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MEMORANDUM

TO: Salmon Managers
Fishway Inspectors
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Chuck Peven, Chelan PUD
Chris Carlson, Grant PUD
Cal Sprague, COE Portland District
Rex Baxter, COE Walla Walla District

FROM: Larry Basham

DATE: September 10, 2002

RE: **Fishway Inspections – August 2002**

State and federal inspectors completed inspections at the lower and upper Columbia River and Snake River dams in August at all projects. I completed fishway inspections with the NMFS at Priest Rapids and Wanapum dams and substituted for NMFS at Bonneville during the month.

Summer flows and spills remained fairly high in the Columbia and Snake River basins in August. Water temperatures have moderated somewhat at Snake River projects as well as the lower Columbia River and adult fish passage has been fairly consistent for chinook salmon with steelhead holding in tributaries and cooler waters in July and August. Overall, most fish facilities were reported operating with few out of criteria problems during the month. The Snake River projects operated with entrance weirs on sill for most of the summer and fall. This means that gate depths will be reduced at these projects. Problems as a result of pumps or fish turbines out of service have been minimal this season.

Bonneville Dam – I completed an inspection of the adult and juvenile fish facilities on August 22. River Q was 150.1 kcfs with about 76.1 kcfs spill. For the season, the WA Powerhouse will be prioritized for turbine operations. A test of daytime spill quantities will be ongoing through the end of August. New spill patterns have been developed for the season. Water turbidity was 7.0 ft with the water temperature at 66°F for the August inspection.

Powerhouse I – At the South end of the powerhouse collection channel Main entrance Gate 2 was submerged 7.8 ft with the head differential at 1.2 ft. Weir Gate 64, located on the North end of the powerhouse was submerged 8.3 ft with the head differential at 1.3 ft. The staff gage reading on the north end of the powerhouse

was difficult to read, but was within 0.2 ft of the PLC reading. The water velocity in the south end of the powerhouse collection channel was reported at 2.4 fps; no reading was taken on the north end of the channel. The five sluice or orifice gates were operating satisfactorily during the inspection. The depth of water over the main Bradford fish ladder weirs was 1.2 ft, with 1.4 ft measured at the A-Branch and 1.2 ft at the B-Branch fish ladder for the August inspection. The exit from the ladder and the picketed lead section at the count station was fairly clear of debris and head loss across the leads was satisfactory.

B-Branch - The computer system was not operating during the August inspection and readings were taken from the staff gages. Head differential was reported at 1.4 ft, near the target of 1.5 ft. The north and main downstream entrances were operating to attract adult fish to the B-Branch fish ladder.

Cascades Island - The Cascades Island fishway entrance is similar in design to the B-Branch. The computer system remained out of service, similar to the B-Branch Fishway. The downstream and south entrances were operating this month. Head differential was 1.6 ft during the inspection and fell within the criteria of 1.0 ft-2.0 ft. The depth of water over the ladder weirs was 1.2 ft.

WA shore fishway –Two small fish turbines supply about 5,000 cfs of water to four main entrance gates, two at each end of the powerhouse, and 12 floating orifice gates along the collection channel. Tailwater elevation permitting, the gates are operated 13 ft submerged below tailwater with the head differential between 1.0 and 2.0 feet and a targeted head of 1.5 feet.

The South Entrance gates were submerged 12.1 ft average with corresponding head differential of 1.2 ft at the upstream and downstream entrances. The north shore entrance gates were submerged about 12.45 ft average below tailwater with the head differential for the upstream and downstream entrance at 1.4 ft and 1.3 ft (estimated), respectively. The floating orifice gates along the channel were operating satisfactorily. The water velocity meter was not inspected during the August inspection. The exit from the fish ladder was clear of debris; however, the over flow section located upstream from the fish trapping station had one log wedged in the fish ladder. The depth of water over the ladder weirs was 1.2 ft.

