewage lagoons, stock ponds, irrigation canals, and irrigated cropland runoff.

The area of wetlands within the BID boundary totals 85.7 acres, the largest block consisting of about 28 acres located in the Corral Creek Canyon. This block is sustained by flows in Corral Creek, which come primarily from outside the BID area.

3.8 Endangered Species

The Endangered Species Act requires Federal agencies to consult with FWS and NOAA Fisheries, as appropriate, to ensure that actions they authorize, fund, or carry out do not jeopardize the existence of a listed species or result in the adverse modification or destruction of their critical habitat. The following list contains those species listed by FWS and NOAA Fisheries as threatened or endangered within the project area:

Federal Listed:
<u>Threatened</u>
• Bull trout (Salvelinus confluentus)
• Steelhead trout (Oncorhynchus mykiss)
• Ute Ladies'-tresses (Spiranthes diluvialis), plant

3.8.1 Summer Steelhead

The Middle Columbia River (MCR) Evolutionarily Significant Unit (ESU) of inland steelhead was listed as "Threatened" by NOAA-Fisheries on March 25, 1999. The MCR ESU includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington (64 Fed. Reg. 14517). Steelhead from the Snake River Basin are excluded from this ESU. ESUs may contain multiple populations that are connected by some degree of migration, and hence may have broad geographic areas, transcending political borders. Currently a Distinct Population Segment (DPS) is considered to be synonymous with an ESU.

General Life History and Yakima River Population Characteristics

Steelhead are phylogenetically and ecologically complex, exhibiting perhaps the most diverse life history patterns of any Pacific salmonid species (Shapovalov and Taft, 1954; Barnhart, 1986). O. mykiss display varying degrees of anadromy, differences in reproductive biology, and plasticity of life history between generations (Busby et al., 1996).

Steelhead on the west coast of the United States have experienced declines in abundance in the past several decades as a result of natural and human factors. Forestry, agriculture, mining, and urbanization have degraded, simplified, and fragmented habitat. Water diversions for agriculture, flood control, domestic, and hydropower purposes have greatly reduced or eliminated historically accessible habitat. Loss of habitat complexity, such as reductions in wetlands and deep pools, has contributed to the decline of steelhead. Studies estimate that during the last 200 years, the lower 48 states have lost approximately 53 percent of all wetlands, and the majority of the rest are severely degraded (Dahl, 1990; Tiner, 1991). Washington and Oregon's wetlands are estimated to have diminished by one-third, while California has experienced a 91 percent loss of its wetland habitat (Dahl, 1990; Jensen et al., 1990; Barbour et al., 1991; Reynolds et al., 1993). In national forests in Washington, there has been a 58 percent reduction in large, deep pools due to sedimentation and loss of pool-forming structures such as boulders and large wood (Federal Ecosystem Management Assessment Team [FEMAT]). Similarly in Oregon, the abundance of large, deep pools on private coastal lands has decreased by as much as 80 percent (FEMAT, 1993). Sedimentation from land use activities is recognized as a primary cause of habitat degradation in the range of west coast steelhead. Critical habitat was designated in the Federal Register as a final rule for the Middle Columbia River steelhead DPS on September 2, 2005 (70 FR 52630 - 52858).

The Reclamation 2000 Biological Assessment focused on the effects of ongoing Yakima Project Operation and Management activities. It was used as a starting point for this analysis, which tiers out from the 2000 BA and is focused on effects of the proposed conversation measure.

Critical habitat designated in this Federal Register Notice included all river reaches accessible to listed steelhead in the Columbia River tributaries (except the Snake River) between Mosier Creek in Oregon and the Yakima River (inclusive). Also included were river reaches and estuarine areas in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to the Yakima River in Washington. Excluded were areas above Condit Dam in the White Salmon River and Pelton Dam on the Deschutes River, or above longstanding, naturally impassable barriers in the above defined area. However, since the original critical habitat rule was published a Federal Court vacated the rule and as a result, critical habitat is no longer designated for MCR steelhead.

All steelhead in the Columbia River Basin upstream from the Dalles Dam are summer-run, inland steelhead (Schreck et al., 1986). Life history information for steelhead of this DSU indicates that most Middle Columbia River steelhead smolt at 2 years and spend one, two, or rarely, three years in the ocean (i.e., 1-salt, 2-salt, or 3-salt fish, respectively) prior to re-entering fresh water. Adult steelhead on their spawning migration enter the Columbia River in mid-May and pass over Bonneville Dam between July and August. Summer-run steelhead adults remain up to a year in fresh water prior to spawning.

Middle Columbia River steelhead population size is substantially lower than historic levels, and at least two extinctions are known to have occurred in the DPS. Based on historic (pre-1960's) estimates, the run size of the MCR DPS could have been in excess of 300,000 fish (Busby et al., 1996) although this figure may be an overestimate since it is largely based on historical estimates of steelhead returns to the Yakima River basin. Other crude estimates, based on the size of the Yakima watershed and salmon and steelhead harvest in the Columbia River (Chapman, 1986) lead to lower estimates of historical abundance for the entire MCR DPS. Similarly, there is uncertainty about how many steelhead existed in the Yakima River basin historically. Although run size estimates vary, numerous early surveyors and visitors to the Yakima Basin reported a robust and widespread steelhead population (Bryant and Parkhurst, 1950; Davidson, 1953; Fulton, 1970; NPPC, 1986; McIntosh et al., 1990). The Washington Department of Fisheries

(WDF 1993) estimated that the Yakima River had annual run sizes of 100,000 steelhead prior to development. However, other historic run size estimates are substantially lower than this figure. For example, Cramer et al. (2003) suggests that production of steelhead in the Yakima River was less than 50,000 fish based on various estimates. Kreeger and McNeil (1993) estimated the historic run of steelhead to the Yakima River was about 20,800 adults based on Columbia River harvest statistics and amount of area the Yakima watershed occupies within the Columbia Basin.

Despite the variation in these historic estimates for the MCR DPS and the Yakima River, all estimates are higher than current abundance levels. In larger rivers across the entire DPS such as the John Day, Deschutes, and Yakima, steelhead abundance has been severely reduced. Currently across the entire DPS, wild fish escapement, that portion of the anadromous fish population that escapes the commercial and recreational fisheries and reaches the freshwater spawning grounds (www.biology-online.org, 2006), has averaged 39,000 fish and total escapement has averaged 142,000, including hatchery fish. The large proportion of hatchery fish, concurrent with the decline of wild fish, is a major risk to the MCR DPS (WDF, 1993; Busby et al., 1996).

