



FISH PASSAGE CENTER

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MEMORANDUM

TO: Salmon Managers
Fishway Inspectors
Rick Klinge, Douglas PUD
Chuck Peven, Chelan PUD
Chris Carlson, Grant PUD
Cal Sprague, COE Portland District
Dave Hurson, COE Walla Walla District

FROM: Larry Basham

DATE: June 15, 2001

RE: **Fishway Inspections – May 2001**

Overall, river flow was well below normal for the month of May compared to previous years. There was a small increase in flow with snowmelt from the higher elevations during the month, and as a result, spill was initiated at Bonneville, The Dalles, and John Day dams to improve juvenile migration through the lower Columbia River. In addition, McNary Dam spilled water every other day starting May 25. These spill levels should have no bearing on adult fish passage rather, numbers and ratios of fish that pass a ladder would likely change due to the spill (pattern). There were no reports of failure of adult passage fish pumps, fish turbines, or other auxiliary water systems for the month. I observed, via fishway inspections, fish passage facilities at the four Snake River projects, Bonneville Dam, and the three upper Columbia River dams.

Bonneville Dam –I completed an inspection of the adult and juvenile fish facilities at Bonneville Dam on May 7. River Q was 149 kcfs with no spill occurring. Seven of 8 main turbine units were operating at the new powerhouse with 3 turbine units operating at the old powerhouse. Both fish turbines were operating at the WA shore. The turbidity of the water was 4.8-ft and the water temperature 57°F. As part of the FPP criteria, spillbays 1 and 18 were open .3 ft to provide attraction flows to the Cascades Island and B-Branch fishway entrances. Note that these spillbays will be closed during evening hours for the purpose of conserving water at the project during this low-flow year or the fish managers make a change.

Powerhouse I – The main entrances to the powerhouse collection channel were submerged 7.8 ft with 1.2 ft head and 8.3 ft with 1.5 ft head at respective Gates 2 and 64 using the PLC readings. The readable staff gages on the north end of the powerhouse gave a channel to tailwater head differential reading of 1.9 ft. The velocity in the powerhouse collection channel was reported at 2.8 fps at the south end of the channel. The electronic meter at the north end of the channel was not working during this inspection. The five sluice gates were closed during the May inspection. The depth of water over the main Bradford fish ladder weirs was 0.9

ft, with 0.9 ft measured at the A-Branch. No reading was taken at the B-Branch fish ladder. The exit from the ladder was clear of debris as were the picketed lead sections at the counting station.

B-Branch - At the B-branch entrance, the computer system was again not operating so visual readings were taken from the staff gages. Head differential was measured at 1.6 ft during the inspection. The north side entrance was open as required. All entrance requirements were met during the May inspection at the B-Branch Fishway.

Cascades Island - The Cascades Island fishway entrance is similar in design to the B-Branch, with the main entrance operating to meet head differential of 1.5 ft. Head differential was 1.3 ft during the inspection using the staff gages. The depth of water over the ladder weirs was 1.0 ft. The computer system remained out of service, similar to the B-Branch Fishway. The head differential was slightly below the targeted head of 1.5 ft, but fell within the range of 1.0-2.0 ft. Basically, entrance requirements were met during the May inspection at Cascades Island Fishway.

WA shore fishway - The new powerhouse adult collection system operates with two entrance gates located at each end of the powerhouse. Tailwater elevation permitting the gates are operated 13 ft submerged below tailwater with the head differential between 1.0 and 2.0 ft. The South Entrance gates were submerged between 11.9 and 12.2 ft with head differential ranging from 0.5 ft to 0.6 ft. The north shore entrance gates were submerged 12.3 ft with the head differential 1.3 ft. The gate depths were on or near sill so no further depth could be attained. I found the South Entrance Gates operating well below the proper head differential of 1.0 ft minimum. From the North end of the powerhouse to the South end, the channel differential was 0.8 to 0.9 ft with the tailwater similar between the North and South ends. The result was the poor head differential reads at the South Entrance Gates. Floating orifice gates along the channel were operating satisfactorily. The water velocity meter was working during this inspection and reads ranged between 1.5 to 2.1 fps. The exit from the fish ladder was clear of debris, as were the serpentine pool sections located upstream from the fish counting station. The depth of water over the ladder weirs was 1.0 ft.