Overall, 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 for this season. All fish ladders were operating according to shad passage season with depth over the weirs at 1.3 ft ±0.1 ft. The changeover to 1.0ft ±0.1 ft was August 16. The project biologist was notified of the need to change criteria for the remainder of the fish passage season. Staff gages required cleaning at the old and new powerhouse. Visual readings were impossible at some locations.

Juvenile System – The WA shore juvenile bypass facility was operating with all screens and orifices as required. The project was operating the low outfall. The ice/trash sluiceway was operating at the old powerhouse (10c and 7a were open). The flow in the old powerhouse is running south so all fish will be exiting through the ice/trash sluiceway till the end of the fish passage season.

The Dalles Dam – Doug Case, ODFW, completed an inspection of the fish facilities at The Dalles Dam on August 16. Project discharge was 130.4 kcfs with 53.1 kcfs spill. Two fish turbines were operating at the OR fishway with a single fish turbine operating at the WA fishway. Water temperature was 69°F with the turbidity reading at 4.5 ft**.** When spill occurs for juvenile fish enhancement, the Northern spillbays (1-13 on this inspection) are prioritized.

Washington Shore - Wasco PUD operates a single turbine unit that supplies water to the diffusion system in the lower WA shore fish ladder and then through main entrance Gate, N-1 to the tailwater. Gate N-1 was submerged 9.4 ft below tailwater elevation with a head differential reading of 1.4 ft. The gate depth and head differential at Weir N-1 was operated within the proper criteria range for the August inspection. The PUD trash

racks had 0.1 ft head differential. The depth of water reported over the fish ladder weirs was 0.9 ft. The picketed leads at the count station and the north ladder exit were reported mostly clear of debris; however, some sticks were on the upstream and down stream pickets at the count station.

Oregon fishway – About 4,460 cfs of water was directed to the auxiliary water supply system via the fish turbines. The South Entrance cables on Gate S-2 were broken prior to mid March inspection date and, Gate S-2 remained bulkheaded off. Gate S-1 was submerged 7.6 ft below tailwater elevation and the head differential was 2.5 ft. The project will repair these entrance gates during the winter maintenance period.

At the West Entrance, Gates W-1 and W-2 were submerged 6.85 ft average depth with the head differential at 1.9 ft. The gates should have been lowered to reach the minimum gate depth of 8.0 ft as the head differential was at 1.9 ft during the August inspection. The electronic velocity meter has been out of service for the season; however, estimated water velocities for the inspection ranged from 2.0 fps to 3.0 fps through powerhouse transportation channel.

The East fishway entrance has two operating gates, E-2 and E-3. These gates were submerged 10.25 ft average depth with the head differential at 2.2 ft. These gates are pushing out a large quantity of attraction flow for the adult fish approaching the eastern end of the powerhouse. Gate depths were satisfactory but the head differential fell slightly above the desired criteria range of 2.0 ft for this August inspection.

The exit from the fish ladder was clear of debris with aquatic vegetation building up on the pickets creating 0.2 ft differential between the upstream and downstream pickets. The project was cleaning the pickets on a daily basis or as needed with the amount of vegetation in the fish ladder. The depth of water over the fish ladder weirs was 1.1 ft and this reading was satisfactory.

The normal sluice gates, Gates 1-1, 1-2, and 1-3, were operating as required for juvenile fish passage at the project. The North shore juvenile fish facility was operating satisfactorily in bypass mode as well.

Overall, the COE should continue repair and assure functionality of their PLC system so that operation of the fishways can be calibrated. The South and West Entrances required adjustments to improve depth/head requirements.

John Day Dam – Doug Case, ODFW, inspected the John Day adult and juvenile fish facilities on August 16. Project Q was 161.3 kcfs with the spill level 47 kcfs during this inspection. Turbidity was 4.0 ft with the water temperature reported at 69°F. Three north shore (WA), and three south shore (OR), fish pumps were operating for the inspection. For most of the season, fish facility equipment has worked satisfactorily.

