



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: July 5, 2001

RE: **Fishway Inspections – June 2001**

Overall, river flow remained well below normal for the month of June. Spill was closed off at the lower Columbia projects: Bonneville, The Dalles, and John Day dams in mid-June. Spill at Grant PUD projects is ongoing for summer juvenile fish passage. There were no reports of failure of adult passage fish pumps, fish turbines, or other auxiliary water systems for the month. Fish facilities were shut down for short periods of time for diffuser grating inspections and to closely look at the triangle section at Bonneville Dam where adult steelhead were trapped. A solution to keep one of the wall diffuser gratings open was agreed to. This should allow fish to pass freely into and out of this section of the ladder without trapping them. This solution should be temporary and the final fix completed during the winter maintenance period. I observed, via fishway inspections, fish passage facilities at Grant PUD projects and an on-site visit of The Dalles Dam (S Spillway Entrance).

Bonneville Dam –Ed Meyer completed an inspection of the adult and juvenile fish facilities at Bonneville Dam on June 21. River Q was 138.1 kcfs with no spill occurring. Seven of 8 main turbine units were operating at the new powerhouse with 2 turbine units operating at the old powerhouse. Both fish turbines were operating at the WA shore. The turbidity of the water was 5.9-ft and the water temperature 63°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 7.7 ft with 1.1 ft head and 8.2 ft with 1.2 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 1.1 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 working during this inspection. The five sluice gates were opened during the June 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 1.3 ft 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 1.5 ft during the inspection. The north side entrance was open as required. All entrance requirements were met during the June 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 1.8 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 June 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 12.2 and 13.0 ft with head differential ranging from 1.0 ft to 1.3 ft. The north shore entrance gates were submerged 12.7 to 13.3 ft with the head differential ranging from 1.4 to 1.6 ft. Floating orifice gates along the channel were operating satisfactorily. The water velocity meter was out of service 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 close to criteria 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. Ed Meyer noted a number of juvenile and adult salmon, shad and other fish in the triangular area of the B2 AWS system. The project has removed the vertical bar racks that separate this area from the fish ladder. **Ed also indicated that physical readings at several of the main entrances (Gate 2; NCH and NTW) do not match those reported by the computer. The project should check calibration of the water level sensors.**

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.

The Dalles Dam – Doug Case, ODFW, completed an inspection of the fish facilities at The Dalles Dam on June 5. Project discharge was 163.9 kcfs with flow passing through 7 operating turbines. 48 kcfs of spill was churning 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 61°F with a turbidity reading of 4.1 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 9.0 ft below tailwater elevation with the head differential reading 1.4 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 0.3 ft head differential. 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 1.2 ft.

Oregon fishway – About 4,310 cfs of water was directed to the auxiliary water supply system via the fish turbines. At the South Entrances, 1.3 ft of head was recorded with 12.0 ft depth using the Selsyns gage. The PLC reading was definitely in error as it read only 0.4 ft head differential. The PLC readings at the East Entrances required calibration, as they were about 1.0 ft different from the Selsyns Gage. Satisfactory readings for head differential and gate depth were achieved at the East Entrances as more than 12.0 ft depth and 1.3 ft of head existed at the time of inspection. At the West Entrances, the gate depths were greater than 9.0 ft with a head differential of about 1.2 ft. The electronic velocity meter reported velocity of 1.0 fps

through the collection channel. Doug estimated from 1.5 to 2.5 fps water velocity through the collection channel.

The exit from the fish ladder was clear of debris while the picket leads at the count station were reported with some sticks and a lot of debris on the downstream leads. The depth of water over the fish ladder weirs was 1.3 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 complete calibration of their PLC system to match the Water Level Sensor Readings and channel staff gage readings. Hopefully this has been completed by the project at time of this Memo.

John Day Dam – Doug Case, ODFW inspected the John Day adult fish facilities on June 5. Project Q was 160.6 kcfs during the inspection with 12 turbine units operating. Turbidity was 5.0 ft with the water temperature at 61°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 8.4 ft on the gage and 8.7 ft at the Panel. Head differential was 1.2 ft using the gage reading and 1.3 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 (NE-1 & NE-2) were submerged about 8.0-8.5 ft with 1.4 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 June inspection at the NEs. Water velocity recorded along the powerhouse collection channel averaged about 2.3 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 jammed in the pickets as well as some dead shad. The exit from the fish ladder was clear of debris. The depth of water over the weirs was 1.2 ft.