Overall, the adult fish passage facilities (main entrance gates) were operating close to criteria at the OR fishways; however, **the head differential at the WA South Powerhouse entrance was less than 1.0 ft (only 0.5 to 0.6 ft recorded)**. The computer (PLC) system at the B-Branch and Cascades Island fish ladders should be fixed and operable as soon as possible; it has not been operational during this season. Unfortunately I did not have the proper key to check the SA24 Board to compare readings for the WA shore entrance gates.

Juvenile System - Both juvenile bypass facilities were operating with all screens and orifices operating as required. The project was operating the low outfall based on tailwater elevation at the juvenile fish facility. The orifice lenses were not clear enough in some cases to determine whether the orifice flow was smooth and the orifices not plugged with debris. There were still smolts being trapped in the AWS at the New Powerhouse DSM. This should be investigated and fixed to reduce mortality in that section. The Project closed the AWS shortly after the inspection to reduce numbers of fish being trapped in that area. **One other comment passed on to the project was the large amount of Styrofoam that was in the WA shore gatewells. If this has detrimental effects on the environment or to fish health, then the Tribal fishery should consider changing their floats on gillnets located upstream of Bonneville Dam.**

The Dalles Dam - Doug Case, ODFW, completed a fish facilities inspection at The Dalles Dam on May 1. Project discharge was 163.6 kcfs with flow passing through 13 operating turbines. No spill occurred during the inspection. Both fish turbines were operating at the OR fishway with a single fish turbine operating at the WA fishway. Water temperature was 52°F with a turbidity reading of 5.0 ft

Washington Shore - Wasco PUD operates a single turbine unit that supplies water to the diffusion system and into the lower end of the fish ladder. Gate N1 was submerged 9.0 ft below tailwater elevation with the

head differential reading 1.3 ft using the Selsyns gage. The gate depth and head differential at Weir N1 were operated within the proper criteria range. The PUD trash racks required cleaning; a 0.4 ft head differential existed. Sticks were lodged in the upstream pickets and debris in the downstream picket leads. The depth of water reported over the fish ladder weirs was 1.0ft

Oregon fishway – About 4,600 cfs of water was directed to the auxiliary water supply system via the fish turbines. At the South Entrances, 1.21.4 ft of head was recorded with 8.08.2 ft and 6.5-6.7 ft of depth using the Selsyns and PLC; the FPC Sensor could not be used due to the windy conditions. The PLC readings at the East Entrances required calibration as they were almost 2.0 ft off from the FPC probe. In either case, satisfactory readings for head differential and gate depth were achieved at the East Entrances as more than 11.0 ft depth and 1.5 ft of head existed at the time of inspection. At the West Entrances, the gate depths were 9.6 ft with the head differential at 1.6 ft. The electronic velocity meter reported velocity of 2.3 fps through the collection channel.

The exit from the fish ladder was reported with a branch on the trashrack. The picket leads were clear of debris on this inspection. The depth of water over the fish ladder weirs was 1.2 ft.

The normal sluice gates, Gates 1-1, 1-2, and 1-3 were operating as required to improve juvenile fish passage conditions at the project.

Overall, the COE should calibrate their PLC system to match the Water Level Sensor Readings and channel staff gage reading. A meeting with Mir Z, a project electrician, Doug Case, ODFW, and myself took place on June 5 for the purpose of clearing up the problems noted at the South fishway entrances. We reviewed the readings Doug Case had taken earlier in the day and made direct readings with the probe versus the Selsyns Gage and PLC readings. The COE had matched the PLC with the Selsyns Gage, which was about 0.40.5 ft off from the sensor and staff gage. We pulled the Selsyns tape and found several kinks in the tape that obviously contributed to the bogus readings of the channel elevation. The COE will calibrate their entrances using the Water Level Sensors. We recommended that they check all entrance tapes to assure that there are no further problems with kinks in the tapes, etc.

John Day Dam – Doug Case, ODFW, inspected the John Day fish facilities on May 1. Project Q was 163.6 kcfs during the inspection with 11 turbine units operating. Turbidity was 2.2 ft with the water temperature at 52°F. Two north shore (WA) and three south shore (OR) fish pumps were operating to supply flow to the fishways.

