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MEMORANDUM

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

FROM: Larry Basham

DATE: July 8, 2002

RE: **Fishway Inspections – June 2002**

State and federal inspectors completed inspections at the lower and upper Columbia River and Snake River dams in June at all projects. I substituted for NMFS and completed the facility inspections at Priest Rapids and Wanapum dams.

Water temperatures have been cooler than normal this spring and adult fish passage was somewhat delayed in their arrival at Bonneville Dam and upstream projects. Flows and spill levels remained fairly high in the Columbia and Snake River basins. In some cases, you can expect higher fallback rates of adult fish at some projects, i.e., Bonneville Dam for example. A few other problems have resulted from the presence of debris in the fishways.

Bonneville Dam – Ed Meyer, NMFS, completed an inspection of the adult and juvenile fish facilities on June 19. River Q was 332 kcfs with about 130.8 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 fish passage season. New spill patterns have been developed for the season. Water turbidity was 4.5 ft with the water temperature at 58°F for the June inspection.

Powerhouse I – Main entrance Gate 2 was operating at the South end of the powerhouse collection channel with the weir submerged 13.3 ft and the head differential at 1.0 to 1.1 ft. Weir Gate 64, located on the North end of the powerhouse was submerged 8.5 ft with the head differential at 1.4 ft. The staff gage reading on the north end of the powerhouse gave channel to tailwater head differential readings that were within 0.2 ft of the PLC reading. The water velocity in the north end of the powerhouse collection channel was reported at 2.5 fps and was only 0.7 fps at the south end of the channel (less than criteria). The five orifice gates were operating during the inspection. The depth of water over the main Bradford fish ladder weirs was 1.1 ft, with 1.2 ft measured at the A-Branch and 1.2 ft at the B-Branch fish ladder for the June inspection. The exit from the ladder required

cleaning as weeds covered the rack. The picketed lead section was fairly clear of debris and head loss across the leads was satisfactory.

B-Branch - The computer system was not operating during the June inspection and readings were taken from the staff gage and probe. Head differential was reported at 1.3 ft, slightly below the target of 1.5 ft. The north and south entrances were closed during the inspection. The downstream entrance was operating to attract adult fish to the entrance and 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 entrance was operating with the side entrances closed in June. Head differential was 1.0 ft during the inspection and met the minimum criteria of 1.0 ft-2.0 ft, but missed the target head of 1.5 ft. The depth of water over the ladder weirs was 1.2 ft and was satisfactory.

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 12.8 ft and 14.1 ft with corresponding head differentials of 1.5 ft and 1.2 ft at the upstream and downstream entrances. The north shore entrance gates were submerged about 13.8 ft and 14.4 ft with the head differential for the upstream and downstream entrance at 2.0 ft and 1.8 ft, respectively. The floating orifice gates along the channel were operating satisfactorily. The water velocity meter was reported at 2.2 fps during the June 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 1.0 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. Higher spill levels during the daytime may be causing passage problems through the spillway entrances and to fish passage in general. Visual observation of the entrances looked unfavorable compared to the lower levels of spill seen in previous years. Ed Meyer noted that there was a large boil of water in the vicinity of FG3-5 and FG3-4. The project was asked to monitor the situation and begin probing the ladder to insure AWS diffusers were not missing. The Project further checked the area and found no immediate problems.

Juvenile System – The WA shore juvenile bypass facility was operating with all screens and orifices as required. The project was operating the high outfall as required. The ice/trash sluiceway was operating at the old powerhouse. As an update, on July 4, the flow in the old powerhouse was turned south for the weekend as maintenance was required and no personnel were available to fix the add-in water valve that was apparently clogged with debris. The project completed the work on Monday, July 8 and the flow in the juvenile bypass channel was switched back to north flowing through the juvenile bypass facilities.

The Dalles Dam – Doug Case, ODFW, completed an inspection of the fish facilities at The Dalles Dam on June 1. Project discharge was 384.1 kcfs with 117.1 kcfs spill. Two fish turbines were operating at the OR fishway with a single fish turbine operating at the WA fishway. Water temperature was 58°F by this early June inspection with the turbidity reading at 3.5 ft. When spill occurs for juvenile fish enhancement, the Northern spillbays are prioritized. Passage of adult salmon through the WA shore fish ladder has been substantial during the past few years due mainly to the spill pattern change.

