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Walla Walla River Fish Passage Operations Project
Annual Progress Report
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ACRONYMS

AOP – Annual Operations Plan
AWS – auxiliary water supply
BPA – Bonneville Power Administration
COE – Army Corps of Engineers
CTUIR – Confederated Tribes of the Umatilla Indian Reservation
DOE – Washington Department of Ecology
ESA – Endangered Species Act
FACPSA – Final Amended Civil Penalty Settlement Agreement
GFID – Gardena Farms Irrigation District
HBDIC – Hudson Bay District Improvement Company
NOAA – National Oceanic and Atmospheric Administration
ODFW – Oregon Department of Fish and Wildlife
PNNL – Pacific Northwest National Laboratory
USFWS – U.S. Fish and Wildlife Service
USGS – U.S. Geological Survey
WWBNPME – Walla Walla Basin Natural Production Monitoring and Evaluation Project
WWFPO – Walla Walla Fish Passage Operations
WWRID – Walla Walla River Irrigation District

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ABSTRACT

In the late 1990s, the Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife, along with many other agencies, began implementing fisheries restoration activities in the Walla Walla Basin. An integral part of these efforts is to alleviate the inadequate fish migration conditions in the basin. Migration concerns are being addressed by removing diversion structures, constructing fish passage facilities, implementing minimum instream flow requirements, and providing trap and haul efforts when needed.

The objective of the Walla Walla River Fish Passage Operations Project is to increase the survival of migrating adult and juvenile salmonids in the Walla Walla River basin. The project is responsible for coordinating operation and maintenance of ladders, screen sites, bypasses, trap facilities, and transportation equipment. In addition, the project provides technical input on passage and trapping facility design, operation, and criteria. Operation of the various passage facilities and passage criteria guidelines are outlined in an annual operations plan that the project develops.

Beginning in March of 2007, two work elements from the Walla Walla Fish Passage Operations Project were transferred to other projects. The work element Enumeration of Adult Migration at Nursery Bridge Dam is now conducted under the Walla Walla Basin Natural Production Monitoring and Evaluation Project and the work element Provide Transportation Assistance is conducted under the Umatilla Satellite Facilities Operation and Maintenance Project. Details of these activities can be found in those project's respective annual reports.

BACKGROUND

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Oregon Department of Fish and Wildlife (ODFW), and Washington Department of Fish and Wildlife (WDFW) are conducting numerous fisheries activities associated with the rehabilitation of summer steelhead and bull trout populations in the Walla Walla River Basin (Figure 1) (Walla Walla Subbasin Plan 2004). In addition, reintroduction efforts are also in progress for spring chinook in the basin (COE 1997, CTUIR 1998, Zimmerman and Duke 2002). The Bonneville Power Administration (BPA) and U.S. Army Corps of Engineers (COE), along with other local, state, and federal agencies, are funding several projects related to the restoration of these populations (Walla Walla Subbasin Plan 2004). Included among these is the Walla Walla River Fish Passage Operations Project.

Figure 1

The Walla Walla River is heavily diverted for agricultural use. Passage constraints associated with these diversions are one of the major factors limiting fisheries restoration efforts in the basin (CTUIR & ODFW 1990, COE 1997, Zimmerman and Duke 2002). Low flows and diversion structures can delay or preclude the migration of both adult and juvenile salmonids. Fish passage improvement efforts, including maintenance of instream flows, dam removal, ditch consolidation, juvenile screens and bypasses, adult ladders, and trap and haul capabilities are being implemented to enhance passage conditions.

The Walla Walla River Fish Passage Operations Project (WWFPO) was implemented in 1998 to assist fish passage efforts in the basin. The goal of the project is to maximize survival of migrating adult and juvenile salmonids in the Walla Walla River. The project has four primary areas of responsibility to meet this objective: 1) Monitor flow and passage conditions; 2) Operate passage facilities, trapping facilities, and transportation equipment; 3) Provide technical input on passage improvement projects; and 4) Coordinate

passage improvement efforts. Two work elements which historically were part of WWFPO Project were transferred in March 2007 to other CTUIR projects. Enumeration of Adult Migration at Nursery Bridge Dam is now conducted under the Walla Walla Basin Natural Production Monitoring and Evaluation Project (WWBNPME). The work element Provide Transportation Assistance will be conducted under the Umatilla Hatchery Satellite Facilities Operation and Maintenance Project. Details and data associated with these to work elements will now be reported under those projects respective annual reports.

ANNUAL WORK ELEMENTS

A. Work Element: Operate and Maintain Habitat/Passage.

1. Milestone - Monitor channel conditions.

River channel conditions influence the ability for passage facilities to operate within established or designed criteria. The project regularly monitors channel conditions throughout the Walla Walla River (including tributaries), Mill Creek, and the lower Touchet River looking for changes in river morphology and instream structures that may potentially affect upstream and downstream migration. The project places specific emphasis on monitoring river morphology in the areas around the major passage facilities in Oregon and Washington. The Oregon sites are Little Walla Walla River facility and Nursery Bridge Fishway. The Washington sites are Gardena Canal (formerly Burlingame Canal) and Garden City/Lowden II diversion.

Channel inspections were conducted weekly by field observation. Channel locations that are identified as passage impediments are generally associated with irrigation diversions or stream reaches with low flow or high seepage loss. In addition to the weekly inspections, visual monitoring is conducted immediately following major events such as large changes in water diversion for irrigation, construction or removal of in-channel gravel berms or high flow events where gravel accumulation may cause fish passage problems. Specific areas of concern are identified and reported to fisheries co-managers in order that further analysis of the situation can occur and potential solutions to address the concerns can be implemented.

With the exception of channel related issues in the area around Nursery Bridge Dam, field observations concluded that passage conditions for adult steelhead and salmon were adequate during the project year. There were only minor issues related to channel conditions at the Washington passage facilities.

Securing flows to the new (east) ladder at Nursery Bridge Dam has been an issue since construction in 2001. The geomorphologic conditions downstream and upstream of Nursery Bridge are the major force behind channel related issues that affects flow to both ladders. The confinement of the river in this area does not allow for the energy of moderate to high flows to dissipate resulting in significant gravel migrations upstream of the site and subsequent deposition near or at the fish exitways of both ladders as well as excessive downcutting below the new ladder. The relationship between flows and

operation of the passage facilities will be more thoroughly discussed in the monitoring of passage facility operations section.