OR fishway – During the inspections, the South (OR shore) fishway entrance was operating with a gate depth at SE-1 of 8.5 ft on the gage and 8.8 ft at the Panel. Head differential was 13 ft using the gage reading and 1.7 ft using the Panel. In either case, there was sufficient depth and head at the South Entrance. The two main entrances at the north powerhouse (NE1 & NE-2) were submerged about 8.4 ft with 1.35 ft average head differential. The gate depth and head differential readings were satisfactory. The panel readings varied from the gage readings by about 0.6 to 0.7 ft during the May inspection at the north powerhouse entrances. Water velocity recorded along the powerhouse collection channel averaged about 2.1 fps during the inspection. Ten floating orifice gates were operating satisfactorily along the powerhouse collection channel. The picketed lead section at the counting station had some sticks and wood chunks jammed in the pickets but the exit from the fish ladder was clear of debris (same comment as April inspection...are they cleaning the leads?). We did note sticks and woody chunks across the exit slots above the overflow weir. These should be removed; however, there is netting covering this section of the ladder and access would be difficult at best; (same comment as previous report). The depth of water over the weirs was 1.0 ft.

WA fishway – One main entrance gate is operated at the WA shore fishway. The Gage and ED readings were the same so no calibration was required. The gate depth was 8.7 ft with the head differential reading 1.1 ft. Readings from the WA shore fish ladder were as follows: the picketed lead section at the counting

station had some small debris in the pickets and the exit from the ladder was reported clear of debris. The depth of water over the fish ladder weirs was 1.1 ft

Overall, the fish passage facilities were operating within acceptable criteria at all the main fishway entrance gates. The project should calibrate the PLC to match the staff gages to assure that all readings are accurately displaying on the panel or computer system. We found these readings to vary more than 0.6 ft at the North Powerhouse Entrances.

Juvenile Fish Facility – The Smolt Monitoring facility was operating during the May inspection. The JBS screen cleaners have not worked yet this year and remain in manual operation. All gatewells were clear of debris.

McNary Dam – Larry Swenson, NMFS, completed an inspection of the fishways on May 4. Project Q was 157.5 kcfs with no spill and 14 turbine units operating. River temperature was 53°F with the turbidity reading 4.1 ft. A fishway status report was obtained prior to the inspection to compare on-site elevation readings with computer readings.

OR fishway – Three fish pumps were operating with pump angles recorded at 22 on average. About 450 cfs flow from the juvenile bypass system was joining the auxiliary water at the north end of the powerhouse collection channel. Gravity flow water from the forebay is also added in the lower end of the OR fish ladder. All auxiliary water systems were operating through the month.

The South Powerhouse and North Powerhouse entrance gates were submerged 9.1 to 9.8 below tailwater elevation, with the head differential ranging between 1.4 ft and 1.7 ft during the inspection. Both gate depth and head differential were found within proper criteria range at the powerhouse entrances. The orifice gates along the collection channel were operating satisfactorily. The velocity reported at the south end of the collection channel was close to 1.1 fps, and at the northern end of the channel it was estimated at 2.3 fps. The depth of water over the fish ladder weirs was 1.0 ft. The exit from the fish ladder had light debris on the racks with the picket leads at the fish counting facility reported clear of debris.

WA fishway – The fish turbine operated by North Wasco PUD was supplying sufficient flow to the WA shore fishway entrances to meet criteria. Entrances WFE2 and WFE-3 were operating with head differential of 1.6 ft and the Gates submerged an average depth of 9.3 ft below tailwater elevation during the inspection. The exit from the fish ladder and the picket leads at the counting station were clear of debris. The depth of water over the fish ladder weirs was satisfactory with 1.0 ft reported for the inspection.

Overall, the adult fish passage facilities were operating within normal criteria at all main entrance gates on this May inspection. The computer printout was compared with the actual on site readings and no calibration appeared necessary. Larry Swenson requested that the elevation information tags on the stilling well covers be replaced so that they can be easily read again

Juvenile Fish Facility – Debris in front of the project was recorded as being light during the inspection with most debris in front of Unit 3. The screens, orifices, and other juvenile fish facility equipment appeared to be operating satisfactorily. Larry noted that the dewatering screens immediately upstream of the juvenile separator “A” side could occasionally run dry when the separator is configured to maximize separation. He suggested that flow control hardware be improved or modified.

Priest Rapids Dam – Melissa Jundt, NMFS, was unable to complete the May inspection but will complete two inspections during June. She completed an inspection of the adult fish facilities on June 6. Project discharge was 98 kcfs; 62kcfs through spill and 36 kcfs through 4 main turbine units. Water temperature was

56°F with the turbidity reading 10.4 ft. Fish pumps (tailwater) and gravity-flow water (forebay) discharge water to a large supply pool that will distribute this water through diffusers along the powerhouse collection channel and at the main fishway entrance areas.

