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: August 6, 2001

RE: **Fishway Inspections – July 2001**

Overall, river flow remained well below normal for the month of July. Spill was started at Bonneville (about 5-hours per evening) and The Dalles dams in mid-July. Spill at Grant PUD projects was ongoing for summer juvenile fish passage, ending on July 31. There were no reports of failure of adult passage fish pumps, fish turbines, or other auxiliary water systems for the month. I accompanied Larry Swenson on the McNary Dam fishway inspection during July.

Bonneville Dam –Ed Meyer completed an inspection of the adult and juvenile fish facilities at Bonneville Dam on July 16. River Q was 82.7 kcfs with no spill occurring. Six of 8 main turbine units and both fish turbines were operating at the WA shore; no turbine units were operating at the old powerhouse. The turbidity of the water was 4.5-ft and the water temperature 66°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.

Powerhouse I – The main entrances to the powerhouse collection channel were submerged 4.0 ft with 1.6 ft head and 3.7 ft with 1.1 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 1.6 ft. The velocity in the powerhouse collection channel was reported at 2.6 fps at the south end of the channel. The electronic meter at the north end of the channel was not read during this inspection. The five sluice gates were closed during the July inspection. The depth of water over the main Bradford fish ladder weirs was 1.3 ft, with 1.5 ft measured at the A-Branch and 1.3 ft at the B-Branch fish ladder. The exit from the ladder was clear of debris; however, **the picketed lead sections at the counting station had estimated head loss of 4-5 inches and required cleaning.**

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 estimated at 1.6 ft during the inspection. The north side entrance was open as required. All entrance requirements were met during the July 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 1.7 ft using the staff gages. The depth of water over the ladder weirs was 1.2 ft. The computer system remained out of service, similar to the B-Branch Fishway. Entrance requirements were met during the July 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 6.0 and 6.5 ft with head differential at 0.9 ft. The north shore entrance gates were submerged 6.7 ft to 7.2 ft with the head differential ranging from 1.3 to 1.4 ft. Floating orifice gates along the channel were operating satisfactorily. The water velocity meter was out of service again during this inspection. 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 1.2 ft.

Overall, the adult fish passage facilities (main entrance gates) were operating with extreme low tailwater elevations that resulted in reduced gate depths at the OR and WA shore fishways. **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.** The project was working on their PLC system at ph1 that would allow the Gates to operate at deeper depths during this period of low tailwater elevations that are a result of the low river flow this summer. The project should verify whether the mechanical gate position readings at the new powerhouse are on sill (elevation 1.0 ft) and match the computer reading at the SA-24 Board.

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. Two gatewells (2B & 11B) had an oily sheen with the source possibly from the gantry crane (small oil leak – 2B) or from a project fire truck that was parked adjacent to 11B gatewell and being used to wash the TIES that were being removed from the forebay.

The Dalles Dam – Doug Case, ODFW, completed an inspection of the fish facilities at The Dalles Dam on July 2. Project discharge was 129.5 kcfs with flow passing through 11 operating turbines. No spill was occurring 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 65°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 N-1 was submerged 8.8 ft below tailwater elevation with the head differential reading 1.1 ft using the Selsyns gage. The gate depth and head differential at Weir N-1 were operated within the proper criteria range. The PUD trash racks had 0.4 ft head differential. A large number of dead shad were lodged on the upstream pickets. The depth of water reported over the fish ladder weirs was 1.3 ft.

Oregon fishway – About 4,430 cfs of water was directed to the auxiliary water supply system via the fish turbines. At the South Entrances, 1.6 ft of head was recorded with 6.4/7.4 ft depth using the Selsyns gage. The project biologist made a change to the system and one gate was lowered to 8.4 ft depth. The Selsyns gage at the East Entrances gave satisfactory readings of 1.5 ft head differential and 11.1 ft gate depth for the inspection. At the West Entrances, the gate depths were about 9.0 ft with the head differential about 1.6 ft.