The head end of the Eastside Ditch is the pivot point for the river channel above Nursery Bridge. The main channel hugs the east bank up until that point when it laterals to the west bank upstream of the old (west) ladder. Over the years, Walla Walla River Irrigation District (WWRID) has constructed a gravel berm at their headworks to direct flows down their ditch and wasteway providing a flow benefit to the fish exitway of the new ladder.

This pivoting point of the thalweg is the main area for conducting instream work for securing flows to the Nursery Bridge new ladder following a channel changing event as well as the diversion point for the Eastside Ditch. At this point, flows are spread into the three distinct channels; the east bank channel (Eastside Ditch), middle channel (low flow channel), and the west bank channel. As mentioned above, during low flows a berm was constructed concentrating all available flows down the Eastside Ditch providing water for their users as well as the new ladder at Nursery Bridge.

Eastside Ditch is typically closed during the winter and early spring when high flows are most likely to occur. The middle channel (low flow channel) is used as a passage way during this period when Eastside Ditch was closed. The middle channel provides an unobstructed pathway for fish to move upstream past the point of diversion. Finally, the west bank channel mostly spills into the west side of stilling basin over the upper sill but only provides marginal flows to the old ladder.

There were few moderate to high flow events that resulted in channel migrations and gravel deposition during the adult steelhead return season. The one exception being flows experienced during May which deposited a gravel bar at the fish exitway of the old ladder and a significant amount of large woody debris (LWD) and gravel the stilling basin. The loose gravel bars upstream of the Nursery Bridge Dam allow for immediate deposition even under moderate flow conditions. For example, flows ranging from 300 cfs to 600 cfs contributed a large amount of gravel deposition in the stilling basin during the first half of May. In the last half of May, there were several observations of spring Chinook jumping at the dam unable to make it over. It was apparent that adult spring Chinook were not easily accessing either the new ladder stilling basin entrance or the old ladder entrance due to gravel and LWD material build up in the stilling basin.

On May 28, Hudson Bay District Improvement Company (HBDIC) personnel dug out a small channel at the fish exitway of the old ladder in order to keep the ladder operating as flows receded. As mentioned above, the thalweg continues to migrate laterally towards the west bank and the resultant spill falls between the ladder entrances resulting in a false attraction away from the entrances. The weak attraction out of the fish entrances due to the gravel and LWD deposition compounds the issue of the false attractant river flows spilling into the basin. These conditions initiated plans for conducting instream work at the Eastside Ditch headworks to direct flows towards the fish exitway of the new ladder.

It has become an annual occurrence to conduct instream work to secure flows for the ladders at Nursery Bridge. On June 5, instream work was done at the pivot point above the dam to provide increased flow to the new ladder and split the thalweg in an effort to reduce the flows falling over the upper sill. The instream work focused on developing the middle channel and directing most of the flow towards the new ladder but leaving enough water to operate the old ladder. Providing adequate flows to the new ladder added two vital components of fish passage through the site. First, secured flows provided an opportunity to run the new ladder at or near the one foot attraction flow design differential. Secondly, dispersing the flow across the upper sill reduced the false attraction addressing the delayed ladder entry issues.

In addition to the instream work done within the middle channel, work also had to be done at the rock weir constructed last summer. The rock weir was constructed as a supposed final and permanent solution towards directing low flows towards Eastside Ditch eliminating the need to construct a gravel berm every summer. However, high flows in the spring washed some rock out of the weir limiting flow down the ditch requiring the need to do additional instream work this summer. Instream work efforts concentrated on providing for Eastside Ditch water needs and focusing flows down the middle channel for fish passage.

Following the instream work, video reviews observed the second highest daily adult spring Chinook total of 27 fish. This was likely due to the ability to run attraction flows out of the stilling basin entrance at criteria (slightly over 1 foot differential). The day prior to the instream work, there were no adults observed in the new ladder with the stilling basin entrance operating at less than 0.5 foot of differential. However, a total of seven adult spring Chinook were noted passing through the old ladder. Up until the end of June flows directed towards the ladder were adequate. By the end of June, flows decreased dramatically resulting in water related issues at Eastside Dam, ditch, waste way, and both Nursery Bridge ladders.

As flows receded, a fish salvage was conducted by WWBNPME and WWFPO on June 24 within the west channel above the old ladder. As flows dropped, it was apparent that the instream work done in the spring needed to be redone to direct the remaining low flow either down the middle channel or the Eastside Ditch. Instream work was conducted on June 25 and a fish salvage was conducted during that time; fish that became isolated in small pools below the berm were removed, placed into buckets, and relocated above the newly constructed gravel berm. The total numbers of fish collected during salvages is provided within the WWBNPME annual report.

There have been significant efforts by managers in the basin to reduce the amount of instream work needed at Eastside Ditch. Instream work conducted by WWRID in the spring/summer to erect the gravel diversion berm for Eastside Ditch was thought to be at an end. However, the construction of a permanent rock diversion weir and headgate structure was not done according to the plans which resulted in additional concerns related to water deliveries and passage at the site. The problems associated with the operation of the headgate structure at Eastside will be presented in the monitoring of passage facility operations.

Following the construction of the new ladder at Nursery Bridge, the old ladder was only to be used during emergency situations in which the stilling basin entrance to the new ladder is not operating. Channel conditions continue to favor the location of the old ladder due to the upstream morphological conditions. The project will continue to work with HBDIC in regards to identifying potential gravel removal activities. However, installing instream structures that provide adequate flow to the new ladder under an array of flow conditions is essential in ensuring adequate passage conditions through the site and would reduce the need for gravel removal activities during peak migration periods. Alternatives for fixing the headgate structure and rock weir at the Eastside Canal are currently being discussed in order to reduce the need to conduct future instream gravel work at low flow levels.

Adequate and secured flows to the ladders allow for the passage facilities to operate within criteria through critical migration periods. Ensuring passage conditions during the migration season calls for adaptive management decisions anticipating gravel removal activities.