WA fishway – One main entrance gate is operated at the WA shore fishway. The Gage and LED readings were within 0.2 ft so no calibration was required. The gate depth was 8.9 ft average with the head differential reading 1.1 ft average. Readings from the WA shore fish ladder were as follows: the picketed lead section at the counting station was clear of debris, as was the exit from the ladder. 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 June 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 June 25. Project Q was 105.4 kcfs with no spill and 10 turbine units operating. River temperature was 63°F with the turbidity reading 5.4 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 9.0 to 10.1 ft below tailwater elevation, with the head differential ranging between 1.5 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 about 0.5 fps, and at the northern end of the channel it was estimated at 2.0 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 1.6 ft and the Gates submerged an average depth of 8.6 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 June 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 0.5 ft reported on this inspection.** The project began north powerhouse loading on June 20. The purpose is to reduce water temperatures through the juvenile bypass flume by pulling water through the cooler north end units.

Juvenile Fish Facility – Debris in front of the project was recorded as being **very light** during the inspection with some debris in front of Unit 9. The screens, orifices, and other juvenile fish facility equipment appeared to be operating satisfactorily. Larry noted that there were approximately 62 Western Grebes in the immediate forebay of the project. There have been as many as 5-6 grebes under the deck grating at the downstream end of the juvenile collection channel.

Priest Rapids Dam – Melissa Jundt, NMFS and I completed an inspection of the adult fish facilities on June 28. Project discharge was 79.8 kcfs; 19.5 kcfs through spill and the remainder through 5 main turbine units. Water temperature was 60°F with the turbidity reading 12.3 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-4 was recorded with 1.3 ft head differential and Gate LSE-2 with 1.1 ft head differential. Both gates were within criteria range of 1.0-2.0 ft but were below the target of 1.5 ft at LSE-4 and 1.25 ft at LSE-2. Water velocity reported at the eastern end of the collection channel was near 2 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 1.1 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 1.2 ft. 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 spilling water for protection of juvenile fish; I observed many juvenile salmonids passing over the sluice spill gate located at the east end of the spillway. 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. We are currently investigating what the Target differential is for the Right Bank Entrance, RSE-1. The tailwater elevation reading from the stillwell at the LSE-2 was 0.5 ft different from the staff gage reading. We used the staff gage reading for the inspection form.

Wanapum Dam – Melissa Jundt, NMFS and I completed an inspection of the fish facilities on June 28. Project discharge was 129 kcfs with 40.9 kcfs passing through spill and the remainder through 6 main turbine

units. The spilled flow is used to pass juvenile fish migrants at the project; as at Priest Rapids, we observed and a video clip was taken of juvenile fish passing the sluice flow water over one of the spill bays. The water temperature was reported 58°F with the turbidity reading same as at Priest Rapids Dam.

Left Bank fishway – Two fish pumps were operating at 137-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 1.4 ft head differential and the SE-3 Gate had 1.5 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 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 – Steve Gacek, WDFW, completed an inspection of the fish facilities on June 25. Project discharge was 96.1 kcfs with flow passing through 7 turbine units at the new powerhouse only. No spill for juvenile fish was occurring during this inspection. Turbidity was reported at 11.8 ft with the water temperature reading 57.2° 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 6.5 ft below tailwater with the ΔH at 1.2 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 was removed from the tailwater next to the old powerhouse (same as previous years). As an aside, netting was placed over the left bank fish ladder during the month. This was done to keep fish from jumping out of the fish ladder (1 adult spring chinook [dead] was observed next to the fish ladder during the May inspection).

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 8.5 ft (criteria = 8.5 ft or $>$) with the ΔH reported at 1.2 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 June 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 1.5 ft “head”, 1.5 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 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 fish passage facilities were operating at satisfactory levels during the June inspection. The netting over the left fish ladder was installed during June.

Rocky Reach Dam – The adult fish passage facilities were inspected by Steve Gacek, WDFW on June 22. Project discharge was 95.1 kcfs with flow directed through 9 main turbine units. No spill was occurring during this inspection. Water temperature was 57.2F with the turbidity reading 16.5 ft. Three fish pumps were operating at 51% wicket gate opening and supplying about 792 cfs pumped flow each to the fishway. 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 12.3 ft with a head differential of 1.2 ft; while the right powerhouse entrances had satisfactory “head” with 1.0 ft recorded. 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. The surface collector was operating with some sampling occurring at the bypass during this inspection.