Within the Yakima River Basin, wild adult steelhead returns have averaged 1,818 fish (range 505 to 4,491) over brood years 1985–2007 as monitored at Prosser Dam (RM 47.1; NPPC 2001, brood year 2007 data from Yakima-Klickitat Fisheries Program (YKFP), available at: www.ykfp.org).

Generally, adult MCR steelhead migration into the Yakima Basin peaks in late October and again in late February or early March. Steelhead adults begin passing Prosser Dam in late summer, suspend movement during the colder parts of December and January, and resume migration from February through June. The relative number and timing of wild adult steelhead returning during the fall and winter-spring migration periods varies from year to year (BOR, 2000; NPPC, 2001). Most adult steelhead over-winter in the Yakima River between Prosser and Sunnyside Dams (RM103.8) before moving upstream into tributary or mainstem spawning areas (Hockersmith et al., 1995).

The historical distribution of Yakima steelhead is thought to have included all reaches of the Yakima River mainstem and its tributaries that supported spring Chinook salmon (O. tshawytshca), as well as many other tributaries (YIN et al., 1990). As steelhead spawners are capable of utilizing smaller streams with steeper gradients than spring Chinook, most accessible permanent streams and some intermittent streams may have once supported spawning steelhead. Currently, Yakima River steelhead are found in nearly all mainstem and tributary reaches, however, access to portions of the headwaters of the Yakima River and some tributaries is blocked by dams and other passage barriers. As a result, anadromous steelhead cannot access the entire Yakima River watershed.

Hockersmith et al. (1995) identified the following spawning populations within the Yakima Basin: upper Yakima River above Ellensburg, Teanaway River, Swauk Creek, Taneum Creek, Roza Canyon, mainstem Yakima River between the Naches River and Roza Dam, Little Naches River, Bumping River, Naches River, Rattlesnake Creek, Toppenish Creek, Marion Drain, and Satus Creek. Of 114 radio-tagged fish observed from 1989 to 1993, Hockersmith et al. (1995) found that well over half of the spawning occurred in Satus and Toppenish Creeks (59%), with a smaller proportion in the Naches drainage (32%), and the remainder in the mainstem Yakima River below Wapato Dam (4%), mainstem Yakima River above Roza Dam (3%), and Marion

Drain (2%), a Wapato Irrigation Project drain tributary to the Yakima River. Electrophoretic analyses have identified four genetically distinct spawning populations of wild steelhead in the Yakima Basin: the Naches, Satus, Toppenish, and Upper Yakima stocks (Phelps et al., 2000).

Hockersmith et al. (1995) found that steelhead passed Roza Dam from November through March; however, more recent data suggest that passage occurs from the end of September through May (Mark Johnston, Yakama Nation Fisheries Program, personal communication).

Steelhead spawning varies across temporal and spatial scales in the Yakima Basin, although the current spatial distribution is significantly decreased from historical conditions. Yakima Basin steelhead spawn in intermittent streams, mainstem and side-channel areas of larger rivers, and in perennial streams up to relatively steep gradients (Hockersmith et al., 1995; Pearsons et al., 1996). Typically, steelhead spawn earlier at lower, warmer elevations than in higher, colder waters. Overall, most spawning is completed within the months of January through May (Hockersmith et al., 1995), although steelhead have been observed spawning in the Teanaway River (RM 176.1), a tributary to the Upper Yakima into July (Todd Pearsons, WDFW, personal communication).

Steelhead eggs take about 30 days to hatch at 50 degrees Fahrenheit, and another two to three weeks before fry emerge from the gravel. However, time required for incubation varies significantly with water temperature. Fry emergence typically occurs between mid to late May, and early July, depending on time of spawning and water temperature during incubation. Juvenile steelhead utilize tributary and mainstem reaches throughout the Yakima Basin as rearing habitat, until they begin to smolt and emigrate from the basin. Smolt emigration begins in November, peaking between mid-April and mid-May. Busack et al. (1991) analyzed scale samples from smolts and adult steelhead and found that the smolt transformation typically occurs after two years in the Yakima system, with a few fish maturing after three years and an even smaller proportion reaching the smolt stage after one year. When compared to spawning distribution and run timing, these data suggest that various life stages of listed steelhead are present throughout the Yakima Basin and its tributaries virtually every day of the calendar year.

Habitat alterations and differential habitat availability (e.g., dikes, levees, and fluctuating discharge levels) over time have imposed an upper limit on the production of naturally spawning populations of salmon and steelhead. The National Research Council Committee (NRCC) on Protection and Management of Pacific Northwest Anadromous Salmonids identified habitat problems as a primary cause of declines in wild salmon runs (NRCC, 1996). Some of the habitat effects identified were the fragmentation and loss of available spawning and rearing habitat, migration delays, degradation of water quality, removal of riparian vegetation, decline of habitat complexity, alteration of streamflows and streambank and channel morphology, alteration of ambient stream water temperatures, sedimentation, and loss of spawning gravel, pool habitat and large woody debris (NMFS, 1998; NRCC, 1996; Bishop and Morgan, 1996). These effects are readily observed in the MCR DPS, including the Yakima River and its tributaries.

Hatchery management practices are suspected to be a major factor in the decline of this DPS. The genetic contribution of non-indigenous, hatchery stocks may have reduced the fitness of the locally adapted native fish through hybridization and associated reductions in genetic variation or introduction of deleterious (non-adapted) genes. Hatchery fish can also directly displace natural spawning populations, compete for food resources, or engage in agonistic interactions (Campton and Johnston, 1985; Waples, 1991; Hilborn, 1992; NMFS, 1996).

Water temperatures in the lower Yakima River may contribute to lower survival of smolts and kelts during summer months (Vaccaro, 1986; Lichatowich and Mobrand, 1995; Lichatowich et al., 1995; Pearsons et al., 1996; Lilga, 1998). Steelhead kelts and smolts have been observed at the Chandler Juvenile Enumeration Facility (RM 47.1) into the middle of July, when water temperatures can become lethal. Conditions in the lower Yakima River become suitable once again for salmonids in early fall, near the end of the irrigation season (NPPC, 2001). Steelhead in the Yakima River Basin have faced a number of challenges in the recent past, but continue to endure at significantly depressed population levels. The four genetically distinct stocks identified persist across widely varied conditions of streamflow, habitat, topography, elevation, and land management scenarios, in a fraction of their historic habitat.