2. Milestone - Monitor flow and temperature conditions.

Hydrologic conditions as relates to fish passage are monitored as needed. Project staff makes visual observations of flow conditions multiple times per week to relate measured flow levels to passage conditions and facility operations. In Oregon, river flows are reviewed for the South Fork Walla Walla River and North Fork Walla Walla River using Oregon Department of Water Resources (OWRD) monthly reports on river flows. The flow information for the North Fork and South Fork Walla Walla is available on the OWRD website. In addition, the local irrigation districts monitor river flow in the reach from Nursery Bridge Dam to the state line and include the data in their monthly river monitoring reports. In Washington, real-time flow data is checked daily by project staff by reviewing: 1) the United States Geological Survey (USGS) website for their gauging station located on the lower mainstem Walla Walla River (RM 18), below the confluence with the Touchet River, and 2) the Washington Department of Ecology (WDOE) website for two gauging stations located at Pepper Bridge and Beet Road. Information on the WDOE website is also in the local irrigation districts' monthly river monitoring reports. Actual data from these gauging stations is then correlated to observed flow/channel conditions to assess passage concerns at varying flow levels.

The Federal Amended Civil Penalty Settlement Agreement (FACPSA) (USFWS 2001) identified minimum instream flow requirements of 19 cfs below Burlingame Dam and 27 cfs below Nursery Bridge Dam until June 30 of each year, lowering to 18 cfs below Burlingame Dam and 25 cfs below Nursery Bridge Dam on July 1 for the remainder of each year. Maintenance of minimum instream flows extends the opportunity for passage for both adults and juveniles. In addition, instream flow increases the area available for rearing of resident and non-migratory salmonid life histories. Historically, few fish would be in this river reach by mid summer and large scale salvage operations were conducted to

rescue juveniles stranded in this reach. No rescue operations were performed below Nursery Bridge Dam this year.

With the instream flow requirement of 25 cfs immediately below Nursery Bridge Dam in effect, there was continuous flow through this stream reach again this year. Flows in the reach from Nursery Bridge Dam to the state line were field measured by the local irrigation districts in October and December 2007 and again from January through August 2008. Flows were observed at diminished levels of 10.5 cfs at the state line reach in July 2008. Flows levels below 25 cfs were also observed in October, November, August and September. The reduced levels are typical for the river "loss" area below Nursery Bridge to the state line. Flows are hyporheic through this reach due to the build up of substratum.

Flows were measured in the mainstem Walla Walla River below Burlingame Dam at Beet Road. Flows reached a low of approximately 17.7 cfs in July 2008 to approximately 2150 cfs on May 18, 2008. The observed low flows in October may be attributed to gravel dams put up by youth in the area causing uncertainties with the accuracy of the estimated bypass flows. Flows and temperatures reported for all sites have not been finalized by all parties responsible for them. Flows measured at the USGS site in the lower Walla Walla River ranged from a low of 5.3 cfs in mid-August of 2008 to a high of 2,820 cfs on May 19, 2008.

Annually, water temperatures exhibit extreme seasonal fluctuations throughout the mainstem Walla Walla River. In the reach from Nursery Bridge Dam to the state line, water temperatures approached a low of approximately 32°F in January 2008 and approached a high of 74°F in August 2008. Below Burlingame Dam, temperatures ranged from a low of approximately 32°F in January and approached a high of 75° F in August 2008.

Temperature and flow data from other, less critical, passage locations in the Walla Walla Basin are being monitored and reported by other agencies. The project continues to make field observations of flow and temperature but no longer collects or reports detailed flow and temperature field data from the Walla Walla Basin as this is redundant with other ongoing efforts in this area. The project accesses data collected and reported by the irrigation districts and other sources for hydrological information relative to passage operations on an as needed basis. The project will continue to monitor river conditions as they relate to the operation of passage facilities and fish passage conditions. In order to make decisions related to fish passage, temperature and flow data need to be available on a real-time basis. The project suggests consolidating the flow data onto a website that encompasses flow data collected from USGS, WDFW, OWRD, and DOE. This would allow managers in the basin to follow flows in step sequence starting from the headwaters downstream to the mouth of the Walla Walla River. This information is also helpful in identifying tributary contributions of flow.

3. Milestone - Monitor passage facility operations.

Juvenile fish screens/bypasses and adult ladder facilities, located at four major diversions (Little Walla Walla River (LWWR), Nursery Bridge, Burlingame, and Garden City/Lowden II) and several smaller diversions, are monitored weekly throughout the year to ensure that adequate passage conditions exist for upstream and downstream migrants. Inspections include checking for proper installation and operation of screens, gaps and holes in screens or seals, debris buildup on screens and trash racks, proper flows to smolt bypasses and adult ladders, adequate access and exit conditions at bypasses and ladders, signs of fish activity, and to ensure passage facilities are being operated according to operating criteria.

A number of operational problems were observed during monitoring of the juvenile and adult passage facilities. These problems were also identified in last year's annual report and include; inability to operate Nursery Bridge Fishway within criteria, inadequate headgate structure on the Eastside Ditch, the Eastside Ditch rock weir and gravel deposition at Nursery Bridge Dam.

During low flows and channel altering events, the entrance gate attraction flow criteria could not be maintained at the new ladder entrances. The location of the new ladder exitway continues to pose passage issues because it does not have the ability to receive adequate flow during low water conditions. Less than adequate flows to the ladder exitway have rarely allowed the ladder to be operated within the designed criteria. The goal is to operate the fishway to provide a 1-foot differential across the fish entrances. Poor attraction flows to the ladder entrances may contribute to fish passage delays at the site. The Nursery Bridge new ladder continues to operate out of criteria during all but a few days during the project year. These pre-existing conditions occur without any additional problems related to flow, gravel deposition, and channel migrations during the fall. Problems that occur on top of those issues compound fish passage concerns at the site.

The brush on the east side screen cleaner at Nursery Bridge fell into the screen bay in December 2007. Project concerns were focused on the build up of debris on the screens due to the inability to be continually and effectively cleaned. It was thought that "hot spots" on the screen surface would result in fish being impinged on the screens. The project requested that Pacific Northwest National Laboratories (PNNL) conduct velocity measurements in the screen bay to better assess the situation. PNNL conducted these measurements on February 1, 2008 and reported that only one measurement exceeded the National Marine Fisheries Service (NMFS) approach criteria for safe juvenile passage of 0.4 fps. It was also noted that sweep velocity shows a sharp increase at this same point. It is speculated that both are probably caused by water hitting that area as it enters the fishway through the tunnel at an angle.