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. On this inspection, Gate N-1 was

submerged 9.2 ft below tailwater elevation with a head differential reading of 1.7 ft. The gate depth and head differential at Weir N-1 was operated within the proper criteria range for the June inspection. The PUD trash racks had 0.4 ft head differential. The depth of water reported over the fish ladder weirs was 1.2 ft. The picketed leads at the count station and the north ladder exit were reported mostly clear of debris.

Oregon fishway – About 5,060 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 the mid March inspection date and, Gate S-2 was bulk headed off. Gate S-1 was submerged 13.4 ft below tailwater elevation and the head differential was 1.2 ft. Sufficient flow should have been supplied to attract adults to the entrance area. The COE may be planning a mid-season remedy to repair this equipment.

At the West Entrance, Gates W-1 and W-2 were submerged 10.2 ft and 9.2 ft with the head differential at 1.1 ft. The gate depths and head differential were within proper criteria settings during the June inspection. The electronic velocity meter has been out of service for the season; however, estimated water velocities for the inspection ranged from 3.0 fps at the east end of the channel to over 2.0 fps at the west end of the channel.

The East fishway entrance has two operating gates, E-2 and E-3. These gates were submerged 12.7 ft and 11.4 ft with the head differential at 1.0 ft. These gates are pushing out a large quantity of attraction flow for the adult fish approaching the eastern end of the powerhouse. All gate depths and head differential fell within the criteria range for the June inspection.

The exit from the fish ladder was clear of debris at the exit trash rack (1 large tumbleweed was present). The east ladder picketed leads were also clear of debris. 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. We recommend that the PUD trashrack be cleaned on a regular weekly basis.

John Day Dam – Doug Case, ODFW, inspected the John Day adult and juvenile fish facilities on June 4. Project Q was 301.1 kcfs with 90.8 kcfs flow passing via spill. Turbidity was 4.0 ft with the water temperature reported at 58°F for the June inspection. Two north shore (WA) and three south shore (OR) fish pumps were operating for the inspection. Fish facility equipment has worked satisfactorily to date through the adult fish passage.

OR fishway – During this inspection, the South (OR shore or SE-1) fishway entrance was operating with the gate depth at 8.7 ft on the gage and 8.0 ft at the panel. Head differential was 1.2 ft using the staff gage reading and 1.6 ft at the panel board. For this inspection, there was sufficient depth and head at the South Entrance to meet criteria. The two main entrances at the north powerhouse (Gates NE-1 & NE-2) were submerged from 8.3 to 8.7 ft using the gages and 8.1 ft submerged using the panel reading. Head differential was 1.6 ft using the staff gage and 1.8 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 2.2 fps for the June 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 1.2 ft.

WA fishway – Gate N-1 is operated 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 9.1 ft with the head differential reading 1.2 ft at the staff gage and 1.1 ft at the LED gage during the June inspection. 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 1.3 ft.

Overall, the adult fish facilities were operating close to criteria at the fish ladders and main entrance gates during the June inspection date.

Juvenile Fish Facility – The Smolt Monitoring facility was operating satisfactorily; however, one adult steelhead had jumped out of downstream transport channel just east of the dewatering structure. The COE was asked to assess the problem and cover or keep fish from jumping out of that area.

McNary Dam – Larry Swenson, NMFS, completed an inspection of the fishways on June 11. Project Q was 344.4 kcfs with 169 kcfs through the turbines and 171 kcfs through spill. River temperature was 56°F with turbidity reading at 4.4 ft during the June inspection. 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 20° to 21°. 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 9.1 to 9.5 ft below tailwater elevation, with the head differential reading 1.0 ft at the South entrances and 1.1 ft at the North Powerhouse entrances in June. Gate depths and head differentials were found within proper criteria range at the powerhouse entrances. The orifice gates along the collection channel were also operating satisfactorily. The velocity reported at the south end of the collection channel was about 1.8 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 1.0 ft. The exit from the fish ladder and the fish counting facility was 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 levels. Entrances WFE-2 and WFE-3 were operating with head differential of 1.5 ft and the gates submerged an average depth of 9.3 ft inspection. Tumbleweeds were building at the exit from the fish ladder and potentially wash down through the fish ladder section to the picketed leads at the counting station. The picketed leads showed a 0.8 ft differential across the leads and required cleaning. The depth of water over the fish ladder weirs was 1.0 ft for the June 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. The debris in the fish ladder was especially excessive in the WA fish ladder as 0.8 ft head loss was reported across the picketed leads. Potentially calibration was required on the computer PLC for one reading.