Left Bank Fishway – At each end of the powerhouse is a slotted entrance to attract adult fish to the powerhouse collection channel or junction pool area and to the fish ladder that leads to the forebay of the dam. Along the powerhouse collection channel are 9 operating orifice gates that are normally submerged 3 ft below tailwater and discharge about 60 cfs flow from each gate. Gate LSE-1 was recorded with 1.2 ft head differential and Gate LSE-2 with 1.0 ft head differential. Both gates were within criteria range of 1.0 to 2.0 ft but were below the target of 1.5 ft at LSE-1 and 1.25 ft at LSE-2. Water velocity reported at the eastern end of the collection channel was close to two fps, which was satisfactory. The exit from the fish ladder was reported clear of debris. The depth of water recorded over the ladder weirs was 1.0 ft.

Right Bank Fishway – A slotted entrance is located at the right bank fishway and operates continually open throughout the fish migration season. Gate RSE-1 was operating with 1.0 ft of head differential at time of inspection using the staff gage and tape for tailwater elevation. The computer readout listed the reading at 1.3 ft. The Entrance should be 1.5 ft to meet the targeted head differential. In either read, the targeted head differential was not reached; however, the head differential was between the range of 1.0 and 2.0 ft. The fish ladder exit was reported clear of debris. The depth of water recorded over the fish ladder weirs was 1.0 ft.

Overall, the project was passing much of their water through spill for protection of juvenile fish. The adult fish passage facilities were operating within criteria ranges (1.0 to 2.0 ft) but were unable to meet targeted head differentials at the Left Bank and Right Bank fishway entrances.

Wanapum Dam – Melissa Jundt, NMFS, completed an inspection of the fish facilities on June 6. Project discharge was 91.9 kcfs with 39.5 kcfs passing through spill and the remainder through 5 main turbine units. The purpose of the spill was to pass juvenile fish migrants at the project. The water temperature was reported 57°F with the turbidity similar to Priest Rapids Dam.

Left Bank fishway – Two fish pumps were operating at 163rpm average, and gravity-fed water from the forebay of the project supply water to the adult fishways. The Main Entrance gates are slotted and rely on meeting head differential criteria of 1.0 to 2.0 ft (range) with the preferred target of 1.5 ft at the SE-2 and 1.25 ft at SE-3. During this inspection, the SE-2 Gate had 1.9 ft head differential and the SE-3 Gate had 1.3 ft of head. Both readings were within criteria and met the target differential as well. Ten orifice gates were operating along the powerhouse collection channel. The water velocity was estimated at 2.0 fps. The exit from the fish ladder was clear of debris with the depth of water recorded over the fish ladder weirs at 0.9 ft.

Right Bank fishway – Gravity-fed water from the forebay of the project supplies flow to the main entrance gate (REW-2). On this inspection, the head differential measured 1.2 ft and was within a criteria range of 1.0 to 2.0 ft. Most of the spill bays (712) are open at the opposite end of the spill basin than Gate REW-2. Spill bay Gate 1 was open 1.0 ft and should have provided good attraction flow for adult fish on the Right Bank of the Columbia River. The exit from the fish ladder was clear of debris. Depth of water over the fish ladder weirs was 0.9 ft.

Overall, the fish facilities were satisfactory for the month. Melissa noted that the spill pattern was off and based upon a full pool for calculations of flow. In addition, the staff gage at the Right Bank was dirty and difficult to read.

Rock Island Dam – I accompanied Denise McCarver, WDFW, on an inspection of the fish facilities on May 23. Project discharge was 105.9 kcfs with flow passing through 7 turbine units at the new powerhouse and 1 unit at the old powerhouse. Spill for juvenile fish was on-going with about 20% of the river being spilled during this inspection. Turbidity was reported at 7.0 ft with the water temperature reading 54°F.

Left Bank fishway– Water from the immediate forebay supplies flow through the diffusion system to the two downstream entrances. The criteria ranges for gate depth (6.0 ft minimum) and head differential (2 ft) are normally met under any river flow scenario. The gates were submerged 6.9 ft below tailwater with the ΔH at 1.0 ft. The exit from the fish ladder and the picket lead section at the counting station were clear of debris. The depth of water over the ladder weirs was 1.1 ft. The research boat for the release of fish during the survival studies is moored in the tailwater next to the old powerhouse (same as previous years).