Wells Dam – Stewart Mitchell, WDFW completed an inspection of the adult fish facilities on June 26. Project discharge was 112.5 kcfs with all 10 main turbine units operating. Spill for juvenile fish protection was 11.6 kcfs for the inspection. River temperature was 57.7°F with the turbidity reading 14 ft. 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 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 0.1 ft the same for the Control Room, the deck gage, and the staff gage and the tailwater elevation measured within 0.2 ft the same. The readings gave a head differential of 1.3-1.6 ft for three separate measures. Depth of water over the ladder weirs was 1.1 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, the computer reading, and the staff gage were within 0.1 ft for channel elevation and 0.2 ft for the tailwater elevation. The head differential measured at 1.5-1.6 ft. The staff gage reading of depth of water over the weirs was 1.0 ft with 0.9 ft at the Control Room. The exit from the west bank fish ladder was 0.6 ft and fell within the expected range.

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 June inspection.

Ice Harbor Dam - Steve Richards, WDFW completed an inspection of the Ice Harbor fish facilities on June 27. Project discharge was 40.4 kcfs with 3 of 6 main turbines operating to pass inflow; there was no spill occurring during the inspection. The turbidity reading was 6.4 ft with the water temperature 62°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 1.7 ft head differential and the gate submerged 8.0 ft. The Computer Status Report showed the Entrance operating with 1.1 ft head differential and 8.0 ft of depth. The channel elevation from the PLC measured 0.6 ft different from the staff reading; the tailwater elevation was the same reading. The north powerhouse gate was 0.2-0.3 ft different for the elevations measured. The NPE was recorded with 1.2 ft of “head” and the gate submerged

7.8 ft below tailwater. The water velocity through the collection channel recorded 2.5 fps at the electronic gage. Seven orifice gates were operating along the powerhouse collection channel. The exit from the south fish ladder reported 0.2 ft differential across the trash racks. The project should watch closely to assure that this differential does not increase over time. The 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 1.1 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 6.4 ft below tailwater elevation with the head differential at 1.5 ft using the staff gage, and 6.5 ft submerged with 1.2 ft head differential using the display (LED). The snapshot computer printout reported head differential of 1.1 ft and 6.1 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 1.0 ft.

Overall, the adult fish facilities were operating close to criteria levels at the main entrance gates; however, it would appear that the Project should increase their set points for the Gate Depth to 8.2 ft \pm 0.1 ft to assure that the minimum depth was met more often. The juvenile fish facility and components was operating satisfactorily on this inspection.

Lower Monumental Dam – Steve Richards, WDFW inspected the fish facilities on June 27. Project discharge was about 41 kcfs with Units 1 and 2 operating and no spill occurring during this inspection. River temperature was 65°F, with the turbidity reading greater than 4 feet.

North Shore fishway – Three turbine driven fish pumps operating at 73.6 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 8.55 ft average depth with the “head” measured at 1.5 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 7.2 ft with 1.3 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 7.9 ft and had 1.1 ft “head”. The digital display showed the gate at 8.0 ft submerged with 1.2 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 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. **The spare plastic backboard for the south shore count station was floating between the picketed leads and should be removed.**

Little Goose Dam – Josh Hanson, ODFW inspected the adult fish facilities on June 27. Project discharge was 31.9 kcfs with flow through Units 1 and 2. Water temperature was 65.2°F with a turbidity reading of 4.6 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 8.4 ft average depth with the head differential at 2.0 ft using the staff gage reading, and 8.2 ft depth and 2.3 ft head differential using the FSC Board Reading. Channel velocity recorded at the south end of the channel registered about 1.2 fps, with the velocity up to 2.2 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 5.5 ft with the “head” at 1.7 ft using the FSC Board reading and 2.0 ft using the staff gage. The Gate depth was 5.1 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 staff gage and 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 1.2 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. 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. **The NPE tailwater staff gage was dirty and should be cleaned. Also, the NSE channel light through the transport tunnel is either off or burned out (since 6/11).**

Lower Granite Dam – Josh Hanson, ODFW completed an inspection of the adult fish facilities on June 26. Project discharge was 30.2 kcfs with 2 of 6 main turbine units operating. Water temperature was 66.3°F with the turbidity reading at 4.6 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 7.95 ft average depth with ΔH of 1.6 ft using the staff gage and 1.7 ft using the FSC Board readings. The North Powerhouse entrances were submerged an average of 5.45 ft with ΔH of 1.1 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 0.9 fps at the south end of the powerhouse collection channel and 2.9 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 6.15 ft below tailwater elevation using the FSC Board reading and the head differential reading 1.0 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 June inspection showed the adult facilities operating 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 channel staff gage reads 0.5 ft higher than the FSC Board Reading for channel elevation. This should be calibrated as soon as possible by the COE staff.** 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.