OR fishway – During this inspection, the South (OR shore or SE-1) fishway entrance was operating with the gate depth at 8.8 ft on the gage and 9.0 ft at the panel. Head differential was 1.1 ft using the staff and panel reading. The gate depth and head at the South Entrance met criteria. The two main entrances at the north powerhouse (Gates NE-1 & NE-2) were submerged from 8.5 to 8.9 ft using the gages and 8.1 ft submerged using the panel reading. Head differential was 1.2 ft using the staff gage and 1.4 ft using the panel gage. All gate depths and head differentials fell within the criteria range for the North Powerhouse Entrances. Water velocity recorded along the powerhouse collection channel averaged about 1.9 fps for the August inspection. Ten floating orifice gates were operating satisfactorily along the powerhouse collection channel. The picketed lead section at the counting station and the exit from the fish ladder was clear of debris during this inspection. The depth of water over the weirs was 1.0 ft.

WA fishway – Gate N-1 and Gate N-2 were operating at the WA shore fishway. The Gage and LED readings were within 0.1 ft so no calibration was required during this inspection. The gate depth was 8.0/8.3 ft with the head differential reading 0.6 & 0.5 ft at the staff gage and LED gage. Both readings showed the head differential to be well below the minimum reading of 1.0 ft. Readings from the WA shore fish ladder were as

follows: the picketed lead section at the counting station and the exit from the fish ladder were clear of debris. The depth of water over the fish ladder weirs was 1.1 ft.

Overall, the OR fishway was operating close to criteria at the fish ladders and main entrance gates with the WA fishway entrance gates (2-operating) with the required depth, but with about ½ the required head differential for the August inspection. We were unsure as to why both entrance gates were operating. Normally the criteria call for 1-gate operation.

As an add-on, one fish pump on the OR fishway was out of service for 3 days and head differentials/gate depths were slightly less than criteria according to the Project Biologist.

Juvenile Fish Facility – The Smolt Monitoring facility was operating satisfactorily.

McNary Dam – Larry Swenson, NMFS, completed an inspection of the fishways on August 27. Project Q was 145.6 kcfs with no spill at time of inspection. River temperature was 68°F with turbidity reading at 5.2 ft. A fishway status report was obtained prior to the inspections to compare on-site elevation readings with computer readings.

Oregon Fishway – Three fish pumps were operating with pump angles recorded at 19° to 22°. About 450 cfs water Q from the juvenile bypass system is added to the powerhouse collection channel flow at the north end of the powerhouse, near the North Entrance gates. Gravity flow water from the forebay is also added in the lower end of the OR fish ladder. All auxiliary water systems were operating this month.

The South Powerhouse and North Powerhouse entrance gates were submerged 9.2 ft and 9.5 ft. respectively, below tailwater elevation, with the head differential reading 1.3 ft at the South and North Powerhouse entrances. Gate depths and head differentials were found within proper criteria range at the Oregon fishway entrances. Three of the orifice gates along the collection channel were overtopped with water during the inspection. The velocity reported at the south end of the collection channel was about 1.2 fps, and at the northern end of the channel it was near 3.9 fps. The depth of water over the fish ladder weirs was 1.1 ft. The exit from the fish ladder was reported with light debris with the fish counting facility reported clear of debris.

Washington Fishway – The fish turbine operated by North Wasco PUD was supplying sufficient flow to the WA shore fishway entrances to meet criteria requirements. Entrances WFE-2 and WFE-3 were operating with head differential of 1.5 ft and the gates submerged an average depth of 9.5 ft during the inspection. The exit from the fish ladder was clear of debris during this month's inspection. The picketed leads were also clear of debris. The depth of water over the fish ladder weirs was 1.1ft for the August inspection.

Overall, the adult fish passage facilities at the OR and WA fishways were operating within normal criteria at main entrance gates with sufficient head differential and gate depth reported. Several floating orifice gates were overtopped with water.

Juvenile Fish Facility – Debris in front of the project was basically reported as very light. No reports were received of problems or mortality due to water temperatures this summer to date. One orifice illumination lamp was burned out.