Middle fishway– Gravity-flow water is directed through the diffusion system to the downstream gate and the side entrance. The downstream gate was submerged 8.7 ft (criteria = 8.5 ft) with the ΔH reported at 1.3 ft. The side entrance is fixed-open and depends on “head” only to be within criteria. The gate depth and head differential were found within criteria ranges on the May inspection. The exit from the fish ladder and the picket lead section at the counting window was reported clear of debris during the inspection. The depth of water over the ladder weirs was 1.1 ft.

Right Bank fishway– The gravity flow water (100% open) plus three fish pumps supply water to the Right Bank fishway. The main entrances are fixed-open at 3-ft and require a head differential more than 1.0 ft to be within criteria. The RPEs were reported with 1.5 ft “head”, 1.3 ft “head” at the LPE, and 1.2 ft at the TRE (downstream) entrance. The velocity in the left powerhouse collection channel was measured at 4.3 fps. The Attraction Water jet was operating as is normal for the Right Bank fishway. The exit from the fish ladder and the picket lead section at the counting station was clear of debris during the inspection. The depth of water recorded over the fish ladder weirs was 1.1 feet.

Overall, the adult fish passage facilities were operating at satisfactory levels during the initial May inspection. One Change in Operation: At the Left Bank fish ladder count station, a trap is set up to capture and hold Bull Trout temporarily. Input from the operators indicates that it is functioning as planned. One item that was brought to the attention of Robert MacDonald, Chelan PUD biologist, was the need to place netting over the Left Bank fish ladder. We found a dead, unmarked adult spring chinook that had jumped out of the ladder.

Rocky Reach Dam– The adult fish passage facilities were inspected by Denise McCarver, WDFW, and me on May 23. Project discharge during the inspection was 106.1 kcfs with flow directed through 8 main turbine units, including Unit 11. No spill was occurring during this inspection. Water temperature was 53.4°F with the turbidity reading 7 ft. Three fish pumps were operating at 43% open and supplying about 790 cfs pumped flow to the fishway. The main spillway entrance was offline and will not be opened unless spill occurs.

Fishway Entrances-The left powerhouse entrance gates are operated to maintain a minimum gate depth of 10 feet or more, while the right powerhouse entrances are fixed open at 3-ft. Two entrance gates were operating at the right powerhouse (RPE1 and RPE-2) and two at the left powerhouse (LPE1 and LPE-2). The LPEs were submerged 12.7 ft with a head differential of 1.1 ft; while the right powerhouse entrances had satisfactory “head” with 1.0 ft recorded. Velocity through the transportation channel was 1.7 fps. The exit from the fish ladder and picket lead section was clear of debris. The depth of water over the ladder weirs was 1.0 ft. Orifice gates operating along the collection channel were in slots 1, 2, 3, 14, 16, and 20.

Overall, the fishway was operating at satisfactory criteria levels relating to gate depth and head differentials at the main entrance gates. The surface collector was operating with some sampling occurring at the bypass during this inspection. A trapping system, linked to the fish counting window, was in place and several bull trout have been successfully captured to date.

Wells Dam – I accompanied Ace Trump, WDFW, during the inspection of the Wells Dam adult fish facilities on May 24. Project discharge was 74 kcfs with 5 of 10 main turbine units operating. Spill for juvenile fish protection was 6.1 kcfs for the inspection. River temperature was 53.4°F with the turbidity reading 9.5 ft. As is normal for an inspection, readings from the control room are taken which includes the hydraulic data and turbine/spill operations that are occurring at time of inspection. After that information is recorded, the inspector and an operator with a radio go to the east or west entrances and record the staff gage, deck gage, and call the control room operator to obtain the computer readings for the channel and tailwater elevations. These readings should come within 0.2 ft on a normal inspection.