The project's intentions were to identify whether operating the facility under current conditions resulted in excessive velocities in the screen bay. It appears that under current operations, velocities are within the designed NMFS criteria. However, the facility typically operates at less than a foot of differential at both ladder entrances for most of the year. The next step will be to monitor approach and velocities with both entrances running within criteria. Addressing these types of questions will help the

project and O&M personnel in refining operating criteria. It is suggested that we work with PNNL staff in developing a protocol for measuring velocities when entrance criteria is met and when it is not.

Construction of the Eastside Ditch headgate structure and rock weir was completed late summer/early fall of 2007. Problems first arose at the end of October 2007 when the headgate was not locked and vandals closed the headgate structure dewatering the head end of the Eastside Ditch. Following that event, a lock was added to the headgate structure however, there are other parts of the system that are accessible to vandals which may allow further tampering compounding flow issues to Nursery Bridge fishway. Fortunately, there were no further attempts by vandals during the project year. Due to the reliance on supplemental flows from the Eastside Ditch wasteway, the Nursery Bridge new ladder is highly susceptible to dewatering during low flow scenarios.

As flows increased in late fall, there were concerns that the undershot gate at the upper headgate structure was a problem for fish passage due to excessive velocities. It was discovered that the head gate structure was constructed a foot higher than designed. The project requested that PNNL take velocity measurements at the site. NOAA fisheries have established that upstream juvenile fish passage criteria for fish ranging from 45 to 65 mm is 1.5 to 2.5 feet per second and the criteria for fish ranging from 80 to 100 mm is 3.0 to 4.5 feet per second. ODFW's fish passage criteria for adult salmon are 8 feet per second. PNNL took velocity measurements at the Eastside headgate structure on both February 1 and February 29. Data was collected from two measurement points on February 1 and three measurement points on February 29. The two measurements taken on February 1 were 2.4 and 5.7 fps while the three measurements on February 29 were 3.4, 7.0, and 7.3 fps. The velocities increased from upstream to downstream, and the turbulence at the third location (where the cement platform is present) was much higher than the other two points. Measurements were also taken at the wasteway structure on February 29 but velocities at this location were well within juvenile passage criteria. However, the measurements taken at the head gate structure exceeded NOAA's juvenile criteria but fell below ODFW's adult criteria.

A meeting was conducted on March 7 to discuss possible alterations that could be made to the structure in order to improve fish passage and to better comply with irrigation water demands. At that time, it was decided that placing rock weir(s) downstream of the head gate structure would back up flows enough to reduce the differential and velocities would be within salmonid criteria. Some small rip rap material was placed just downstream of the ditch head gate but it did not help to reduce velocities or the differential through the structure.

High flows during May made facility operations at the Oregon sites very difficult. O&M personnel struggled with keeping trash racks, screens, down wells, and fish ladders clear of debris. The high flows graveled in the old ladder at Nursery Bridge. In an effort to keep fish from becoming stranded in the ladder as conditions worsened, ODFW dewatered the ladder on May 23 and there were no salmonids observed during

or after the dewatering. As mentioned in the monitoring of channel conditions section HBDIC conducted gravel work at the exit way of the old ladder to get the ladder in operation as flows declined.

Debris deposited at the Nursery Bridge Fishway during the May high flows became evident as flows receded in June. There was a temporary shut down of the new ladder on June 5 to remove debris caught in the screen cleaner. At that time instream work was being done to restore flows down the middle channel towards the fish exit way of the new ladder.

The high flows also washed out a portion of the Eastside Ditch rock weir which resulted in diminished water deliveries to the new ladder from June 1 through June 5 until the instream work was completed. Additional work was done on June 26 to replace five boulders that had rolled out of the rock weir. At that time, it was also arranged to gravel in 90% of the weir to increase flows down the Eastside Ditch while still leaving enough flow to sustain fish below the berm. Fish salvages were conducted during and after each instream work activity conducted in late June. Fish were removed from the west bank channel and relocated above the berm. All fish salvaged were recorded by the WWBNPME project and will be presented in their annual report.

Flows continued to decline in July forcing more instream work to direct all available flows down the ditch and subsequently the exit way of the new ladder at Nursery Bridge. Another salvage was conducted on July 8 in conjunction with the work done to complete the Eastside gravel berm. After this work, another rain event washed 50% of the berm out which created further water delivery issues down the ditch and rewatered the west channel which may have allowed fish to reenter an area that was previously salvaged. The project continued to monitor the west channel for fish moving back into that area and an additional salvage was not needed. The project expressed that the berm should not be reconstructed to alleviate the need for continued salvages and handling of juvenile salmonids in the area. During these low flow conditions, there is not enough flow to operate both ladders. The old ladder was closed during with the work done on July 8.

Part of the ongoing work by USFWS to assess seasonal distribution, passage, and movement of bull trout (*Salvelinus confluentus*) in the Walla Walla River has included the installation of PIT tag detection sites, hook and line sampling, and the operation of fyke nets at passage facilities in the basin. One of the sites monitored by the USFWS is Gardena Canal. In early November, preliminary PIT tag and hook and line sampling data suggested that there may be a large number of bull trout in the residing in the canal forebay. Discussions and concerns were initiated amongst FPO, ODFW, USFWS, and the Gardena Farms Irrigation District (GFID) prior to shut down in December on how to deal with the suspected large number of bull trout in the canal.

On December 28, Gardena Canal was closed for winter maintenance and at that time the head gates were reduced to 4%. Then, the bypass ramp weir was fully raised on January 2, 2008 and at that time the boards at the bypass outfall were removed to attract fish to volitionally move out of the canal via the bypass. On January 3, one

headgate was fully closed while the other remained at 4% open. On January 4, the remaining open headgate was reduced to 2% open in an additional effort to force fish out the canal and reduce the number of fish handled in the upcoming fish salvage. The headgates were fully closed on January 7 in conjunction with the fish salvage.