These readings were also satisfactory. The electronic velocity meter reported a water velocity of 2.1 fps through the collection channel.

The exit from the fish ladder had a large pile of vegetation attached to the exit trash rack. Photos were taken of the debris. The project later cleared this debris from the exit. The East Ladder picket lead was clear of debris. The depth of water over the fish ladder weirs was 1.4 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 repair and assure functionality of their PLC system so that operation of the fishways can be calibrated as needed and their readings at the main entrances kept in proper criteria, etc. Entrance Gate S-1 was stuck in place. The PUD trash racks should be cleaned of debris as required.

John Day Dam – Doug Case, ODFW, inspected the John Day adult fish facilities on July 2. Project Q was 127.8 kcfs during the inspection with 10 turbine units operating. Turbidity was 5.0 ft with the water temperature at 65°F. Two north shore (WA) and three south shore (OR) fish pumps were operating to supply flow to the fishways.

OR fishway – During the inspection, the South (OR shore) fishway entrance was operating with a gate depth at SE-1 of 8.5 ft on the gage and 8.7 ft at the Panel. Head differential was 1.3 ft using the gage reading and 1.4 ft using the Panel. For this inspection, there was sufficient depth and head at the South Entrance. The two main entrances at the north powerhouse (NE-1 & NE-2) were submerged about 8.1-8.4 ft with 1.3 ft average head differential. The gate depth and head differential readings were satisfactory. The panel readings varied from the gage readings by about 0.2 ft during the July inspection at the NEs. 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 several chunks of wood jammed in the pickets. The exit from the fish ladder was clear of debris. The depth of water over the weirs was 1.3 ft.

WA fishway – One main entrance gate is operated at the WA shore fishway. The Gage and LED readings were within 0.1 ft so no calibration was required. The gate depth was 8.7 ft with the head differential reading 1.15 ft average. Readings from the WA shore fish ladder were as follows: the picketed lead section at the counting station had a few sticks and a wood chunk jammed in the pickets. The exit from the fish ladder was clear of debris. The depth of water over the fish ladder weirs was 1.3 ft.

Overall, **the adult fish passage facilities were operating within acceptable criteria at all the main fishway entrance gates.**

Juvenile Fish Facility – The Smolt Monitoring facility was operating during the July inspection. The JBS screen cleaners are working in manual operation. All gatewells were clear of debris. **The Project should repair the screen cleaner to assure that it will be fully automated by next season. Next year will likely have a completely different picture relating to amount of debris in the water.**

McNary Dam – Larry Swenson, NMFS, and I completed an inspection of the fishways on July 24. Project Q was 114 kcfs with no spill and 10 turbine units operating, all on the north end of the powerhouse (Units 5-14). River temperature was 68°F with the turbidity reading 6.0 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 24° 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 9.5 to 9.9 ft below tailwater elevation, with the head differential ranging between 1.3 ft and 1.5 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 about 0.8 fps, and at the northern end of the channel it was estimated at 2.1 fps. The depth of water over the fish ladder weirs was 1.0 ft. The exit from the fish ladder and the picket leads at the fish counting facility were 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 WFE-2 and WFE-3 were operating with head differential of 1.5 ft and the Gates submerged an average depth of 9.4 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 July inspection. The computer printout was compared with the actual on site readings and no calibration appeared necessary; all readings were within 0.2 ft. **The velocity at the South end of the collection channel was less than criteria, only 0.8 ft reported on this inspection**.

Juvenile Fish Facility – Debris in front of the project was basically non-existent. The screens, orifices, and other juvenile fish facility equipment appeared to be operating satisfactorily. **We observed 3 Western Grebes under the deck grating at the downstream end of the juvenile collection channel; the SMP personnel indicate that as many as 6-7 reside there and harass juvenile fish. These grebes should be removed from the bypass channel.**

Priest Rapids Dam – Melissa Jundt, NMFS, completed an inspection of the adult fish facilities on July 24. Project discharge was 41 kcfs; 9.8 kcfs through spill and the remainder through three main turbine units. Water temperature was 66°F with the turbidity reading 10.4 ft. Fish pumps (tailwater) and gravity-flow water (forebay) discharge water to a large supply pool that distributes this water through diffusers along the powerhouse collection channel (mainly when the Orifice Gates are operating) and near the main fishway entrances.