Juvenile Fish Facility – Debris in front of the project was mainly concentrated in front of Units 5B-13B. The juvenile bypass channel was dewatered for mid season maintenance. Larry Swenson noted that the dewatering wall screen was completely covered with debris. He questioned whether the screen would eventually fail if subjected to this amount of debris and pressure over time. The channel was restored to emergency bypass by the end of his inspection.

Priest Rapids Dam – I substituted for NMFS this month and completed an inspection of the adult fish facilities on June 20. Project discharge was 281.8 kcfs with spill at 165 kcfs; this was the highest flow of the season to date. Water temperature was 56.7°F with the turbidity reading 6.2 ft. Five fish pumps (tailwater) and gravity-flow water (gravity intake gate 4.3 ft open) supply 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 1.1 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, but LSE-4 was less than the targeted differential of 1.5 ft. Water velocity reported at the eastern end of the collection channel was 1.5 fps and fell within the criteria range of 1.5 to 4.0 fps. With the higher tailwater elevations and subsequent channel elevations, water velocity was minimal through the entire 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 satisfactory at 1.0 ft.

One change was noted at the LSE-4 gate: with the high tailwater elevation, the top crossbar on the gate sets up a loud noise-like vibration that could be disruptive to fish passage through that gate. Possible modifications to the crossbar should be considered that would reduce the noise factor.

Right Bank Fishway – Slotted entrance (RSE-1) was operating with 1.0 – 1.2 ft head differential during the June inspection. There was considerable fluctuation in the tailwater elevation due to the large amount of spill. It was necessary to use only the computer reading of the tailwater elevation as the staff gage was below the water surface. The computer printout indicated there was 1.2 ft head while the channel staff gage and the computer tailwater elevation reading gave 1.0 ft head. 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. I asked the fish counter about fish passage on the Right fish ladder as the spill condition would appear to cause problems to fish attempting to find the RSE gate. **Basically, passage was almost nothing for the day and would suggest that a change is required to pass fish through the spill/RSE gate.**

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. As noted above, the high spill level appeared to stop or severely limit fish passage on the Right Bank Fishway. I checked for adult fish passage numbers on the Right fish ladder during the past two weeks, June 20-July 2, and passage was generally satisfactory through the spillway entrance. Passage of fish through the Left Bank fish ladder appeared excellent on June 20 despite the high flow level and overall adult fish passage.

Wanapum Dam – I completed an inspection of the adult fish passage facilities on June 20. Project discharge was 286 kcfs with 135 kcfs spill and the remainder through the 10-operating turbines. Water temperature was reported at 56°F.

Left Bank Fishway – Two fish pumps were operating at 152-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 June inspection, the LSE-2 Gate had 1.2 ft and the LSE-3 Gate, 1.1 ft head differential, respectively. Both readings were within the proper range with LSE-3 meeting the target differential and LSE-2 about 0.4 ft lower than the target. Due to the closure of the orifice gates along the powerhouse collection channel, the project was able to operate only the 2 pumps and stay close to criteria at the main entrances. In years past, this high level of flow would have resulted in head differentials below the 1.0 ft minimum. Water velocity was estimated at nearly 3.0 fps at the East end of the channel and appeared to stay close to that velocity through the channel toward the West end of the channel. As a side note: there was only 0.1 ft drop between the Junction Pool and the LSE-3 and the velocity level was still well above minimum levels. We need to examine whether the need to maintain the 0.3 ft differential that was required when the orifice gates were operating in past years. The exit from the fish ladder was reported clear of debris in June. The depth of water recorded over the fish ladder weirs was 1.0 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 measured 1.7 ft and was within the criteria range of 1.0 to 2.0 ft and met the target head of 1.5 ft. The exit from the fish ladder was clear of debris during this June inspection date. Depth of water over the fish ladder weirs was 1.0 foot.

Overall, Wanapum Dam was operating their fishways within acceptable criteria range during the June inspection. One facility change that seems to have occurred is that the project can now operate and maintain the fishway in criteria with two fish pumps operating rather than using gravity-flow water from the forebay of the dam at the Left Bank fishway. This is probably a direct result of shutting down the orifice gates that operated along the powerhouse collection channel in previous years. The Left Bank fishway was always able to maintain criteria during low to medium river flow conditions but was lacking during periods of high flow when the system could not supply sufficient flow to the fishway. The June inspection had very high river Q and flow to the LSEs was close to target levels relating to head differentials. As another point of interest: the project has been working on an automated computer controlled fishway system and is making good headway on implementing the new system.