Priest Rapids Dam – I accompanied Marc DeHart, NMFS, during the August 20 inspection of the adult fish facilities at Priest Rapids Dam. Project discharge was 81.6 kcfs with no spill occurring during the inspection. Water temperature was 67.4°F with the turbidity reading 10.2 ft. Five fish pumps (tailwater) and gravity-flow water (gravity intake gate 6.7 ft open) supplied flow to the supply pool. This pool normally maintains about 6.5 ft head above the tailwater elevation.

Left Bank Fishway – At each end of the powerhouse, a slotted entrance is open to attract adult fish into the fishway/channel that leads to the fish ladder. Gate LSE-4 was recorded with 1.3 ft head differential and Gate LSE-2 with 1.4 ft head differential. Both gates were within criteria range of 1.0-2.0 ft. The LSE-2 met the target differential this month, with the LSE-4 within 0.2 ft of the targeted differential of 1.5 ft. Water velocity reported at the eastern end of the collection channel was nearly 1.2 fps. For the 2nd month in a row, water velocity through that section of the channel was less than the normal for the season. The project was planning to check whether there had been diffuser changes made that might slow flows through that end of the channel. The exit from the fish ladder was reported clear of debris during this inspection. The depth of water recorded over the ladder weirs was within criteria and reported at 1.2 ft.

Right Bank Fishway – Slotted entrance (RSE-1) was operating with 1.4 ft head differential and was within satisfactory range and near target. The fish ladder exit was reported clear of debris, and the picketed leads at the counting station were also clear of debris. The depth of water recorded over the fish ladder weirs was 1.0 ft.

Overall, the adult fish passage facility was operating within criteria ranges (1.0 to 2.0 ft) at the main entrance gates when checking the computer reading and readable staff gages and the newer sensor gages. A velocity meter is required to accurately assess flows through the powerhouse channel.

Wanapum Dam – Marc DeHart, NMFS, and I completed an inspection of the adult fish passage facilities at Wanapum Dam on August 20. Project discharge was 99 kcfs with 1.4 kcfs spill (sluice) and the remainder through the nine operating turbines. Water temperature was reported at 66°F.

Left Bank Fishway – Two fish pumps were operating at 140-rpm average and supplying sufficient flow volume to the adult fishway. 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 LSE-2 and 1.25 ft at LSE-3. During the August inspection, the LSE-2 Gate had 1.7 ft and the LSE-3 Gate, 1.3 ft head differential. Both readings were within the proper range and met target differential at both entrance gates. Water velocity was estimated at nearly 2.0 fps at the East end of the channel and maintained that velocity through the channel toward the West entrance (LSE-3). The exit from the fish ladder was reported clear of debris. The depth of water recorded over the fish ladder weirs was 1.1 ft during the inspection.

Right Bank Fishway – Gravity-fed water from the forebay of the project supplies flow to the main entrance gate (RSE-2). The head differential was measured at 1.3 ft and was within the criteria range of 1.0 to 2.0 ft but less than the targeted head of 1.5 ft. The exit from the fish ladder was clear of debris. Depth of water over the fish ladder weirs was 1.1 foot.

Overall, fishways were operating within acceptable criteria range during the August inspection. In addition, the project should complete work on their video counting so that assessment of passage can be gathered at Left and Right Bank fish ladders on a real time basis. This would be beneficial to better assess whether fish are being delayed due to spill pattern changes, etc., that might occur during a year.

Rock Island Dam – Glen Liner, WDFW, completed an inspection of the adult fish facilities on August 29. Project discharge was 172.2 kcfs with no spill occurring during the inspection. Spill ended on August 26 for the season. All eight turbine units at the new powerhouse and five of 10 turbine units at the old powerhouse were operating. Turbidity was reported at 14.2 ft with the water temperature reading 68.2° F.

