U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#24-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: August 5 - 11, 2016

Turbine Operation

McNary had available 12 to 13 units (out of 14 total units) for power generation. Turbine unit outages are recorded in Table 1 below. The hard 1 percent peak efficiency constraint criteria began April 1. No turbine units ran outside the constraint. The saw tooth unit priority for warm water temperature abatement continued.

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
1	Jul 25 – Sep 23	About 2 months.	Nine year over haul.
11	Aug 8 – 11	3.4 days.	Annual maintenance.
14	Aug 9	32 minutes.	Extended-length submersible bar screen (ESBS) camera inspections.
8	Aug 9	1.1 hours.	Vertical barrier screen (VBSs) replaced.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on August 6, 8 and 10. Fisheries technicians monitored the ladders as shifts allowed. Adult salmonid fish counts, adult lamprey video monitoring and ladder water temperature monitoring continued.

Fish Ladder Exits: The head over weir criteria at both exits are to be within 1.0 to 1.3 feet. The differential criteria at the count stations are to be within 0.0 to 0.5 feet. Both ladder exits met all criteria during measured inspections.

At the Washington exit, debris loads were minimal. The regulating weir tripped an alarm, was reset and its set point adjusted on August 8.

At the Oregon exit, debris loads ranged from minimal to light. Debris loads along the shoreline were light. The regulating weir set point was adjusted on August 8 and 10. The mechanics performed scheduled maintenance on both exit traveling screens.

Fishway Entrances and Collection Channel: Criteria for all entrances are pool differentials measuring between 1.0 and 2.0 feet, and weir depths measuring 8.0 feet or deeper.

At the Washington ladder, all inspection points were in criteria.

At the Oregon ladder, north powerhouse entrances, NFEW2 and NFEW3 measured 7.3 to 7.6 feet in depth all week. South powerhouse entrances, SFEW1 and SFEW2 measured 7.8 to 7.9 feet in depth on August 8 and 10. A possible explanation is low tailwater elevation. The pool differentials remained in criteria.

The Oregon ladder collection channel surface velocities averaged 1.8 feet per second.

Auxiliary Water Supply System: The Wasco County Public Utility District (PUD) turbine unit in the Washington ladder remains out of service for runner replacement, which is scheduled for completion in October. The bypass continues to function satisfactorily.

Two of the three Oregon ladder fish pumps operated satisfactorily with one interruption in service this week. Fish pumps 1 and 3 were out of service for 17 and 16 minutes, respectively, for cooling water supply back flow protector testing on August 10 starting at 1344 hours. Both pumps operated with blade angles of 24 degrees this week. Fish pump 2 is currently under contract for major overhaul with completion scheduled for mid-November.

The juvenile facility continued to supply 450 cubic feet per second (cfs) to the north powerhouse pool.

Juvenile Fish Passage Facility

The fish passage season consists of alternating days of primary and secondary bypass modes. The switch occurs every morning at 0700 hours. There were no deviations from this schedule. Secondary bypass occurred on August 6, 8, and 10. This week, 32 juvenile lamprey and 311 smolts were bypassed. The juvenile shad outmigration continues.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads were minimal at the powerhouse and spillway. The debris predominately consisted of aquatic vegetation, which has been dissipated by the wind.

No high trash rack differential measurements were recorded and no trash racks were cleaned.

No problems were observed in the gatewell slots.

ESBSs/VBSs: ESBSs are deployed in all units. ESBS camera inspections occurred in unit 14 and no problems were found. The ESBSs in slots 6B, 6C and 12C remained in timer mode.

VBS differential monitoring revealed no screens out of criteria. The VBSs in slots 1A, 1B, 2A and 8B were cleaned on August 8 and 9.

VBS rehabilitations continued with new mesh being installed on torn VBS sections. The VBS in slot 8B was replaced with the VBS from slot 1B on August 9. Rehabilitated VBSs were installed in slots 1B and 1A on August 10 and 11, respectively.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: Forty-two orifices were in use. During VBS cleaning, orifices in the affected slots were closed, with makeup water coming from orifices in adjacent slots. An orifice valve actuator was repaired in slot 13B on August 8.

All dewatering and cleaning systems operated satisfactory when in automatic mode.

Bypass Facility: During the bypass season, primary and secondary bypass modes return all fish to the river. Passive integrated transponder (PIT) tag detection occurs in the full flow pipe during primary bypass and throughout the facility during secondary bypass. Smolt monitoring occurs only on secondary bypass days.

All systems functioned well. The sample gates are turned on and off every other day so that they are in service only during secondary bypass. The PIT tag sample gates remained turned off. The facility bypass lines provide a superior route for the fish over the PIT tag sample release lines downstream of the PIT tag sample gates.

Algae removal and cleaning throughout the facility continued.

River Conditions

River condition data during the week was provided by the smolt monitoring staff and is outlined in Table 2 below. Water clarity was provided by the control room. The data period runs from 0700 to 0700 hours each day. Flows and spill are recorded in one-thousand cubic feet per second. Temperatures are recorded in degrees Fahrenheit (F).