Rock Island Dam – Glen Liner completed inspection of the adult fish facilities on June 18. Project discharge was 189.5 kcfs with fish spill at about 20% of river flow or near 40 kcfs. As in previous years, the bulk of the river is passing through the new powerhouse with few turbine units operating at the old powerhouse. Turbidity was reported at only 3.8 ft with the water temperature reading 55.2° F.

Left Bank Fishway – Water from the immediate forebay supplies flow through the diffusion system to the two downstream entrances. Gate depth criterion: 6.0 ft minimum and a head differential of 1 - 2 ft. The gates were submerged 6.6 ft below tailwater with the ΔH at 1.4 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 during the inspection 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 9.0 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 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 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 attraction water jet was operating at this fishway 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 0.9 ft “head”, 0.7 ft “head” at the LPE, and 0.6 ft at the TRE (downstream) entrance during the June inspection. Because of the tailwater elevation (>575 ft elev.), all entrance gates had less than the minimum criteria level for head differential of 1.0 ft. The water velocity in the left powerhouse collection channel was 3.6 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 the Right Fishway Entrances.

Rocky Reach Dam – The adult fish facilities were inspected by Glen Liner, WDFW, on June 18. River Q was 171.9 kcfs; there was no spill during the inspection. The water temperature was 54.3°F with the turbidity about 5.5 ft. The project was operating three fish pumps at 53% 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 11.0 ft below tailwater elevation with the head differential at 1.3 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 1.1 ft head differential and again met the criteria standards. The spillway entrance, MSE was operating with gate depth of 11.3 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. Water velocity through the transportation channel was reported at 1.5 fps; minimum standard for velocity. 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 June inspection. Spring spill for juvenile fish ended 6/17 at midnight. Turbine Unit 11 is currently being overhauled.

Wells Dam – Stewart Mitchell, WDFW, inspected the adult fish facilities on June 26. Project discharge was 202.4 kcfs with all 10 main turbine units operating and the remainder of flow through the spillways used to enhance juvenile fish passage at the project. River temperature was 59°F with the turbidity reading 7.0 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 0.1 ft of each other with the deck and staff gages and computer reading. The head differentials from the deck gage read 1.5 ft, the staff gage read 1.4 ft, and the computer reading was 1.3 ft. 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, all measuring gages and computer readings were within 0.1 ft for channel elevation and read the same for the tailwater elevation. The head differential measured was 1.2 ft for the staff and deck gage and 1.3 ft for the computer. The end gate was back at the normal position of 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 slightly below normal during the June inspection. **The targeted head differential of 1.5 ft was not being met at the West Fishway Entrance Gate; it would improve operation if the pump's rpms were increased to provide more flow to that Entrance and meet the 1.5 ft targeted head differential.** The adult trapping schedule will be included when it is initiated this summer and fall.

Ice Harbor Dam – Steve Richards, WDFW, completed an inspection of the adult fish facilities on June 27. Project Q was 97.5 kcfs with 79.4 kcfs spill during the inspection. Water temperature was 60°F with turbidity reading of about 5.0 ft. Eight pumps were operating and supplying water to the South Shore and 3 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 8.4 ft below tailwater with head differential at 1.8 ft. The North powerhouse entrance was submerged 8.6 ft with 1.2 ft head differential. Seven orifice gates were

operating along the powerhouse collection channel. The water velocity through the powerhouse collection channel was reported as 1.9 fps. The South shore and North powerhouse entrance gates were operating with satisfactory gate depth and head differential at these entrances. 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 0.1 ft.

North Shore – The North Shore entrance was submerged 8.4 ft with 1.5 ft head differential for the June inspection. The gate depths and head differential were within criteria range. The fish ladder had 1.1 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 in satisfactory criteria ranges at the main fishway entrances and in the fish ladder. **The inspector reported that, “substantial spray resulting from the high spill prevented him and the COE project biologist from reading the north shore mechanical gages. In addition, high spill levels made it impossible to obtain accurate tailwater elevations, therefore, he used the levels recorded on the computer printout.”** In observing adult fish passage, the majority of the fish pass the project on the powerhouse side (South fish ladder) rather than through the North ladder despite the high % spill that has occurred at that site this year.

Lower Monumental Dam – Steve Richards, WDFW, inspected the adult and juvenile fish facilities on June 26. Project Q was 83.2 kcfs with no spill during the inspection. As much as possible, spill will be limited at this project in 2002 as the tailwater area below the spill basin had severe erosion and damage. When flow exceeds powerhouse turbine capacity, only then will flow be spilled; spill has occurred during the 2002 season with the high flows in the Snake River. Water temperature was 60.5°F with the turbidity reading at 5.0 ft. Three turbine-driven pumps were operating at 75-rpm average and with the excess flow from the juvenile bypass system supplying sufficient Q to the adult fishway.