Left Bank Fishway – Water from the immediate forebay supplies flow through the diffusion system to the two downstream entrances. Gate depth criterion is: 6.0 ft minimum depth with the head differential maintained between 1 - 2 ft. The gates were submerged 6.65 ft (average) below tailwater with the ΔH at 1.3 ft during the inspection. 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. All readings at this fishway were satisfactory.

Middle Fishway – Gravity-flow water from the forebay of the project is directed through the diffusion system to the downstream gate and the side entrance. The downstream gate was submerged 8.6 ft (criteria = 8.5 ft or >) with the ΔH reported at 1.1 ft. The side entrance is fixed-open and depends on "head" only to be within criteria. The gate depth and head differential was within proper criteria range during the inspection. The exit from the fish ladder and the picket lead section at the counting window was reported clear of debris. 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 attraction water jet was operating as required. The main entrances are fixed-open at 3-ft and require a minimum head differential of 1.0 ft to be within criteria. The RPEs were reported with 1.0 ft "head", 0.9 ft "head" at the LPE and at the TRE (downstream) entrance during the August inspection. The tailwater elevation was nearly 574 ft elev., and even with the attraction water pumps operating at 100% and the RO4 valve open 100%, the head differential at the LPE and TRE gates still were slightly below the minimum criteria level for head differential of 1.0 ft. The water velocity in the left powerhouse collection channel was 4.1 fps. The exit from the fish ladder and the picket lead section at the counting station was clear of debris. The depth of water recorded over the fish ladder weirs was 1.1 feet.

Overall, the adult fishway entrances were satisfactory at the Left and Center Fishway, but less than minimum criteria of 1.0 ft head differential was maintained at two of the Right Fishway Entrances (Same as noted in the July inspection).

Rocky Reach Dam – The adult fish facilities were inspected by Glen Liner, WDFW, on August 30. Project Q was 149.7 kcfs with all 11 main turbine units operating; there was no spill during the inspection. The water temperature was 66.2°F with the turbidity about 18 ft. The project was operating three fish pumps at 55% open and flow was distributed to the LPEs, RPEs, and the spillway entrance.

Fishway Entrances -The left powerhouse entrance gates (LPE-1 and LPE-2) were submerged 10.8 ft below tailwater elevation with the head differential at 1.1 ft during this inspection. Entrance depth (10-ft or >) and head differential (1-2 ft) criteria standards were met. The right powerhouse entrances (RPE-1 and RPE-2) are fixed-open at 3-ft and must maintain head differential between 1 and 2-ft to meet criteria standards. The RPEs were reported with 1.0 ft head differential and met the criteria standards. The spillway entrance, MSE was operating with gate depth of 10.7 ft with the head differential at 1.0 ft. The same criteria of gate depth and head differential as for the LPEs applies for the Spillway entrance. The head differential was satisfactory during this month's inspection. Water velocity through the transportation channel was reported at 1.65 fps. The exit from the fish ladder and picket lead section was clear of debris. The project cleaned the turbine pump intake screens on 8/28. 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 all main powerhouse entrances as well as at the Spillway entrance gate.

Wells Dam – Stewart Mitchell, WDFW, inspected the adult fish facilities on August 28. Project discharge was 190 kcfs with 9 of 10 main turbine units operating; there was no spill for this inspection date. River temperature was 68°F with the turbidity reading 15.0 ft. To assess calibration of the computer readings, staff gages and deck sensor gages located at the entrance gates are read and recorded. These readings are then compared to the computer readings that are simultaneously phoned in from the shift operator. The readings should come within 0.2 ft of each other to assure calibration of the computer system 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 8-ft open with head differential targeted for 1.5 ft at both fishway entrances.

At the **East** fishway, the channel and tailwater elevations were within 0.2 ft of each other with the deck and staff gages and computer reading. The head differentials from the deck gage and staff gage read 1.5 ft, and the computer reading was 1.4 ft. Depth of water over the ladder weirs was 1.0 ft. The east fish ladder reported a differential through the exit pool to the forebay of 0.9 ft. The normal head through that exit trash rack ranges from 0.5 ft to 0.8 ft so the reading was 0.1 ft above the normal expected differential.