3.8.2 Bull Trout

On June 10, 1998, the U.S. Fish and Wildlife Service (USFWS) (USFWS 1998) listed the Columbia River population segment of bull trout, which includes the Yakima basin, as threatened. Bull trout populations within this population segment have declined from historic levels and are generally considered to be isolated and remnant. Bull trout were likely widely dispersed throughout the Yakima River drainage, limited only by natural passage and thermal barriers. The historical range may have approximated that of spring, summer, and fall Chinook salmon (Oncorhynchus tshawytshca), much as may have been the case in Idaho (Thurow, 1987; Rieman and McIntyre, 1993). The distribution of bull trout may parallel the distribution of potential prey such as whitefish and sculpins. Yakima Basin studies indicate that bull trout typically occur in the upper reaches of several tributaries, in small populations that are mostly isolated from each other (Goetz, 1994; Wissmar and Craig, 1998; WDFW, 1998). Studies have indicated that bull trout are most likely to occur, and to be strong in cold, high elevation, low- to mid-order watersheds with low road density (Rieman et al., 1997; Goetz, 1994; MacDonald et al., 1996). Bull trout have some of the most demanding habitat requirements of any native trout species mainly because they require water that is especially cold and clean. As a result, water temperature is a critical habitat characteristic for bull trout. Bull trout have demonstrated a unique adaptation for spawning, incubating, and rearing in colder water than salmon and steelhead which has allowed this species to survive in habitat areas that may be unsuitable for most other species of fish. Ratliff and Howell (1992) note that in many of the cold streams where bull trout spawn, they are the only fish present. McPhail and Murray (1979) demonstrated that survival of bull trout eggs was 80-95 percent to hatching at temperatures of 2–4ºC and dropped to 0–20 percent at temperatures of 8–10ºC. Buchanan et al. (1997) report observations from throughout Oregon and the published literature, and concluded that, while optimum temperatures for juvenile growth are between 4-10ºC, the optimum for adult bull trout is near 12–15ºC. Temperatures above 15°C (59° F) exceed bull trout physiological preferences and are therefore thought to limit their distribution (Fraley and Shepard, 1989).

Bull trout reach sexual maturity after 4 or more years and live up to 10 to 12 years. They typically spawn during September through November, in relatively cold streams that are clean and free of sediment. The incubation period for bull trout is extremely long and young fry may take up to 225 days to emerge from the gravel (Craig, 1997; USFWS, 1998). Because of this long incubation period, eggs are particularly vulnerable to siltation problems and bed load movement in rivers and streams where spawning occurs. Any activity that causes erosion, increased siltation, removal of stream cover, or changes in water flow or temperature affects the number of bull trout that hatch and their ability to survive to maturity (Knowles and Gumtow, 1996).

Bull trout exhibit both migrant and resident life history strategies. After rearing as juveniles for 2–4 years in their natal streams (Meehan and Bjornn, 1991), migrant bull trout emigrate to larger rivers or lakes, whereas resident fish complete their entire life cycle within their natal stream. Migrant forms, including both fluvial (downstream migration to larger rivers) and adfluvial (downstream migration to lakes) grow rapidly, often reaching over 20 inches in length and 2 pounds by the time they are 5–6 years old. Migratory bull trout live several years in larger rivers or lakes, where they grow to a much larger size than resident forms before returning to tributaries to spawn. Growth differs little between forms during their first years of life in headwater streams, but diverges as migratory fish move into larger and more productive waters (Rieman and McIntyre, 1993).

Although both the Fish and Wildlife Service (USFWS, 2002) and the Washington Department of Fish and Wildlife (WDFW, 1998) recognize the existence of a mainstem Yakima River sub-population of bull trout, very little information exists to document the abundance or status of this fish in the mainstem Yakima River. Bull trout have been sporadically caught during electrofishing surveys in the upper Yakima River by the WDFW and adult bull trout have been observed migrating upstream through the Roza Diversion Dam fish ladders between the years of 1999 and 2003. In addition, inconsistent spawning activity has been reported in the reach between Keechelus Dam and Lake Easton in the upper basin. Bull trout observations in the lower Yakima River are more infrequent, consisting of a single adult fish captured in the mainstem Yakima River near Benton City by WDFW biologists in 1997.

Based on this information, it seems that the mainstem Yakima River is primarily used as migratory or rearing habitat for small numbers of adult and sub-adult bull trout. This may be the extent of the historic usage of the mainstem river by these fish. The lack of juvenile and sub-adult bull trout in the mainstem river indicates that bull trout are not and have not been reproducing successfully in the mainstem Yakima River. Given the fact that habitat conditions are not suitable for bull trout in the lower river, particularly the high water temperatures during the summer, it is not surprising that few fish have been observed in the lower sections of the mainstem Yakima River.

Bull Trout critical habitat was proposed in the Yakima River Basin in November 2002 (67 FR 71235) for the Columbia River DPS. Final Critical Habitat designations for this DPS came on Oct. 6, 2004 (69 FR 59996). However, the lower Yakima below Ahtanum Creek was not included. The project area is therefore not within designated critical habitat for Bull Trout.

3.8.3 Ute Ladies'-tresses

Ute ladies' tresses is a member of the orchid family and is found in wetland, riparian areas, spring habitats, mesic to wet meadows, river meanders, and floodplains. The plant occurs between an elevation range of 1,500 to 7,000 feet and at lower elevations in the western part of its range. The orchid generally occurs below montane forests, in open areas of shrub or grassland, or in transitional zones. It is considered a lowland species, typically occurring beside or near moderate gradient - medium to large - streams and rivers. The plant is not found on steep mountainous parts of a watershed, nor out in the flats along slow meandering streams. This species tends to occupy grass, rush, sedge and willow sapling dominated openings.

3.9 Economics

BID is located in a highly productive fruit growing region of Central Washington. The soils and weather patterns along the Columbia River and tributaries, such as the Yakima River, provide near ideal conditions for the production of apples, cherries, peaches, prunes, pears, and grapes. Apples are the state's highest valued crop, accounting for 53 percent of the nation's production (Washington 2002 Annual Bulletin, p. 8). The value of the 2002 Washington apple crop was $1,112.6 million with most sold on the fresh market (Washington Agri-Facts, January 28, 2003). Sweet cherries are also an important fruit crop and accounted for 46 percent of the national production in 2001. The value of the 2002 Washington sweet cherry crop was $142.7 million with about 77 percent sold on the fresh market. Washington was the leading producer of pears in 2001 with 44 percent of the nation's output (Washington 2002 Annual Bulletin, p. 59). The state ranked second in grapes, but California dominates this market with 92 percent of the national production (Washington Agri-Facts, October 16, 2002).