At that time, the canal forebay was seined to force fish out of the bypass with limited success. There were two additional efforts conducted on January 9 and January 11 utilizing both seines and electrofishers. A total of 24 steelhead and two spring Chinook juveniles and seven bull trout were removed from the canal and transported and released into the adjacent Walla Walla River. Only four of the seven bull trout captured had been previously pit tagged. The bypass remained open until the final fish salvage on January 11 when the exclusion grate was placed in the outfall between the ramp weir and the bypass channel.

The need to conduct several salvages initiated dialogue between FPO, WDFW, USFWS, GFID and ODFW as what would be the best strategy to get fish to move during draw down of the canal. Over the years, the canal forebay has been cleaned repeatedly which has led to large pool that is lower than the rest of the channel below the toe of the trash racks. It was thought these bathymetric conditions led to the large number of fish observed in the canal and that this large pool precluded fish from moving out the bypass. Restructuring the canal forebay with rock to prevent the canal depth from extending below the toe of the trash racks to allow better flushing down the canal pass the trash racks to the bypass was determined to be the best alternative.

From September 19 through 25, GFID lined the Gardena Canal forebay with rock in an effort to increase sediment movement, provide a low flow channel for fish to congregate and flush out during de-watering procedures, as well as to provide a good footing for personnel conducting fish salvages during the de-watering. The project will continue to monitor the site and work with interested parties in assessing the benefits provided by the rock installation.

The Little Walla Walla River was closed for irrigation deliveries on January 25, 2008. The canal forebay was ramped down from January 29 to 31. To initiate the drawdown the Obermeyer gate was completely lowered on January 29. On January 30, all but one of the head gates were closed and the bypass weir was fully raised to reduce the canal forebay water level by half. On the afternoon of January 31, HBDIC worked on sealing the headgates to further reduce the water level to less than 2 ft. in preparation for the fish salvage on February 1. The bypass remained open until the salvage on February 1 by WWBNPME and WWFPO in coordination with HBDIC. For the third year, there were few salmonids observed during the salvage. The project will continue to adhere to the above draw down procedures to ensure that fish can move out of the canal volitionally.

B. Work Element: Coordination

1. Milestone - Coordinate Passage Facility Operations.

Passage facility operations at Little Walla Walla River, Eastside Ditch, Nursery Bridge Dam, Gardena Canal, and Garden City/Lowden II Canal are coordinated by the project through the Walla Walla Basin Passage and Production Annual Operations Plan (AOP) and field interaction with the Passage Facility O&M staffs. In addition, the project coordinates with various agencies involved with fish passage/flow enhancement efforts including multiple irrigation districts, US Army Corps of Engineers, US Fish and Wildlife Service, NOAA Fisheries, and Oregon and Washington fisheries and flow management agencies. The project acts as a liaison between these various entities involved in the operation and maintenance of the passage facilities as well as the flow enhancement effort to ensure adequate passage conditions exist for both upstream and downstream migration.

Currently, HBDIC is responsible for O&M of the Oregon facilities (Little Walla Walla and Nursery Bridge Fishway) while GFID is handling the Washington facilities (Gardena Canal and Garden City/Lowden II). The project coordinated by phone or in person on a weekly basis with personnel from HBDIC and GFID on both daily operations and facility maintenance throughout the project year at these sites.

There have been ongoing concerns regarding the O&M at the Oregon facilities. The O&M at LWWR has generally been adequate but at Nursery Bridge it has been inadequate especially during high maintenance periods (i.e., high flows or debris loads). In addition, to the lack of maintenance at Nursery Bridge Dam, there has been difficulty coordinating operation of the facility. It appears that the O&M personnel are having a hard time balancing irrigation district duties with passage facility O&M.

The project still recommends that the O&M contracts and staff be combined similar to the Umatilla Basin to ensure that additional staff is available during high maintenance periods or at the least that the two staffs coordinate during high maintenance periods in order to provide each other assistance. In addition, combining staff may reduce the likelihood of personnel having to transition from prioritizing irrigation tasks and O&M needs at the same time and may also provide an opportunity for more field interaction between oversight staff and operators. Also, experiences and information gained may be transferred and shared to improve overall efficiency. It is important to conduct maintenance at the sites during high debris loads to maintain adequate passage conditions and to minimize the stress of migrating salmonids passing through the facilities.

The project continues to work with the HBDIC to implement the operational guidelines developed for Nursery Bridge Fishway that were finalized in November, 2002. Because of the flow issues at NBD it has been difficult applying the original operating guidelines. Facility operations at Nursery Bridge continue to be directed at attempting to come as close to identified criteria as possible with the limited flow

available most of the year. The Nursery Bridge new ladder continues to operate out of criteria during all but a few days during the project year.

Retrofitting fish passage facilities to irrigation diversions is a difficult task. Site selection based on delivery of water works for irrigation but typically results in less than ideal passage conditions. Because of the complex nature of delivering water and passing fish at the same site, it is important that passage O&M crews strictly follow the operating criteria as directed by the WWFPO.

C. Work Element: Little Walla Walla River Trap and Haul.

1. Milestone – Operate Juvenile Trapping Facility.

A juvenile passage facility is located at the Little Walla Walla River diversion (Figure 2). The facility consists of vertical plate screens along with a fish bypass and trap. It is designed to bypass outmigrating juveniles during periods of adequate flow or trap them during periods of low flow. Operation of the Little Walla Walla River juvenile trapping facility is conducted under guidelines developed by the project in conjunction with NOAA Fisheries and other affected agencies. Information collected at the Little Walla Walla River facility includes dates of canal operation and facility operational modes.

Figure 2.

The Little Walla Walla River juvenile trapping facility is operated as needed based on the following AOP criteria: if river flows below Nursery Bridge Dam become intermittent prior to June 15, the juvenile bypass will be closed and the trap opened. At a point during trapping when resident salmonids outnumber migratory juveniles, the trap will be shut off and the bypass reopened. If flows remain continuous in the river reach

from Nursery Bridge Dam to the state line, then the trap will not be opened. The juvenile trap at Little Walla Walla River was not operated for trap and haul purposes by the project in 2007/2008. With the minimum flow requirement of 25 cfs below Nursery Bridge Dam, it is anticipated that there will likely always be flow between Nursery Bridge and the state line, eliminating the need for trapping at Little Walla Walla River.