At the **West** fishway, all measuring gages and computer readings were within 0.1 ft for channel and tailwater elevations. The head differential measured was 1.4 ft for the staff gage, 1.3 ft for the deck gage, and 1.4 ft for the computer. The end gate was set at 8.0 ft open. The depth of water over the fish ladder weirs was 1.2 ft. The exit from the west bank fish ladder was 0.7 ft.

Overall, the adult fish facilities were found operating near the targeted head differential of 1.5 ft at the west and east fishway entrance gates. The depth of water over the ladder weirs was nearly normal during this inspection. The project is planning to repair problem valves or screens in the fish ladder that have caused the higher than required depth of water at both ladders during the season.

Ice Harbor Dam – Steve Richards, WDFW, completed an inspection of the adult fish facilities on August 28. Project Q was 29.5 kcfs with flow through 3 main turbine units during the inspection. Water temperature was 67°F with turbidity reading of about 6.5 ft. Eight pumps were operating and supplying water to the South Shore and three pumps to the North Shore fishway. In addition about 250 cfs of excess flow from the juvenile bypass system is continually shunted to the South fishway whenever the bypass system is operated.

South Shore – The South Shore entrance was submerged 7.1 ft below tailwater with head differential at 1.1 ft. The North powerhouse entrance was submerged 7.9 ft with 1.3 ft head differential. Seven orifice gates were operating along the powerhouse collection channel. The water velocity through the powerhouse collection channel was reported as >2.0 fps. The South shore entrance gate was not on sill and was almost a foot less than required on this inspection date. The North powerhouse entrance gate was operating near sill during the inspection with the head differential reported at 1.3 ft. The fish ladder was reported with 1.1 ft depth of water over the weirs during the inspection. The exit trash rack and picketed leads at the count station were reported clear of debris. The head loss across the picketed leads at the counting station was even with no head loss.

North Shore – The North Shore entrance was submerged 6.5 ft with 1.9 ft head differential using the staff gages and 6.2 ft with 1.2 ft head using the LED display for the August inspection. The gate depth was much better than shown during the previous inspection. The elevation of the channel reading for the LED and the staff gage reading varied by 0.4 ft and would suggest that calibration of the system would be required. The fish ladder had 1.0 ft depth of water over the weirs and was satisfactory. The exit trash rack and picketed leads were clear of debris on this inspection date.

Overall, the project was operating less than satisfactory at the south main fishway entrance. The North Shore tailrace staff gage is in need of repair. Potentially, the NPW should consider closing all or a portion of the orifice gates at the project during the summer months when head differentials and gate depths are reduced to assure that they can meet criteria. The PLC and control systems must be improved through the winter maintenance period.

Lower Monumental Dam – Steve Richards, WDFW, inspected the adult and juvenile fish facilities on August 29. Project Q was 40.4 kcfs (two main turbine units operating) with no spill during the inspection. Water temperature was 69°F with the turbidity reading at >5.0 ft. Three turbine-driven pumps operating at 74-rpm average and excess flow from the juvenile bypass system were supplying attraction water to the adult fishway.

North Shore – The entrance gates were submerged 8.1 ft below tailwater elevation with the head differential reading 1.9 ft for the inspection. The North Shore entrances were on sill. The South Powerhouse entrance gates

were on sill and submerged 6.7 ft and maintained head differential of 1.4 ft. The water velocity through the powerhouse collection channel was recorded at 1.7 fps. All readings taken at the North shore entrance gates were considered satisfactory as the head differential fell within the range of 1.0 to 2.0 ft and the gate depth was more than the 8.0 ft minimum. The south powerhouse gates were on sill so no further depth could be attained; however, the head differential was 1.4 ft and attraction flows should have been satisfactory. The north fish ladder was reported with 1.1 ft depth of water over the ladder weirs. The picketed lead section at the count station as well as the exit from the fish ladder was clear of debris.