In 1997, Benton County ranked third in the State in terms of land in orchards, with 38,700 acres in about 380 farms. It ranks first in grapes with about 16,000 acres, sixth in apples with about 10,700 acres, and fourth in cherries with about 3,200 acres. Fruit crops, including cherries, apples, peaches, grapes, prunes, and pears, account for the bulk of farm income in the BID. Cherries are the principal crop in terms of income. Export markets are important to the long-term success of growers of these crops. US Department of Agriculture projections indicate only slight increases in the domestic consumption of fruit, so exports will be a major consideration in determining prices and revenues. Japan is by far the largest export market for US-produced cherries, followed by Canada, Taiwan, United Kingdom, and Hong Kong. Asia has about 60 percent of the world's population, but only 34.5 percent of the world's arable land (World Horticultural Trade & US Export Opportunities, June 2002). The Asian diet is traditionally high in fruits and vegetables. Consequently, as the economic and financial conditions in Asia improve, the demand for high quality US fruit and vegetables is expected to increase. Canada is the leading export market for apples and Mexico is the second largest market (Fruit and Tree Nuts Outlook, March 25, 2003).

The US Department of Agriculture has prepared long-run projections for the agricultural economy through the year 2012 (USDA Agricultural Baseline Projections to 2012). The projection assumptions were completed in October 2002, incorporating data and other information available at that time. In the near term, the projections are influenced by slow US and global economic growth and a strong US dollar. In the longer run, the projections indicate a recovery in global economic growth leading to stronger US exports, gains in agricultural commodity prices, rising farm incomes, and general improvement in the financial condition in the farm sector over the next decade. Farm production expenses are expected to increase moderately at slightly less than the general inflation rate, which is projected to be 2.5 percent or less.

In summary, the agricultural economic outlook for the District appears favorable. The District is well suited to the production of high valued fruit crops, and has established strong market positions, especially for cherries and apples. The prices received for these crops are expected to rise as the projected recovery in global economic growth leads to stronger exports. Farm production expenses are expected to rise less than the general inflation rate.

3.10 Historic Properties

The determination of effect and any appropriate mitigation measures will be implemented following consultation with the Washington State Historic Preservation Officer at the Office of Archaeology and Historic Preservation, and the Advisory Council on Historic Preservation.

The area lies in lands ceded by the fourteen tribes and bands of the Yakama Nation. There is a potential for uncovering material evidence of occupations of ancestors of present-day Yakama tribal members, and the area may have traditional cultural or religious significance. Both the National Historic Preservation Act and Executive Order 13007 guide federal agencies to identify and consult with tribes with cultural connections with project areas.

3.11 Indian Trust Assets

ITAs are legal interests in property held in trust by the United States for Indian tribes or individuals. Examples of possible trust assets include lands, minerals, hunting and fishing rights, and water rights.

The United States has a trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or Indian individuals by treaties, statutes, and Executive Orders, which are sometimes further interpreted through court decisions and regulations. This trust responsibility requires Reclamation to take all actions reasonably necessary to protect trust assets.

The Sunnyside Division is within lands ceded in the Yakama Treaty of June 9, 1855. This treaty established the Yakama Reservation and reserved rights and privileges to hunt, fish, and gather roots and berries on open and unclaimed lands to the fourteen Tribes and bands who signed that treaty. Indian Trust Assets of concern for this action may include the rights and privileges to fish, hunt, and gather. The resources that provide for these rights to be exercised include fish, wildlife, and vegetation.

3.12 Environmental Justice

Executive Order 12898 requires each Federal agency to consider environmental justice as part of its decision making process by identifying and addressing disproportionately high adverse human health or environmental effects, including social and economic effects, of its programs and activities on minority populations and low-income populations of the United States.

Environmental justice requires Reclamation programs, policies, and activities affecting human health or the environment to not exclude minorities and low income groups from participation in or the benefits of programs or activities based on race or economic status. People are the primary resource for social assessment and the vast majority of the people that comprise the affected communities reside within the Yakima and Benton County areas. Also included in the affected area is the Yakama Indian Nation.

The area in and around the project area has a relatively high population of minorities (approximately 42 percent in Yakima County and approximately 14 percent in Benton County compared to approximately 18 percent statewide). According to the 2000 census, in Benton County, the Hispanic population is 12.5% of the total population and the Indian population is 0.8% of the total population. In Yakima County, the Hispanic population is 35.9% of the total population and the Indian population is 4.5% of the total population. The Yakama Nation Reservation boundary is located near the project area.

3.13 Sacred Sites

Executive Order 13007, Indian Sacred Sites (May 24, 1996), directs executive branch agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites on Federal lands. The agencies are further directed to ensure reasonable notice is provided of proposed land actions or policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

The Executive Order defines a sacred site as a "specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion."

Chapter 4 Effects of the Proposed Action

4.1 Water Hydrology

The proposed pressurized system is anticipated to have a net benefit to the environment in and around the Yakima River. The project increases the flows in the river during critical periods and virtually eliminates the losses that are currently occurring between the diversion at Sunnyside Diversion Dam and deliveries to BID growers. The elimination of these losses increases instream flows, allows the river habitat to be improved while providing an increased water supply to BID for crop cultivation.

4.1.1 Instream Flow Increases by River Reach

Under the BID Pressurized System Conversion alternative 21,044 AF of BID water will be left instream until it reaches the new BID River Pump Station at RM 32.8. This results in an average increase of 58 cfs over the Sunnyside Diversion Dam. At RM 32.8 the net benefit is less because the 2,524 AF (8 cfs average) of conveyance loss water which comes back to the river as return flows in the No Action alternative but not under the BID Pressurized System Conversion alternative has to be subtracted from the 21,044 AF that passes over the Sunnyside Diversion Dam. This leaves a net benefit of 18,520 AF (50 cfs) at the Pump Station as a result of the proposed action.

Anticipated water conservation savings from the new pump-pressurized system improvements will total approximately 4,346 AF annually. Of this total, 1/3 (1,448 AF) will be available for BID use or returned to the basin TWSA calculation, while 2/3 of the conserved water (2,897 AF) will be dedicated to YRBWEP instream flow improvements in the Yakima River.