2. Milestone – Transport Downstream Migrants.

If the Little Walla Walla River juvenile trapping facility is being operated based on criteria outlined in the AOP, downstream migrants are collected for safe transport around low flow areas. Attempts will be made to segregate migratory and resident juvenile life histories. Any steelhead or chinook smolts, and all summer steelhead kelts trapped will be hauled to the lower mainstem Walla Walla for release. Bull trout, non-migratory rainbow trout, or subyearling chinook will be released at or near the facility. Fish are hauled as needed to prevent accumulation of juveniles or kelts at the facility. Due to adequate flows no juveniles or kelts were transported from the Little Walla Walla River trapping facility by the project in 2007/2008. As stated above, the project does not anticipate hauling fish from the facility as long as minimum instream flows remain in effect.

3. Milestone – Collect Data Related to Downstream Migrant Hauling Operations.

Data to be collected during juvenile hauling operations will include dates, species composition, estimates of mortality, pounds or number hauled and release location. Additional data to be collected from kelts trapped at the Little Walla Walla facility will include number, condition, and external marks. No transport occurred this project year which resulted in no data collected relating to juvenile and/or kelt hauling operations.

D. Work Element: Provide Technical Review.

1. Milestone - Review designs and plans.

A number of juvenile and adult passage improvement projects are being implemented, or planned for, in the Walla Walla Basin. Development of these passage projects has been tasked to various engineering consulting firms by the funding agencies. The project provides technical input on both design and operating criteria for these passage facilities based on operating expertise developed with similar type projects in the Umatilla and Walla Walla basins.

The project participated in discussions related to excessive velocities coming out of the Eastside head gate structure, as well as, the rock weir structure. The project will continue to participate in the ongoing meetings and discussions aimed at fixing passage issues at the site. Alternatives were not implemented this project year but will be reported on in next year's annual.

Since completion of the new ladder at Nursery Bridge, several issues have been discussed with managers in the basin related to downcutting, flows, and gravel deposition all of which relate to passage at the site. In November 2007, there was a meeting conducted by the COE with the stake holders to address the conceptual design for grade control structures below Nursery Bridge. The consulting firm Tetrattech, developed three alternatives which included 0.5, 1.0, and 1.5 foot differentials between the proposed rock structures. There were concerns raised at this meeting by ODFW that juvenile passage criteria would not be met with differentials of 1.0 and 1.5 feet. Later designs have focused on 9 inch weir steps, with low flow notches to allow summer juvenile passage. In addition, low flow design objectives for water velocities were not to exceed 8 fps and that water depths between weirs be a minimum of 2 feet. Other concerns were raised regarding providing passage at all conditions, ensuring passage from the high flow channel (west bank) to the proposed grade control structure and overall costs.

The project supervisor participated in ongoing reviews and conference calls regarding the COE Feasibility Study 90% exchange alternative. The project provided technical input on minimum flow levels and diversion rates for potential flow exchange options being evaluated in the COE Flow Enhancement study. In addition, the project provided comments on the screening of Garrison Creek, the Mill Creek passage assessment, and the Bergevin-Williams/Old Lowden ditch consolidation. The project plans on being involved in the developmental phase of the gravel management plan for Nursery Bridge.

E. Work Element: Fish Passage Annual Operating Plan.

1. Milestone - Produce Annual Operations Plan (AOP).

Each year, the project incorporates information gained from the monitoring of river conditions and facility operations into development of the Walla Walla Basin Passage and Production Annual Operations Plan. This document attempts to coordinate river conditions, facility operations, and diversion activities to maximize passage conditions. The intent of the AOP is to define the primary operational criteria at the major diversions prior to the next season to minimize in-season questions and concerns. A draft AOP is sent out to the involved irrigation districts and the BPA COTR in the late summer for comment and the final AOP for the upcoming year is completed in September and distributed to the involved parties. However, the project did not finalize the 2008-2009 Walla Walla AOP until October 2008. This AOP, which covers the time period from October 1, 2008, to September 30, 2009, is attached as Appendix A to this report.

Development of the AOP continues to be a progressive step in working with managers in the basin. It is modified annually to include operational changes identified as needed during the course of operations from the previous year. There were no modifications between the 2007/2008 AOP and the 2008/2009 AOP. There were discussions regarding the responsible party for operation of the Eastside structure. Managers would like the ability to address concerns associated with the Eastside

structure before adopting the duties of operating it. As new facilities come on line, and additional information becomes available, they will be incorporated into future AOPs. During the project year, the project would like to schedule meetings in August of 2009 to discuss comments and concerns regarding next year's AOP.

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APPENDICIES

Appendix A. Walla Walla Basin Passage Annual Operations Plan

Walla Walla Basin Passage
Annual Operations Plan

October 1, 2007 - September 30, 2008

Prepared by:

Walla Walla Fish Passage Operations Project

For

Bonneville Power Administration

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ACRONYMS

AOP – Annual Operations Plan
BPA – Bonneville Power Administration
CHS – spring Chinook
COE – US Army Corps of Engineers
GFID – Gardena Farms Irrigation District
HBDIC – Hudson Bay District Improvement Company
LWWR – Little Walla Walla River
NOAA – National Oceanic and Atmospheric Administration
ODFW – Oregon Department of Fish and Wildlife
STS – summer steelhead
WWBNPME – Walla Walla Basin Natural Production Monitoring and Evaluation Project
WWFPO – Walla Walla Fish Passage Operations
WWRID – Walla Walla River Irrigation District

I. Introduction

Fish restoration efforts in the Walla Walla Basin are ongoing. Part of these efforts includes improvement of fish passage conditions in the basin through facility and instream flow projects. Most of the Bonneville Power Administration (BPA) funded passage facilities are located in the upper mainstem portion of the subbasin. The major facilities specifically identified in this Annual Operations Plan (AOP) are Gardena Farms Ladder and Juvenile Screen Site, Nursery Bridge Ladder and Trap, Little Walla Walla River Juvenile Facility, and the Garden City/Lowden No. 2 ladder and screen. Current instream flow enhancement and minimum instream flows have been established to ensure 19 cfs below Gardena Farms Dam and 27 cfs below Nursery Bridge Dam until June 30 of each year, returning to 18 cfs below Gardena Farms Dam and 25 cfs below Nursery Bridge Dam on July 1 for the remainder of each year. WWFPO anticipates that these flow regimes will remain the same next year. If flows are continuous from Nursery Bridge Dam through to the state line until June 15, then the juvenile bypass will remain open. Trap and haul will be initiated; if the flows in this reach become intermittent prior to June 15, the juvenile bypass will be closed and the trap opened. At the point during trapping when resident salmonids outnumber migratory juveniles, the trap will be shut off and the bypass reopened.