East and West fishways– At the Wells project, both the east and west fishways are of similar design. Two fish pumps are located on each shore and supply attraction flow to the fishway entrances. The downstream gate operates at 8ft open with head differential targeted for 1.5 ft at both fishway entrances. At the **East** fishway, the channel elevation measured the same for the Control Room, the deck gage, and the staff gage and the tailwater elevation also measured the same. The readings gave a head differential of 1.4 ft for three separate measures. Depth of water over the ladder weirs was 1.3 ft (on the high side). The east fish ladder reported a differential through the exit pool to the forebay of 0.7 ft. The normal head through that exit trash rack ranges from 0.5 ft to 0.8 ft. Trapping for Bull Trout was also occurring at Wells Dam at the East Ladder Trapping Facility on a 3/day per week basis until they obtain the set quota. At the **West** fishway, the deck gage, the computer reading, and the staff gage were within 0.1 ft with the head differential measured at 1.4 ft. In forty minutes, the tailwater elevation changed almost 3.0 ft and the automated system was still able to maintain the head differential of 1.4 ft so the system apparently can handle wide swings in tailwater and still maintain criteria. At least in this case the fishway control system responded quickly to the large elevation change that occurred while on-site. The Wells project still drops flow in the fish ladder to clean the fish counting windows. Such was the case during this inspection. The staff gage reading of depth of water over the weirs and the exit from the west bank fish ladder were not recorded. This window cleaning process takes about one hour to complete and water back up the fish ladder. The attraction flow to the West fishway was not affected (1.4 ft head), but the fish ladder passage and counting would be interrupted for an hour per side.

Overall, the fish facility operation was within the desired flow range through the main fishway entrances; no calibration of the fishway entrances was required for the May inspection. Bull trapping operation was proceeding with little interruption to adult chinook salmon passage at the facility. **As an aside, it would be beneficial to have the biologists from Douglas PUD determine whether there is a “best” time during the day or night to clean the count windows and have least impact on the adult passage at the project.**

Ice Harbor Dam - I accompanied Steve Richards, WDFW, during the May 16 inspection of the Ice Harbor fish facilities. Project discharge was 91.1 kcfs with all 6 main turbines operating to pass inflow; there was no spill occurring during the inspection. The turbidity reading was 5.2 ft with the water temperature 53°F.

South Shore fishway– All eight electric pumps and 200-cfs flow from the juvenile bypass system were operating to supply water to the south fishway. The South Shore entrance was operating with 1.8 ft of “head” and the gate submerged 7.2 ft. The Computer Status Report showed the Entrance operating with 1.1 ft head differential and 8.2 ft of depth. **Based on these differences, the Project should check their settings to assess where the on-site differences in readings are occurring at the South Shore Entrance.** The north powerhouse gate required no calibration as the computer printout was within 0.1 ft for the elevations measured. The NPE was recorded with 1.1 ft of “head” and the gate submerged 11.9 ft below tailwater. The channel velocity was reported more than 2.0 fps at the electronic gage. Seven orifice gates were operating along the powerhouse collection channel. The exit from the south fish ladder and picket lead section near the counting station was clear of debris on this inspection. The depth of water over the south fish ladder weirs was 1.0 ft.

North Shore fishway– Three fish pumps were operating at the north shore and supplying water to the north shore fishway entrance. The entrance gate was submerged 8.7 ft below tailwater elevation with the head differential at 0.5 ft using the staff gage, and 7.9 ft submerged with 1.3 ft head differential using the display (LED). The snapshot computer printout reported head differential of 0.7 ft and an 8.0 ft depth. **Overall, the North Shore should be calibrated to bring the readings in sync.** The exit from the north fish ladder and the picketed lead section at the counting station was also clear of debris. The depth of water over the fish ladder weirs was 1.0 ft.

Overall, the adult fish facilities may have been operating at satisfactory levels depending on which reading was used. **The Project should assure that the Entrance Readings are calibrated as soon as possible** The juvenile fish facility and components appeared to be operating satisfactorily on this inspection.

Lower Monumental Dam– Steve Richards, WDFW, and I inspected the fish facilities on May 16. Project discharge was about 91 kcfs with Units 1, 2, 46 operating and no spill occurring during this inspection. River temperature was 58°F, with the turbidity reading 4.2 feet.

North Shore fishway– Three turbine driven fish pumps operating at 73 rpm average and about 200 cfs excess juvenile bypass flow were supplying water to the north and south shore fishway entrances and powerhouse collection channel. The north shore entrances were submerged 8.2 ft average depth with the “head” measured at 1.4 ft. No orifice gates are operating along the collection channel in 2001. The collection channel velocity was estimated at more than 2.0 fps. The south powerhouse entrances were on sill and submerged 9.7 ft with 1.1 ft of “head”.