As a result of the water conservation associated with the fully piped and pressurized water delivery system, the new Yakima River Pump Station will only be required to divert an average volume of 15,623 AF (42 cfs average) to make water deliveries on District lands. This amount includes the 1/3 savings allocated to irrigation outlined above. When this 15,623 AF (42 cfs) of water is diverted from the 18,520 AF (50 cfs) of net benefit water that is expected to reach the new BID diversion point, a total of 2,897 AF (or 8 cfs) of net benefit water will remain in the river below the River Pump Station. This annual volume of 2,897 AF (8 cfs) will no longer be diverted from the Yakima River and will remain instream, raising flows in the mainstem Yakima River to the point where Kiona Canal drains into the Yakima River at RM 23.8. The 2,897 AF volume savings downstream of the new point of diversion consists of the YRBWEP acquired conservation water resulting from Conservation Plan system improvements. The 2,897 AF in water savings will be dedicated to instream flow increases in the river as a result of water conservation improvements on the District. Mainstem streamflows between the new point of diversion and the Kiona Canal (approximately 9.0 miles) will therefore increase by an average of 8 cfs during the irrigation season.

(See Table 2-1 for data on the net changes in stream flow that would occur with the project.)

4.1.2 Wasteways

The current diversion system relies on wasteway operational spills to maintain sufficient flow to growers at the end of the canal line. The pressurized system will eliminate this need.
If the proposed project is adopted, the Board of Control has expressed plans to maintain operational water in the Benton Waste to act as an 'end-of-the-line' buffer for the Sunnyside Main Canal in the absence of the BID Main Canal. Spill rates will decrease because water will not need to be delivered at the siphon for BID, and SVID has installed two re-regulation reservoirs as a further conservation measure. If the Sunnyside Main Canal were to push the Benton Wasteway to overflow, water will return to the Yakima River and may have a negative effect on water quality. However, whatever amount of spill occurs will be significantly less than current spills, and the quality (sediment and temperatures) will likely be similar to current spills.

4.1.3 Summary

Implementation of the BID Water Conservation Plan would dramatically alter the hydrology of BID, essentially eliminating all losses from the existing distribution system and using the savings to reduce Yakima River diversions while also increasing crop watering efficiency.

4.2 Water Quality

The elimination of main and lateral canal spillage would result in a reduction of surface return flows. Surface return flows resulting from canal spillage would be reduced from 572 to 0 AF for the pressurized system conversion option. The greater efficiency and demand-driven flow of the pressurized pipes toward on-farm use should also reduce surface return flows due to irrigated land runoff from 1,169 to 809 AF. Return flows via groundwater would also be reduced.

The conservation program will reduce losses via subsurface flow paths by an approximated 3,141 to 4,215 AF annually. It is assumed that these reductions will be manifested as reductions in return flow to the Yakima River and not as depletions to local aquifers.

To the extent that surface return flows from the District will be reduced by the pressurized pipe conversion, loadings of sediment and sediment-bound constituents should also be reduced. This will in turn reduce soil depletion or erosion of irrigated lands. However, since much of the return flow to this stretch of the Yakima River originates in districts above the BID boundaries, the ability to affect water quality is ultimately influenced by these outside sources. Overall, water quality and soil integrity impacts are expected to be minor.

4.2.1 Water Temperature

In the Feasibility Study, the rationale follows that the additional flow provided by the project will help reduce seasonally high water temperatures. However, the increased instream flows and reduced irrigation returns in the proposed action, while beneficial to river health, will likely not appear in a sufficient amount to produce measurable or significant impacts to water temperatures in the Yakima River. Past attempts to model water temperature in the Yakima River have been either difficult or contentious. For example, Vaccaro (1986) modeled water temperature in the Yakima River with four scenarios: 1) 1981 operations; 2) 1981 estimated-unregulated or “natural” stream flows without storage or diversions; 3) reductions in irrigation diversions and irrigation return flows over the entire basin; and 4) similar reductions, but limited to the Yakima River below Parker. Vaccaro’s model estimated that reducing return flows and subsequently leaving such flows instream would actually increase water temperatures at Prosser during the high water temperature period because, in late summer, major irrigation return flows are generally cooler than the Yakima River at the point of return. Although the model indicated reducing return flows during the spring months could also help reduce water temperatures (because return flows in spring tended to be warmer than the river), spring temperatures did not exceed steelhead tolerances.

A separate study by Lilga (1999) concluded, “Increasing flows may result in lower temperatures, but without a definitive relationship, it is difficult to predict how much. Stream temperature in the lower mainstem is controlled primarily, but not entirely, by air temperature. The stream temperature regime appears to be confounded by other factors not measured or considered in this study, including the presence to the Prosser Diversion Dam at RM 47.0.”

As such, modification of temperature regimes in the lower Yakima River has been speculated to be a very difficult task, with the minor impacts from this specific project likely to be immeasurable.

4.3 Fisheries

Impacts to fish resulting from the implementation of YRBWEP conservation programs are documented in Section 4.6 of the PEIS (Reclamation, 2002). The water conservation associated with this action will contribute to the achievement of the positive impacts listed. The reduction in diversion will enhance flows below the Sunnyside Diversion Dam, particularly during base flow periods. This should benefit adult and juvenile spring Chinook, fall Chinook and coho which move through this reach of the river during portions of the irrigation season. It may also benefit fall Chinook juveniles who rear for a short time during the irrigation season in this reach. These benefits help fulfill one of the purposes of YRBWEP.

4.4 Vegetation and Wildlife

A goal of YRBWEP is to protect, create, and enhance wetlands and associated riparian and flood plain habitats. The programs and likely impacts along the river Corridor are discussed in Section 4.7 of the PEIS. The discussion here deals with project specific impacts to wetlands.

4.4.1 Wetlands

Section 3.7 identifies 28 acres of wetlands located in the Corral Creek Canyon. This block is sustained by flows in Corral Creek, which come primarily from outside the BID area (i.e., Roza Irrigation District spill and sub flow). BID staff report that Corral Creek flows year round and is supplied by perennial springs in the area upslope from the BID main canal. Field observations support the position that these flows are sufficient to support these wetlands. Furthermore, flow measurements in the BID main canal upstream and downstream of this area indicate little seepage loss from the canal in this segment. The main canal wasteway known as Corral Creek

Spill flows into a tributary of Corral Creek; however this wasteway operates infrequently and joins Corral Creek downstream of all but a few acres of this wetland area. Based on these considerations, the proposed conservation program would not have significant effects on the 28-acre wetland block.

The District Conservation Plan does identify approximately 9 acres of wetland territory that have emerged in depressions adjacent to the BID main canal as a result of operational spillage. These areas will lose their artificial water source once the conservation plan ceases operational flow through the canal and returns this water to the Yakima River. Subsequently, these emergent wetlands will likely disappear without a natural water supply. While these pockets constitute biological wetlands by virtue of their vegetation, hydrology, and soil characteristics, the fact that they were the byproduct of irrigation exempts them from consideration as jurisdictional wetlands under federal or state laws.