To coordinate the implementation of these passage and flow efforts, the Walla Walla Fish Passage Operations Project (WWFPO) develops an AOP. The primary purposes of this AOP are to provide facility operating guidelines and coordinate passage and instream flow enhancement efforts between the various state, tribal, and federal management entities, irrigation districts, and the WWFPO.

The primary focus of this AOP is to provide a guideline for conducting passage activities in the Walla Walla Basin with emphasis on the major BPA funded facilities. Conditions or biological information may dictate a need to change operations in-season from what is outlined in this document. Any entity operating under this AOP should inform the appropriate groups if operations they are conducting significantly deviate from those outlined here.

II. Trap and Video Operations

A. Nursery Bridge

For 2007-2008, enumeration at the new fish ladder will occur by video counting. The video counting station will be operated by WWFPO in conjunction with Hudson Bay District Improvement Company (HBDIC) staff from November through August. Summer steelhead, bull trout and spring chinook will be enumerated. Additional data to be collected will be the number of steelhead kelts, direction of bull trout movement, and age class (adults and jacks) for spring chinook. Other species and life history stages video recorded will be noted. It is not anticipated that the adult trap will be operated in 2007-2008. Gravel accumulation associated with the new ladder continues to compromise fish passage at the Nursery Bridge Dam. In order to provide passage through the site it is anticipated that the old ladder at Nursery Bridge Dam will be

operated in 2007-2008. If the old ladder is operated ODFW Umatilla Fish district personnel and WWFPO will install and operate the video enumeration equipment.

B. Little Walla Walla River

A juvenile trap is located at the Little Walla Walla River screening facility and is operated by WWFPO personnel in conjunction with HBDIC staff. Criteria for operation of the trap will remain the same as past years: if river flows below Nursery Bridge Dam become intermittent prior to June 15, the juvenile bypass will be closed and the trap opened. At a point during trapping when resident salmonids outnumber migratory juveniles, the trap will be shut off and the bypass reopened. If flows remain continuous in the river reach from Nursery Bridge Dam to the state line, then the trap will not be opened. Based on these criteria and the increased minimum instream flows below Nursery Bridge Dam, it is not anticipated that the trap will be operated for trap and haul purposes.

If trap and haul operations are conducted, attempts will be made to segregate migratory and resident juvenile life histories. Any steelhead or chinook smolts, and all summer steelhead kelts that are trapped will be hauled to the lower mainstem Walla Walla for release. Bull trout, non-migratory rainbow trout, or subyearling chinook will be released at or near the facility. Data to be collected from juveniles trapped at the Little Walla Walla facility will include pounds transported and a subsample of species composition. Data to be collected from kelts trapped at the Little Walla Walla facility will include number hauled and any external marks.

C. Monitoring and Evaluation

One exception to the criteria listed under II.A. and II.B. is the utilization of traps at the various facilities for monitoring and evaluation (M&E) reasons. The possibility exists that the trap in either the old or new Nursery Bridge Dam ladder may be operated to capture adult steelhead and bull trout for radio tracking studies. In addition, trapping may occur at both Little Walla Walla River and Gardena Farms canals to capture juveniles for tagging and to collect biological data. M&E personnel are to coordinate their efforts with WWFPO, state agencies, and the appropriate O&M staffs. These facilities are designed to optimize fish passage conditions; if it is determined that M&E trapping efforts are adversely affecting fish passage then M&E efforts will be discontinued.

III. Passage Facility Operations

A. Ladders

1. Garden City/Lowden No. 2

The Garden City/Lowden No. 2 ladder is operated by Gardena Farms Irrigation District (GFID) personnel in coordination with WWFPO staff. Generally, the ladder will be open year-round. Operation of the ladder is determined by stream flow

elevation. The intent of this ladder is to provide passage when the rubber dam is raised for irrigation diversions. The ladder is not operational in low to moderate flow conditions when the rubber dam is down. The intent is to maximize the period when the rubber dam is down, allowing fish to volitionally migrate past the structure in the natural stream channel without having to utilize the ladder.

2. Gardena Farms Dam

The Gardena Farms Ladder is operated by GFID in coordination with WWFPO staff. The ladder will be open for fish passage year-round. When river flows drop to a point where inadequate water is available to properly maintain water levels in both the diversion and ladder, low flow panels will be installed into the ladder. With the low flow panels installed, the ladder should be operable within criteria down to the 10 cfs level which is below the currently identified minimum instream flow level. When the canal is off during the summer low flow period, the low flow panels will be removed and the flash dam will remain in to concentrate flows in the ladder and maintain criteria.

GFID personnel will remove flashboards from the two short slot sections of the dam whenever possible throughout the year to facilitate fish passage. When the canal is shutdown for the winter, a complete section of the flash dam should be removed to facilitate migration through this stream reach. The middle entrance slot to the ladder should be open whenever a full section of the flash dam is out and high flows are concentrated near the ladder entrances. The upper entrance slot should be open whenever the flash dam is completely installed or only the short slot section is removed.

3. Nursery Bridge Dam

The new Nursery Bridge Ladder is operated by HBDIC personnel in coordination with WWFPO staff. The ladder will be open for fish passage year round except for the annual operation and maintenance conducted during the summer. Whenever possible the new ladder will be operated using the operational guidelines provided by the U.S. Army Corps of Engineers (COE). However, times and conditions exist where the COE guidelines cannot be followed. Under these circumstances the ladder will be operated as directed by WWFPO personnel. The old ladder is still in place and will be operated by ODFW District and WWFPO personnel when flows are adequate or as necessary due to inadequate passage conditions at the new ladder. Annual maintenance at Nursery Bridge Dam will be performed by HBDIC within the ODFW instream work window of July 1 – September 30 and will be coordinated with WWFPO. Any emergency instream work outside of this period will be coordinated with BPA and WWFPO prior to doing the work to ensure compliance with US Fish and Wildlife Service and NOAA Fisheries Biological Opinions for this facility.