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 where the fish eventually exit to the forebay of the dam. The orifice gates that normally operate along the channel were shut down and will be through the end of the season. Gate LSE-4 was recorded with 1.2 ft head differential and Gate LSE-2 with 1.7 ft head differential. Both gates were within criteria range of 1.0-2.0 ft; Gate LSE-2 met the target differential. Water velocity reported at the eastern end of the collection channel was 2.5 fps and was within the criteria range of 1.5 to 4.0 fps. 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 gages; the tailwater elevation was estimated. The computer readout listed the reading at 1.3 ft. The head differential was reading between the acceptable criteria 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 spilling water for protection of juvenile fish; this ended July 31. The adult fish passage entrances were operating within criteria ranges (1.0 to 2.0 ft). The target differential for the RSE-1

will be 1.25 ft (1.2 or 1.3 ft acceptable). The staff gages at the left bank entrances and tailwater required cleaning. The Right Bank tailwater gage was unreadable. **WDFW is now operating the adult trap located on the Left Bank fish ladder near the exit from ladder.**

Wanapum Dam – Melissa Jundt, NMFS, completed an inspection of the fish facilities on July 24. Project discharge was 37.2 kcfs with 11.8 kcfs passing through spill and the remainder through three main turbine units. The spilled flow is used to pass juvenile fish migrants at the project. The water temperature was reported 65°F with the turbidity reading same as at Priest Rapids Dam.

Left Bank fishway – Two fish pumps operating at 140-rpm 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 2.1 ft head differential and the SE-3 Gate had 1.5 ft of head. Both readings were acceptable (SE-2 was 0.1 ft high) and exceeded 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 1.1 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 (7-12) 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 1.2 ft.

Overall, the fish facilities were operating close to criteria at all points checked. The Right Bank Entrance could have been increased to provide 1.2-1.3 ft head differential to meet target flow. The staff gage at the Right Bank supply pool was unreadable.

Rock Island Dam – Glen Liner and Kirk Truscott, WDFW, completed an inspection of the fish facilities on July 25. Project discharge was 128.2 kcfs with flow passing through eight turbine units at the new powerhouse only. No spill for juvenile fish was occurring during this inspection. Turbidity was reported at 11.6 ft with the water temperature reading 62.3° 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 (1-2 ft) are normally met under any river flow scenario. The gates were submerged 6.6 ft and 10.1 ft below tailwater with the ΔH at 1.2 ft. The cable on LO-5 was broken and required repair. 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.

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 8.9 ft (criteria = 8.5 ft or >) 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 July 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 minimum head differential of 1.0 ft to be within criteria. The RPEs were reported with 1.25 ft average "head", 1.2 ft "head" at the LPE, and 0.9 ft

at the TRE (downstream) entrance. The velocity in the left powerhouse collection channel was measured at 4.7 fps. The Attraction Water jet was operating at 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 fishway entrances at the Left Bank were within acceptable criteria. The project had set a time to repair the LO5 gate (cabling) to allow the gate to move with tailwater changes. At the time of the inspection, it was at elevation 562.6 ft and submerged 10.1 ft with the high tailwater elevation of 572.7 ft. With the high tailwater from the generation at the new powerhouse, Gate TPE was slightly below criteria of 1.0 ft. Heavy grass was building on the intakes to the fishway.

Rocky Reach Dam – The adult fish passage facilities were inspected by Glen Liner and Kirk Truscott, WDFW, on July 25. Project discharge was 54.1 kcfs with flow directed through five main turbine units. No spill was occurring during this inspection. Water temperature was 62.1F with the turbidity reading 15.5 ft. Three fish pumps were operating at 47% wicket gate opening. The main spillway entrance remained closed.