South Shore – Flow to the South Shore entrance gates is provided from the North Shore water supply source plus the South fish ladder flow. The gate depth at SSE-1 was 7.9 ft with the corresponding head differential at 1.3 ft. Gate SSE-2 is a continuous open gate with a 6-ft opening. Gate SSE-1 was on sill so no further depth could be attained at the entrance gate. The south fish ladder was reported with 1.1 ft of water over the ladder weirs. The picketed leads and the exit from the fish ladder were clear of debris during the inspection.

Juvenile System - All gatewells and operating orifices were clear of debris.

Overall, the adult fish facilities were operating within acceptable criteria ranges for the August inspection as all gates were on sill.

Little Goose Dam – Josh Hanson, ODFW, inspected the adult fish facilities on August 16. Project discharge was 39.4 kcfs with two main turbine units operating; no spill occurred during the inspection. Water temperature was 68.0°F with the turbidity reading >6.0 ft. Three turbine-driven pumps were operating at 71-rpm average. Excess flow from the juvenile bypass system also supplies water to the adult fishway.

The South Shore fishway entrances, SSE-1 and SSE-2, were on sill and submerged 9.0 ft with 1.8 ft head differential using the staff gage and 8.8 ft and 1.9 ft head using the FSC Board readings. Channel velocity recorded at the south end of the channel registered about -0.1 fps. The water velocity was reported at 2.6 fps at the north shore channel. North Powerhouse entrance gates, NPE-1 and NPE-2 were on sill and submerged 5.95 ft deep with the head differential at 1.6 for the August inspection. The North Shore Entrances, NSE-1 and NSE-2 were submerged 6.05 ft average with the "head" at 1.5 ft with the FSC Board for the month. The tailwater staff gage was readable this month and was within 0.1 ft of computer reading. The exit from the fish ladder and the picket lead section at the counting station appeared clear of debris; however, the differential was up to 0.2 ft between the upstream and downstream pickets. The depth of water over the ladder weirs was 1.2 ft.

Overall, the water velocity reported at the South end of the collection channel indicated that the velocity meter was not functioning. All South shore and North powerhouse entrance gates were on sill.

Lower Granite Dam – Josh Hanson, ODFW, inspected the adult fish facilities on August 20. During the inspection, project Q was 29.8 kcfs with flow passing through two main turbine units; no spill occurred during the inspection. Water temperature was 67.2°F (taken at the count station) with the turbidity reading at 5.0 ft. Two electric fish pumps (1 and 2) were supplying flow to the adult fishway entrances and powerhouse collection channel.

The **South Shore** entrances were submerged 8.2 ft average and ΔH of 1.6 ft and 1.8 ft for the respective staff and FSC Board readings. The **North Powerhouse** entrances were on sill so no further depth could be attained during the inspection. The weir depth was 7.0 ft using the FSC reading and 6.9 ft using the staff gage tailwater reading. The ΔH was 1.1 ft using staff gage and 1.0 ft using the FSC Board readings. The velocity in the powerhouse collection channel was about 1.0 fps at the south end of the powerhouse collection channel and 1.8 fps at the North Shore. Four orifice gates were operating along the powerhouse collection channel [1, 4, 7 and 10]. At the **North Shore**, Gates NSE-1 and NSE-2 were submerged 5.6 ft and 6.6 ft below tailwater elevation with the head differential reading of 0.9 ft using the FSC Board reading. The staff gage reading was 0.5 ft different from the FSC reading and should be rechecked for accuracy.

The exit from the fish ladder was reported clear of debris; the picket lead section at the counting station was reported with 0.1 ft head across the pickets and was clear of debris. The depth of water over the fish ladder weirs was 1.2 ft during the inspection.

Overall, the NPEs were on sill during the August inspection so no further depth could be attained there. The water velocity at the south end of the collection channel was less than the 1.5 ft minimum criteria. The NSEs were submerged less than the required 7.0 ft depth. Head differentials were satisfactory at the South Shore and North powerhouse entrances and less than 1.0 ft at the North shore entrance (0.9 ft was reported).