The exit from the north fish ladder was reported clear of debris, as was the picketelead section at the counting station. The depth of water over the fish ladder weirs was 1.1 ft.

South Shore fishway– The north shore fish pumps supply flow to the south fishway entrances along with about 80 cfs flow from the fish ladder. One entrance is a fixed-open gate that remains 6 ft open while the other gate is to be submerged 8.0 ft or more to be within criteria. On this inspection the adjustable gate was submerged 8.3 ft and had 1.5 ft “head”. The digital display showed the gate at 8.0 ft submerged with 1.7 ft head differential. The exit from the south fish ladder and the picket lead section at the fish counting station was clear of debris. The depth of water recorded over the fish ladder weirs was 0.9 ft on the south ladder.

Overall, the adult fish passage facilities were found operating with head differentials and gate depths within satisfactory criteria ranges. In addition, the computer system and reports were close in elevation readings to the on-site staff gage and gate elevation readings, thus no calibration of the system was required. The Juvenile fish facilities were operating satisfactorily on this inspection with gatewells clear of debris and no report of other problems such as blocked orifices, etc.

Little Goose Dam – Josh Hanson, ODFW, and I inspected the adult fish facilities on May 16. Project discharge was 95.6 kcfs with flow through Units 13, 5 and 6. Water temperature was 55.2°F with the turbidity reading of 4.0 ft. Three turbine-driven pumps operating at 73-rpm average, and excess flow from the juvenile bypass system, were supplying water to the adult fishway. The South Shore fishway entrances [SSE-1 and SSE-2] were submerged about 9.9 ft average depth with the head differential at 1.6 ft using the staff gage reading, and 10.2 ft depth and 1.2 ft head differential using the FSC Board Reading. Channel velocity recorded at the south end of the channel registered about 1.0 fps, with the velocity up to 1.7 fps at the north shore channel. Orifice gates along the powerhouse collection channel remained closed for the 2001 adult migration season. The North Powerhouse entrances were on sill with the gates submerged an average of 7.85 ft with the “head” at 1.3 ft using the FSC Board reading and 1.5 ft using the staff gage. The North Shore Entrances were submerged 6.0 ft deep with the “head” at 1.2 ft using the staff gage reading and 1.4 ft using the FSC Board reading. The exit from the fish ladder and the picket lead section at the counting station was visually clear of debris on this inspection. The depth of water over the ladder weirs was 1.1 ft.

Overall, the velocity reported at the South end of the collection channel was 1.0 fps and was less than the 1.5 fps called for in the FPP. The main entrance gates were within satisfactory criteria limits. Most of the staff gage readings and the FSC Board readings were close to matching but should be checked to assure that the readings remain 0.2 ft or less between them.

Lower Granite Dam– Josh Hanson, ODFW, and I completed an inspection of the adult fish facilities on May 17. Project discharge was 93.7 kcfs with all six main turbine units operating. Water temperature was 51.8°F with the turbidity reading at 2.8 ft. Two electric fish pumps were supplying flow to the adult fishway entrances and powerhouse collection channel. The South Shore entrances were submerged an 8.1 ft average depth with ΔH of 1.9 ft using the staff gage and 1.9 ft using the FSC Board readings. The North Powerhouse entrances were submerged an average of 7.6 ft with ΔH of 1.2 ft using the staff gage and the FSC Board reading. The weirs were resting on sill at the NPEs so no further depth could be attained. The velocity in the powerhouse collection channel was about 0.9 fps at the south end of the powerhouse collection channel and 2.1 fps at the North Shore. Four orifice gates operate along the powerhouse collection channel [1, 4, 7 and 10]. At the North Shore, Gates NSE1 and NSE-2 were submerged 7.25 ft below tailwater elevation using the FSC Board reading with the head differential reading 1.1 ft. The exit from the fish ladder was reported clear of debris as was the picket lead section at the counting station. The depth of water over the fish ladder weirs was 1.1 ft.

Overall, this May inspection showed the adult facilities operating at or near satisfactory conditions given the tailwater elevations. There remains no staff gage or other site gage to measure the North Shore Entrance (tailwater elevation). The velocity at the south end of the powerhouse collection channel was about 0.9 fps and falls below the 1.5 fps minimum criterion. We observed some of the adult trapping and handling at the trap and observed a small test using CO₂ as the anesthetizing agent. We also observed adult steelhead kept at the juvenile sampling site.