North Shore – The North Shore entrances were submerged 8.2 ft below tailwater elevation with the head differential reading 1.7 ft for the June inspection. The South Powerhouse entrance gates were on sill and submerged 9.0 ft and maintained head differential of 1.3 ft. The water velocity through the powerhouse collection channel was recorded at 2.1 fps for the inspection. All readings taken at the North shore fishway main entrances were considered satisfactory as the head differentials fell within the range of 1.0 to 2.0 ft and the gate depth was more than the 8.0 ft minimum at the north shore and the south powerhouse gates. 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 8.3 ft and the corresponding head differential was 1.4 ft. Gate SSE-2 is a continuous open gate with a 6-ft opening. All readings at the entrances exceeded minimum criteria ranges and were satisfactory. 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. Relating to the juvenile system, gatewells, and all operating orifices were clear of debris.

Overall, the adult fish facilities were operating within acceptable criteria ranges for the June inspection.

Little Goose Dam – Josh Hanson, ODFW, inspected the adult fish facilities on June 19. Project discharge was 87.4 kcfs with no daytime spill during the inspection. Water temperature was 59.9°F with the turbidity reading at 5.7 ft. Only one of the 2 available turbine-driven pumps was operating at 79-rpm, the project was doing bulkhead changes in the pump pit for a short time. Excess flow from the juvenile bypass system was also supplying water to the adult fishway. The project operated with two pumps for about one month. Pump 2 has

been OOS for repair and major modifications; **Note: this pump finally got up and running on July 2 at 1400 hour so the project is operating with three pumps again.**

The South Shore fishway entrances, SSE-1 and SSE-2, were submerged 9.3/9.4 ft with 1.5 ft head differential using the staff gage and 9.1/9.0 ft and 1.7 ft head using the FSC Board readings. Channel velocity recorded at the south end of the channel registered about -0.5 fps. The water velocity was reported at 2.1 fps at the north shore channel. North Powerhouse entrance gates NPE-1 and NPE-2 were submerged 6.1 ft deep with the head differential at 1.2/1.3 ft for the June inspection. The North Shore Entrances, NSE-1 and NSE-2, were submerged 6.15 ft with the “head” at 1.1/1.2 ft with the staff gage and FSC Board for the month. The exit from the fish ladder and the picket lead section at the counting station appeared clear of debris. 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. The North powerhouse gates were less than the 7.0 ft minimum depth. The NPE and NSE spillway channel lights were burned out or off.

Lower Granite Dam – Josh Hanson, ODFW, inspected the adult fish facilities on June 18. During the inspection, project Q was 92.5 kcfs with 38.2% spill (35.3 kcfs). For 2002, the project is operating spillbay 1 as a surface collector and will normally be spilling water from April through the spring and early summer (test period). **For the spill pattern, the project was spilling through Bays 4-8. The FPP did not receive the updated spill pattern so this might be part of an acceptable spill pattern. I’m in the process of finding the correct pattern.** Water temperature was 59.4°F (taken at the count station) with the turbidity reading more than 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 7.9 ft average and 8.0 ft average depth with ΔH of 1.7 ft and 1.5 ft for the respective FSC Board and the staff gage readings. The FSC readings at the South shore entrance gates were slightly below the 8.0 ft but had satisfactory head differential to improve flow conditions. The **North Powerhouse** entrances were on sill so no further depth could be attained during the inspection. The weir depth was 6.2 ft using the FSC reading and 5.8 ft using the staff gage tailwater reading. The ΔH was 1.6 ft using staff gage readings and 1.3 ft using the FSC Board. **The staff gage readings were 0.4 ft different from the FSC so the project should calibrate their equipment for the North Powerhouse (Same comment as last month).** The velocity in the powerhouse collection channel was about 1.1 fps at the south end of the powerhouse collection channel and 2.5 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 5.6 ft below tailwater elevation with the head differential reading of 1.2 ft at the staff gage and 1.3 ft using the FSC reading.

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 1.1 ft during the inspection.

Overall, the NPEs were on sill during the June inspection so no further depth could be attained. The water velocity at the south end of the collection channel was less than the 1.5 ft minimum criteria for the month. **The project should check calibration of the NPE readings.** The NSEs were submerged less than the required 7.0 ft depth. All head differentials were satisfactory. A new staff gage was placed at the N.Shore entrance this past winter and allows inspectors opportunity to check calibration.