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. The Spillway Gate was closed. Two entrance gates were operating at the right powerhouse (RPE-1 and RPE-2) and two gates at the left powerhouse (LPE-1 and LPE-2). The LPEs were submerged 11.0 ft with a head differential of 1.5 ft; while the right powerhouse entrances had satisfactory "head" with 1.0 ft recorded. In the collection channel, there was an approximate 1.0 ft drop in elevation from the LPEs to the RPEs while the tailwater elevation dropped only 0.5 ft resulting in the minimum 1.0 ft head differential at the RPEs. Velocity through the transportation channel was 1.9 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 for the July inspection. The surface collector was operating with some sampling occurring at the bypass during this inspection. **Note** that between Rocky Reach and Rock Island dam there was more than a doubling of flow. Flow at Rocky Reach and Rock Island were respectively 54 kcfs and 128 kcfs and those differences illustrate the amount of peaking and flow changes that must be occurring in the Mid-Columbia. Undoubtedly, these flow changes (peaking) affect fish passage at both Chelan PUD facilities.

Wells Dam – Stewart Mitchell, WDFW, completed an inspection of the adult fish facilities on July 24. Project discharge was only 25.2 kcfs (**See Rocky Reach note above)** with two main turbine units operating. Spill for juvenile fish protection was 5.0 kcfs for the inspection. River temperature was 60.9°F with the turbidity reading 13 ft. Readings from the control room are taken which include 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 either the East or West entrance 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 8-ft open with head differential targeted for 1.5 ft at both fishway entrances.

At the **East** fishway, the channel elevation measured within 0.2 ft the same for the Control Room and the deck gage; the staff gage was unreadable in the channel and tailwater. The deck and control room readings gave a head differential of 1.5-1.6 ft. Depth of water over the ladder weirs was 1.3 ft. 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.

At the **West** fishway, the deck gage and computer readings were within 0.1 ft for channel elevation and 0.1 ft for the tailwater elevation. The head differential measured 1.6 ft from the deck and computer gages. The channel staff gage was unreadable so no calculation of head differential was possible. The staff gage and Control Room reading of depth of water over the weirs was 1.1 ft. The exit from the west bank fish ladder was 0.7 ft and fell within the expected range as well as being similar to the East fishway differential measured at the Exit from the fish ladder.

Overall, **the staff gages were unreadable due mainly to the reduced flow and tailwater elevation at the project. The main fishway entrances were operating at the targeted head of 1.5 ft. Trapping was occurring from Monday – Wednesday from 0800 – 2000h.**

Ice Harbor Dam - Steve Richards, WDFW, completed an inspection of the Ice Harbor fish facilities on July 24. Project discharge was 43.9 kcfs with 4 of 6 main turbines operating to pass inflow; there was no spill occurring during the inspection. The turbidity reading was 9 ft with the water temperature 70°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 head differential and the gate submerged 8.2 ft. The Computer Status Report showed the Entrance operating with 1.6 ft head differential and 8.2 ft of depth. The channel elevation from the PLC measured 0.5 ft difference from the staff reading; the tailwater elevation had a 0.2 ft difference. The north powerhouse gate was 0.6 ft different for the channel and same for the tailwater elevations measured. The NPE was recorded with 1.8 ft of "head" and the gate submerged 8.3 ft below tailwater. The water velocity through the collection channel recorded 2.4 fps at the electronic gage. Seven orifice gates were operating along the powerhouse collection channel. The exit from the south fish ladder was clear of debris for the July inspection. The picketed lead section near the counting station required cleaning. The depth of water over the south fish ladder weirs was 1.1 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 6.6 ft below tailwater elevation with the head differential at 1.3 ft using the staff gage, and 6.7 ft submerged with 1.1 ft head differential using the display (LED). The snapshot computer printout reported head differential of 1.0 ft and 6.7 ft depth. 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 1.1 ft.