The Corps [33CFR 328.3(b)], the EPA [40 CFR 230.3(t)], the Shoreline Management Act [Chapter 90.58.030 RCW (2)(h)], Washington's Water Quality Standards (WAC 173-201A-020), and the Growth Management Act [Chapter 36.70A.030(20) RCW] all define wetlands as:
"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." The Shoreline Management Act, Washington's Water Quality Standards, and Growth Management Act definitions of jurisdictional wetlands further stipulate:
"Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway."

In application, because the wetlands resulted from inefficiencies (i.e., leaks and spills) in the current system, the canal can be repaired or replaced with a more efficient system to improve water conservation. If the artificial wetland disappears as a result of the improvement, the loss of the wetland is not regulated, and no mitigation actions are necessary (Ecology, 2003).

4.4.2 Wildlife

The BID Conservation Plan will affect wildlife habitats in the three areas where the pump station and booster stations are to be built. Construction will involve clearing the area, building the structures, and surrounding them with a small gravel buffer and chain link fence. These structures are relatively small, however, and will not likely have any significant impact on wildlife.

As discussed in the wetlands section above, abandonment of the current BID canal system in favor of underground pipes will eliminate 9 acres of artificial wetland with corresponding vegetation and possible but unknown animal habitat. This constitutes an unavoidable impact of the Project.

4.5 Threatened and Endangered Species

4.5.1 Steelhead

Because of the complex and diverse life history characteristics exhibited by steelhead trout, it is likely that at least one life history form (adult, egg, fry, juvenile, and smolt) will be present in the project vicinity during all times of the year. Proposed project timing of June to early fall is also known to correspond with a time that avoids conflicts with as many of these steelhead life history forms as possible.

Adult steelhead could be in the project area (Yakima River near river mile 32.8) as early as September, but more likely, adult steelhead will not be in the lower Yakima River Basin near the project area until October or November and could be moving up and down the river through the project area from November through June. The lower Yakima River downstream of Sunnyside Diversion Dam is not considered spawning habitat for steelhead, but steelhead will need to pass over both Prosser and Sunnyside Diversion Dams in the course of their upstream migration during November–June. In addition, steelhead kelt downstream emigration will be occurring during the early spring to summer period (i.e. early irrigation season).

Recently emerged fry as well as juvenile steelhead (i.e. mixture of 1+ and 2+ fish) are likely to be present in the vicinity of the proposed project area in late summer through fall. These fish will be using the Yakima River in limited numbers for rearing and cover habitat during this time period. These fish are likely to be the most vulnerable life history forms affected by flow and water quality modifications in the mainstem Yakima River and drains due to their small size and distribution within the Yakima River relative to the project area.

<u>Effects from Pump Station and Buried Irrigation Lateral Construction</u>

Construction activities related to the abandonment of the existing BID Main Canal and installation of the buried pipe-pressurized lateral distribution system will not result in direct water quality, hydrology, or fish habitat impacts due to their location away from the main channel of the Yakima River, and because they will be constructed in upland areas that do not provide current fish habitat.

Adult steelhead that have passed Prosser Dam and are holding in the Yakima River within and downstream of the project location between the time of their river entry and the end of September may be affected during the work on the left bank associated with construction of the River Pump Station, primarily due to disturbance in the area by cofferdam removal. This disturbance and the associated construction activity within the isolated area may cause some delay to any adult steelhead attempting to pass the work area, but construction activities will not prohibit passage of migrating adult steelhead during the construction project.

The placement of the cofferdam will cause some temporary disturbance in the immediate area which may cause juvenile fish to move away from the project site. Cofferdam installation and removal may cause some increased levels of turbidity and physical disturbance of the river bed which could impact juvenile steelhead. Although unlikely, placement of sandbags in the river during cofferdam construction could also result in the inadvertent crushing of a juvenile fish holding or rearing in the area. Downstream effects caused by construction related turbidity from both cofferdam installation and rip-rap placement along the left bank will be localized and in compliance with Washington State water quality standards for turbidity. In this instance, fine sediments in the water column will settle out to the streambed in a distance less than 300 feet downstream of the project area.

Installation and removal of the cofferdam around the work area has the potential to impact juvenile steelhead due to the size of the cofferdam footprint, fine sediments released into the water column during cofferdam construction, and the duration of the project. The greatest disturbance will occur during the process of installing and removing the cofferdam, and removal of juvenile fish within the isolated area prior to dewatering of the work area. Some impacts may occur to juvenile salmonids during fish removal activities. However, impacts to juvenile *O. mykiss* from fish removal activities are not expected to be severe because of the timing of the work window, minimal size of the dewatered area, and low numbers of juvenile *O. mykiss* likely to be present at this location.

Once the cofferdam is in place and fish removal activities have been completed, juvenile fish should not be impacted from the actual River Pump Station construction activity other than physical displacement from the immediate area taken up by the cofferdams. Rip-rap placement and concrete pouring during intake pipe and pump installation along the left bank should not affect fish life or the aquatic environment since these activities will be performed in the dry and in areas isolated from fish and flowing water.

The project areas will be surveyed prior to the initiation of in-water work to confirm that no adult salmonids are present in the project area. If adult salmonids are encountered in areas where cofferdams will be placed, cofferdam construction will be stopped until the adult fish move out of the area. Heavy equipment operation in the live flow of the river will not be necessary for this project, as all cofferdam installation/removal and placement of rip-rap can be performed from the canal access road atop the left stream bank. Cofferdam installation will occur slowly and isolated work areas will not be fully dewatered until fish herding or seining has removed all salmonid and important game fish species from within the isolated work area. Construction activity will be limited to daylight hours so migrating steelhead will have the opportunity to pass through the area at night while no construction activities are taking place. Finally, the isolated area within the cofferdam will remove only a small amount of wetted habitat area relative to the amount of habitat remaining for fish use in or near the project area. Any habitat loss will be temporary in nature and will be restored to pre-project conditions upon completion of the project and subsequent removal of the cofferdam. As such, no habitat loss will occur at this site as a result of work associated with installation of the new River Pump Station.

Effects from Operational Changes from Implementation of the BID Conservation Plan

Operation of a new River Pump Station will not adversely impact adult or juvenile steelhead because each diversion intake will be fully screened according to WDFW and NOAA Fisheries screening criteria. Fish entrainment into the intake pumps is therefore not likely to occur. In addition, the relatively small amount of water diverted (42 cfs) over the entire area of the intake bays (1,600 ft^2) should not create enough suction to attract and impinge fish against the screens. Operation of the Pump Station should not result in injury or take of listed species. Furthermore, this facility will be maintained by the BID to ensure that the intake structures and screens are fully functional and clean when in use during the irrigation season.