4. Little Walla Walla River

A Denil steepass is located at the Little Walla Walla River diversion dam and is operated by HBDIC personnel in coordination with WWFPO staff. Between water left instream for downstream users (Eastside ditch) and current minimum instream flow levels there is sufficient water available to operate the steepass year round. This allows for both upstream and downstream volitional migration past the diversion structure no matter what operational status the rubber dam and Obermeyer gate are in.

B. Screens and Bypasses

1. Garden City/Lowden No. 2

The Garden City/Lowden No. 2 juvenile screen facility is operated by GFID personnel in coordination with WWFPO staff. It is located at the natural stream bank line, which excludes juveniles or adults from entering any portion of the irrigation canal and precludes the need for a bypass system.

2. Gardena Farms Canal

The Gardena Farms Canal screen/bypass facility is operated by GFID personnel in coordination with WWFPO staff. The facility will be operated whenever the canal is diverting water. Once flows drop to a point where the low flow panels are installed in the ladder, bypass flows will be regulated in order to maintain operation of both the ladder and screens within criteria. At current minimum instream flow levels there should be enough flow available to allow for continual operation of the bypass.

3. Little Walla Walla River

The Little Walla Walla juvenile facility consists of juvenile screens, bypass, and trap and is operated by HBDIC personnel in coordination with WWFPO staff. Based on facility criteria outlined in Section II.B., the trap will not be operated in 2008 and the juvenile bypass will be open whenever the canal is delivering water. At current minimum instream flows there is enough flow available for continual operation of both the bypass and steepass.

4. Eastside Ditch

The Eastside Ditch is operated by the Walla Walla River Irrigation District (WWRID). The screen and bypass facility are operated and maintained by ODFW under the Mitchell Act. The bypass located at the facility will operate whenever the ditch is delivering water. Due to a semi-permanent rock weir being installed at the diversion site, construction of a gravel push up berm should not be necessary. During the low flow months, the ditch will be managed to draw additional flow into the canal over that needed for irrigation. This excess flow will be returned to the river through the ditch wasteway. This will provide better passage conditions for fish moving downstream as there will be supplemental flow for the bypass outfall. In addition, this will provide better flow to the Nursery Bridge Dam ladder and provide fish

moving upstream with a passageway with concentrated flow. In the event that construction of a gravel push-up dam needs to be constructed, WWRID will contact WWFPO prior to constructing the gravel push up berm to ensure that it does not adversely affect ladder operations and to prevent stranding of juvenile fish. WWFPO will coordinate any required fish salvage.

5. Milton Ditch

The WWRID no longer operates the Milton Diversion since the Milton consolidation project was completed. However, WWRID does monitor the site along with Oregon Water Resources Department, WWFPO and ODFW. WWRID will report to WWFPO, USFWS and NOAA Fisheries if water is turned into the ditch (by individual landowners).

C. Facility Shutdowns/Salvage Operations

All the facilities mentioned above have periods of the year when they are shutdown for reasons such as lack of water in the river versus senior water rights, bypass flow maintenance, facility maintenance, irrigation demand, and winter weather. Any closures which will result in the stoppage of flow or dewatering of the facilities that may potentially harm or strand fish will be coordinated with WWFPO staff. WWFPO will schedule salvage operations as needed to rescue fish under these situations.

1. Little Walla Walla River shut down procedure.
 - a. HBDIC personnel will notify the WWFPO project of intent to shut down.
 - b. HBDIC will coordinate shut down procedures with WWFPO project staff following the LWWR Operational and Maintenance Manual Section 3-4 Shut Down and Dewatering Procedures.
 - c. WWFPO will coordinate fish salvage if needed.
2. Nursery Bridge Fishway dewatering procedure.
 - a. HBDIC personnel will notify the WWFPO project of intent to shut down.
 - b. HBDIC personnel will coordinate shut down procedures with WWFPO project staff following the Operational Guidelines for Nursery Bridge Fishway Section 5.0 Dewatering.
 - c. WWFPO staff will coordinate fish salvage if needed.
3. Nursery Bridge old ladder shut down procedure.
 - a. ODFW/WWFPO will close fish exitway gate by 90%.
 - b. ODFW/WWFPO will allow ladder to drain for 1 to 2 hrs.
 - c. ODFW/WWFPO will inspect for fish presence and coordinate fish salvage if needed.
 - d. ODFW/WWFPO will full close fish exitway gate.
4. Gardena Farms Canal shut down procedure.
 - a. GFID personnel will notify WWFPO project of intent to shut down.
 - b. GFID personnel will close canal headgates by approximately 90%.

- c. GFID personnel will open fish bypass fully and leave stop logs in place at the access road culvert.
 - d. GFID personnel will allow the bypass to flush for a minimum of 48 hrs.
 - e. WWFPO project inspect for fish presence and coordinate complete shut down of the canal.
 - f. WWFPO will coordinate fish salvage if needed.
- 5. Gardena Farms Ladder shut down procedure.
 - a. GFID personnel will notify WWFPO project of intent to shut down the ladder for maintenance operations.
 - b. GFID personnel will partially shut down the ladder to allow for WWFPO inspection.
 - b. WWFPO staff will assess fish presence and coordinate with GFID personnel for complete shutdown of the ladder.
 - c. WWFPO will coordinate fish salvage if needed.
- 6. Garden City/Lowden II ladder shut down procedure.
 - a. GFID personnel will notify WWFPO project in anticipation of lowering the rubber dam and interrupting flow to the ladder.
 - b. WWFPO staff will inspect for fish presence and coordinate fish salvage if needed.
- 7. Gardena Farms Ladder Low Flow Sill/Flushing Operations
 - a. GFID personnel will notify WWFPO staff of the intent to install or remove low flow sills or flush the ladder.
- 8. Eastside Ditch shut down procedure
 - a. WWRID personnel will notify ODFW/WWFPO project of intent to shut down.
 - b. WWFPO staff will inspect for fish presence and coordinate fish salvage if needed.
- D. Release schedules
 - 1. STS-100,000 to be directly stream released between Mill Creek and Touchet River (Rm 23-33) in mid to late April.
 - 2. CHS-250,000 to be directly released at Harris Park from late March to early April.

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