Overall, the adult fish facilities were operating within criteria levels at the South Shore and North Powerhouse main entrance gates and met head differential at the North Shore. The juvenile fish facility and components were operating satisfactorily. **The south shore picketed leads required cleaning. The lower 6-inches of the north shore count window also needed cleaning. The Project should calibrate their entrance elevations so that the gages all match on the south shore fishway.**

Lower Monumental Dam – Steve Richards, WDFW, inspected the fish facilities on July 24. Project discharge was about 42.7 kcfs with Units 1, 3, and 5 operating and no spill occurring during this inspection. River temperature was 70.4°F, with the turbidity reading more than 4 feet.

North Shore fishway – Three turbine driven fish pumps operating at 74 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 8.0 ft average depth with the "head" measured at 2.1 ft. No orifice gates are operating along the collection channel in 2001. The visual water velocity reading was estimated at more than 2.0 fps. The south powerhouse entrances were **on sill** and submerged 7.1 ft with 1.4 ft of "head".

The exit from the north 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.

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 8.0 ft and had 1.5 ft "head". The digital display showed the gate at 8.0 ft submerged with 1.5 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 1.1 ft on the south ladder.

Overall, the adult fish passage facilities were 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. **The north shore exit staff gage appears to be out of calibration; i.e., it reads higher than the forebay staff gage.**

Little Goose Dam – Josh Hanson, ODFW, inspected the adult fish facilities on July 18. Project discharge was 29.4 kcfs with flow through Units 1 and 2. Water temperature was 69.8°F with a turbidity reading of >6 ft. Three turbine-driven pumps operating at 73.7-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 on sill and submerged about 9.4 ft average depth with the head differential at 1.7 ft using the staff gage reading, and 9.2 ft depth and 1.8 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 1.9 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 5.7 ft with the "head" at 1.7 ft using the FSC Board reading and 1.6 ft using the staff gage. The Gate depth was 6.2 ft average at the NPEs using the staff gage reading. The North Shore Entrances were submerged 6.0 ft deep with the "head" at 1.6 ft using the FSC Board reading and 6.3 ft with 1.0 ft head differential using the staff gage readings. 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 given the fact that the SSE and NPE were resting on sill and no further depth could be achieved. **Staff gage readings and the FSC Board readings should be calibrated as most were almost 0.3 ft different.** The **NPE and NSE tailwater staff gages were dirty and should be cleaned. Also, the NSE channel lights through the transport tunnel should be repaired or assessment made as to the extent of the problem with the lights. This problem will be addressed by the Little Goose project this week.**

Lower Granite Dam – Josh Hanson, ODFW, completed an inspection of the adult fish facilities on July 18. Project discharge was 33.0 kcfs with 2 of 6 main turbine units operating. Water temperature was 70.9°F with the turbidity reading at > 5.0 ft. Two electric fish pumps (1 and 3) were supplying flow to the adult fishway entrances and powerhouse collection channel.

The South Shore entrances were submerged 8.1 ft average depth with ΔH of 1.6 ft using the staff gage and the FSC Board readings. The North Powerhouse entrances were submerged an average of 5.35 ft with ΔH of 1.3 ft using the staff gage and 1.4 ft with 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 1.1 fps at the south end of the powerhouse collection channel and 2.4 fps at the North Shore. Four orifice gates operate along the powerhouse collection channel [1, 4, 7 and 10]. At the North Shore, Gates NSE-1 and NSE-2 were submerged 6.1 ft below tailwater elevation using the FSC Board reading and the

head differential reading 0.8 ft; the staff gage reading gave 1.0 ft head differential. 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 July inspection showed the adult facilities operating close to satisfactory conditions given the tailwater elevations. **There remains no staff gage or other site gage to measure the North Shore Entrance (tailwater elevation). The channel staff gage reads 0.2 ft higher than the FSC Board Reading for channel elevation.** The velocity at the south end of the powerhouse collection channel was about 1.1 fps and falls below the 1.5 fps minimum criterion.