Flow improvements resulting from the proposed action will lead to improved migration and holding conditions for Yakima River MCR steelhead in the reach downstream of Sunnyside Dam. Although the majority of adult steelhead will have passed through the Prosser and Sunnyside Diversion Dams prior to the onset of the irrigation season, the increased instream flow rates by 58 cfs in the Yakima River downstream of the Sunnyside Diversion Dam will likely improve upstream migration conditions for any late or early migrating adults. The instream flow benefits of the conservation plan decrease with distance downstream (i.e. 8 cfs increase between the new point of diversion at RM 32.8 and the Kiona Canal at RM 23.8, and 0 cfs downstream of the Kiona Canal to the Yakima River mouth). These slight streamflow increases will still benefit, or have neutral impacts to, migration and holding habitat in the lower reaches of the river.

Depending on location in the river, the variable instream flow improvement of 58 cfs, or 8 cfs, will slightly improve streamflow conditions in the Yakima River downstream of Sunnyside Diversion Dam for outmigrating steelhead kelts and steelhead smolts. These may contribute to improvements in outmigration timing and decreased travel times. Although Yakima River streamflows downstream of Kiona Canal will not be improved as a result of the proposed action they will be unchanged from baseline conditions so that no adverse impacts will occur to either upstream migrating adults or to outmigrating kelts or steelhead smolts in the lower river.

Steelhead juveniles are not known to use habitat in the lower Yakima River extensively for rearing during the summer months due to elevated temperatures or low flow conditions. The increased flow conditions immediately downstream of Sunnyside Diversion Dam may lead to improved rearing conditions in those limited habitat areas where steelhead juveniles are located. The improvements to flow conditions in the mainstem Yakima River downstream of Sunnyside Diversion Dam and the new River Pump Station location will not result in negative effects to juvenile rearing or emigration from the basin as a result of implementation of the proposed action.

Fisheries Effects in Project Return Flow Drains

Implementation of proposed conservation measures will reduce flows in Kiona Canal by an average of 8 cfs (range of 2 to 12 cfs) during the irrigation season as measured for a typical year. Some habitat losses may occur and potential access will be reduced into the Kiona Canal as a result of reduced operational spill to the Kiona Canal that result from the proposed water conservation measures. However, habitat conditions in this drain are currently marginal for successful juvenile steelhead access and rearing and any available habitat is currently limited in extent to the lower portion of the canal (lower 0.4 miles). There is little evidence to suggest that significant numbers of Middle Columbia River steelhead inhabit and use the Kiona Canal. Implementation of proposed conservation measures will not improve or significantly degrade habitat conditions in the Kiona Canal. There could be a slight decline in water temperatures due to the decrease in operational spill from the main canal and a slight increase in the proportion of groundwater. The confluence of Kiona Canal with the Yakima River could be an important thermal refuge for juvenile salmonid species in the lower river considering the extremely elevated water temperatures that occur every summer in the lower river. Implementation of the proposed action will not degrade this important rearing area for juvenile salmon and MCR steelhead.

4.5.2 Bull Trout

Implementation of the Benton Irrigation District Conservation Plan will have no effect on bull trout in the project area because of the extremely low numbers of bull trout presently inhabiting or using the lower Yakima River. Bull trout would likely not be found in the project area. If present in the reach below Sunnyside Diversion Dam, which is also unlikely, the increase in flows might benefit bull trout but any benefits would be immeasurable.

4.5.3 Ute ladies' –tresses

Ute ladies' –tresses habitat consists of wetland, riparian areas, spring habitats, mesic to wet meadows, river meanders, and floodplains. As of a July 2005 regional survey of Ute ladies' –tresses distribution, the only known sightings in Washington have been located on the Columbia plateau in the northern central part of the state (Fertig et al., 2005). It is therefore reasonable to assume that habitat for Ute ladies'-tresses is not present at any of the impacted sites.

4.6 Economy

4.6.1 With-Project Cropping

The two dominant crops in BID are pasture and cherries with roughly 67 and 17 percent of the assessed area in 2000, respectively. The increased water supply resulting from improvements to the BID distribution system is expected to result in an increase in the area planted to cherries, the most economically viable crop in BID. As a result, the area in pasture is expected to decrease. With the project, cherries are expected to increase from approximately 17 percent to 24 percent of the irrigated area with pasture decreasing from 67 percent to 54 percent.

Farm Budget Item	Existing (2003) On-Farm Irrigation Related Costs	2003 BID Without Project	2003 BID With Project	Change (With minus Without)
Assessment per Acre [1]	$85.48	$96.56	$141.67	$45.11
Irrigation Investment Costs				
On-Farm Irrigation System	$73.80	$73.80	$73.80	$ -
Pump	$7.03	$7.03	$ -	$(7.03)
Pond	$3.51	$3.51	$ -	$(3.51)
Screening & Filtration	$12.58	$12.58	$12.58	$ -
Irrigation System Replacement Costs				
On-Farm Irrigation System	$19.35	$19.35	$19.35	$ -
Pump	$4.21	$4.21	$ -	$(4.21)
Pond	$2.11	$2.11	$ -	$(2.11)
Screening & Filtration	$7.53	$7.53	$7.53	$ -
On-Farm O&M Costs				
Pump Maintenance	$9.43	$9.43	$ -	$(9.43)
Pond Maintenance	$4.71	$4.71	$ -	$(4.71)
Screening & Filtration Maintenance	$8.44	$8.44	$8.44	$ -
Energy	$27.64	$27.64	$ -	$(27.64)
Totals	$265.83	$276.91	$263.37	$(13.53)

Table 4-2. Average On-Farm Per Acre Irrigation Costs under Without-Project and With-Project Conditions.

[1] Existing based on 2002 lots/acres (641 lots, 177 partial lots, 3,765.74 full acres) with-project lots/acres estimated as 742 lots, 222 partial acres, and 4,210 full acres and assumed lots and partial acres pay full one acre amount. For without-project District budget, R&M and accounting audit were increased to sustainable levels.

4.7 Historic Properties

In order to comply with Section 106 of the National Historic Preservation Act, a survey of the proposed Project sites will be conducted once the Conservation Plan progresses to the next phase in design. The District will consult with Reclamation and the State Historic Preservation Office (SHPO) to prepare a report on the archaeological or cultural significance of impacted areas based on historical research, field surveys, sample testing, and collaboration with the Yakama Nation.

Once a final site has been selected for the River Pump Station and approved by the involved parties, Project personnel will engage in common risk management strategies such as excavation monitoring and inadvertent discovery preparedness. In the event that artifacts are found during the construction of Project facilities, the District will consult with the Yakama Nation to ensure proper handling until correct mitigation actions can be performed.

4.8 Indian Trust Assets

There would be no impacts to ITAs associated with the on-site activities of this action. The proposed increase in stream flows from Sunnyside Diversion Dam to the mouth of the Kiona Canal are expected to benefit anadromous fish stocks in the Yakima River.

4.9 Environmental Justice

Water is a limited resource, and in many years, demand is much higher than supply. This condition has prevailed in the area for several years and would be expected to continue indefinitely were no action to occur. The District WCP will engender positive impacts to social well-being, since the improvement in water efficiency and delivery supply during water short times will likely lessen the potential conflict between competing water users.

4.10 Cumulative Impacts

Cumulative impacts are those effects on the environment resulting from the incremental consequences of a proposed action alternative when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these actions.
The YRBWEP PEIS addresses cumulative impacts for the portion of impacts attributable to the program actions. For this action, the impacts are also cumulative to the other elements of the YRBWEP that may be implemented. Since these impacts are considered in the PEIS they need not be addressed separately in this document.

The Yakama Nation is currently studying the feasibility of reintroducing Summer Chinook to the mainstem Yakima River. If they progress toward implementation of this plan, the timing would likely not conflict with the proposed short-term construction and river interference associated with the first stage of the BID Conservation Plan. The additional base flow the Project provides, however, should benefit any reintroduction efforts due to the water hydrology, quality, and temperature improvements described in this report.

4.11 Sacred Sites

No sacred sites have been identified in the project area. See Section 4.7 for discussion of a more specific assessment in future phases of the project.

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FINDING OF NO SIGNIFICANT IMPACT
Benton Irrigation District Conservation Project
PN-FONSI-08-03

Introduction

The Bureau of Reclamation has prepared an Environmental Assessment (EA) for a conservation project on the Benton Irrigation District (BID).

The purpose of the BID conservation project is to make the irrigation system more efficient by implementing water conservation improvements, thereby conserving water for fish benefit. The project will completely abandon the existing system and replace it with a new pump-pressurized, buried pipeline distribution system. Additionally, the project allows water diversions to BID to be relocated from the Sunnyside Diversion Dam to a new River Pump Station located 71 miles downstream on the Yakima River near Benton City.

Alternatives Considered

Two alternatives were developed and evaluated in the Environmental Assessment (EA), the No Action Alternative (as required by the National Environmental Policy Act) and BID Pressurized System Conversion.

The Recommended Alternative

Reclamation has selected the BID Pressurized System Conversion alternative as the recommended alternative for implementation.

Proposal

Reclamation proposes to implement the conservation project which will provide additional water for fisheries benefits.

This project consists of the following:

- Re-locate the BID diversion point from the Sunnyside Diversion Dam to a point on the Yakima River 71 miles downstream.
- Construct a pumping station, with fish screens, on the Yakima River to supply water to the district.
- Convert the existing open canals and laterals to buried pipeline.

Consultation, Coordination, and Public Involvement

Informal consultations under Section 7 of the Endangered Species Act (ESA) have been conducted with the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA Fisheries) to address impacts from this conservation project on listed species and designated critical habitat.

Summary of Review Comments and Reclamations Responses

The draft EA was sent out for public comment and posted on the Pacific Northwest Region Internet site on July 23, 2008. The public comment period closed on August 29, 2008. One comment was received from the Washington State Department of Ecology. The comment pertains to acquiring permits for the construction project. These permits will be acquired by the district prior to project commencement.

Comments were also received from Washington State Department of Fish and Wildlife (WDFW). The primary comment from WDFW dealt with the use of the conserved water to be dedicated for instream flow purposes. WDFW recommended that the conserved water dedicated for fish be storable and its use be determined by the fishery agencies rather than simply using it to increase irrigation season target flows at Parker and Prosser. The current legislation governing the Yakima River Basin Water Enhancement Project directs how the conserved water will be used to increase target flows. While modifications to that legislation are being considered that would allow the WDFW recommendation to be implemented, at least in part, the current law does not permit it. As such the disposition of the conserved water will be as laid out in the EA. WDFW also requested several other minor changes which have generally been made where appropriate.

Findings

This Finding of No Significant Impact (FONSI) is based upon the following:

- Impacts to listed fish would be beneficial for the 71 miles of river below the Sunnyside Diversion Dam.
- No negative impacts to terrestrial species, groundwater, surface water, or soils were identified in the EA.

Based on the environmental analysis as presented in the final EA, Reclamation concludes that implementation of preferred action and associated environmental commitments would have no significant impact on the quality of the human environment or the natural resources in the affected area.

This Finding of No Significant Impact has therefore been prepared and submitted to document environmental review and evaluation in compliance with the National Environmental Policy Act of 1969, as amended.

RECOMMENDED:

[signature] 9-24-08

Upper Columbia Area Environmental Manager — Date

APPROVED:

[signature] 9/25/08

Upper Columbia Office Area Manager Acting — Date

United States Department of the Interior
BUREAU OF RECLAMATION
Upper Columbia Area Office
1917 Marsh Road
Yakima, Washington 98901-2058

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IN REPLY REFER TO:
UCA-1607
ENV-2.00

Interested Individuals, Organizations, and Agencies (See Enclosed List_

Subject: Final Environmental Assessment and Finding of No Significant Impact, Benton Irrigation District Water Conservation Project Feasibility Study, Yakima Project, Washington

Dear Interested Parties:

Enclosed is a copy of the Final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the Benton Irrigation District Water Conservation Project Feasibility Study, Yakima Project, Washington.

The Final EA presents the analyses of the impacts of implementation of the conservation project. The proposed project would involve constructing a pump station and pump-pressurized buried pipeline distribution system to replace Benton Irrigation District's (BID) existing conveyance and distribution system. The new pump station would be located about 71 miles downstream of the Sunnyside Diversion Dam where water for BID is currently diverted. Utilizing the new pump station would allow the water diverted for BID at the Sunnyside Diversion Dam to remain in the Yakima River down to the pump station improving flows in that reach of the river for fish. Constructing the pipeline distribution system would improve efficiency of the BID system providing additional water for instream flow enhancement.

The decision document for this action, the FONSI, concludes implementation of this alternative would have no significant impacts on the quality of the human environment or the natural resources of the area. The Final EA and FONSI are also available for viewing on the Internet at: http://www.pn.usbr.gov.

Sincerely,

Gerald W. Kelso
Area Manager

Enclosure