Temperature monitoring continued. The contractor, Anchor QEA, continues to document temperature data in a separate report. A new temperature probe was installed at the navigation lock wing wall on August 5.

Routine spill in support of fish passage continued. During the summer spill season, fifty percent of river flow is slated for spill.

Table 2. River Conditions at McNary Dam.

Daily Average River Flow		Daily Average Spill		Water Temperature		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
152.0	131.1	76.2	65.7	70.0	69.1	6.0	6.0

Other

Inline Cooling Water Strainers: Cooling water strainer examinations are slated to occur on September 6.

Invasive Species: The next mussel station examination will occur in late August.

Avian Activity: Avian counts are recorded in Table 3 below.

Table 3. McNary Project's Daily Avian Count.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
Aug 5	Forebay	4	0	2	1	0
	Spill	0	1	0	3	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Aug 6	Forebay	0	1	1	1	0
	Spill	0	2	3	2	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	2	0
Aug 7	Forebay	0	0	1	0	0
	Spill	71	10	2	1	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	4	0
Aug 8	Forebay	0	0	2	0	0
	Spill	52	17	17	3	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	1	0	0
Aug 9	Forebay	0	0	1	0	0
	Spill	1	4	1	4	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	1	0
Aug 10	Forebay	0	0	0	0	0
	Spill	116	3	2	11	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	2	0
Aug 11	Forebay	3	0	2	0	0
	Spill	25	0	0	4	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0

Gull numbers increased with most gulls roosting around the spill zone. Cormorant numbers increased as they continued to feed in the spill zone. Both species appear to be feeding on juvenile shad. Caspian tern numbers remained low as they continued to feed in the forebay and spill zones. Pelican numbers remained fairly low as they were scattered throughout the project.

Ospreys were noted at times. Pelicans, gulls and cormorants continued to roost on the rocks by the Washington shore boat dock, which is outside the forebay zone.

No grebes were observed on project.

United States Department of Agriculture – Animal and Plant Health Inspection Service – Wildlife Services (USDA–APHIS–WS) hazing personnel concluded work on August 6.

The bypass outfall sprinklers have been functioning satisfactory. The sprinklers' supply pump intake is being cleaned twice a week.

Fish Salvage/Rescue**:** Two adult Chinook mortalities were observed in the unit 1 south tailwater bulkhead slot this week. When added to the 48 Chinook mortalities recorded in Weekly Report #23, this brings the total fish mortality to 50 Chinook salmon. The unit's two bulkhead slots are being examined daily.

Research

GBT: Gas bubble trauma (GBT) monitoring continues once a week.

Project: Ice Harbor
Biologist: Ken Fone
Dates: August 5 - 11, 2016

Turbine Operation

Unit 5 was taken out of service on March 14 at 1117 hours, due to an oil leak from the blade packing. The packing is being replaced to fix the leak. Unit 2 was taken out of service on April 25 at 0606 hours for runner replacement. Unit 1 was removed from service on June 14 at 1211 hours when it tripped a protective relay at the generator bus ground. The stator is being repaired to fix the problem. Annual maintenance of unit 1 is also in progress.

Only unit 6 was operated this week, and it was operated within the 1% peak efficiency range (hard constraint).

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on August 8, 9, and 10.

Fish Ladders: The north fish ladder inspection areas (head differentials at fishway exit and picketed leads, and depth over weirs) were in criteria on all inspections. The south fish ladder inspection areas (head differentials at fishway exit and picketed leads, and depth over weirs) were in criteria on all inspections. Criteria for head differentials at ladder exits and picketed leads, and depth over the weirs are 0.5 feet or less, 0.3 feet or less, and 1.0-1.3 feet, respectively. The water surface above the fish ladder exits were clear of debris and the bubblers were operating satisfactorily.

Fishway Entrances and Collection Channel: The south shore entrance (SFE-1) depth and channel/tailwater head differential were in criteria on all inspections. The north powerhouse entrance (NFE-2) depth and channel/tailwater head differential were in criteria on all inspections. The north shore entrance (NSE-1) depth and channel/tailwater head differential were in criteria on all inspections. Fishway entrance criteria are 8 feet depth or greater, or on sill. Channel/tailwater differential criteria are 1 – 2 feet.

The south shore channel velocity was in criteria. The channel velocity criterion is 1.5 - 4.0 feet per second.

Auxiliary Water Supply (AWS) System: Two of the three north shore AWS pumps were in operation during the week. Five of the eight south shore AWS pumps were in operation.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was no debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 10%. Slot 2C was un-watered on July 6 to facilitate the unit 2 head gate sill plate repair.

STSs/VBSs: The STSs are in cycle-run mode, as the average fork length of subyearling Chinook is over 120 mm at the Lower Monumental Juvenile Fish Facility. The STS in slot 5B has not yet been installed to facilitate the work on unit 5. Unit 2 STSs are raised and stored upright in their gatewell slots, since unit 2 will not be operated for the rest of the year. Units 3, 4, and 6 STSs and unit 4 VBSs were inspected on July 19 and 20, with no problems found. The next monthly inspections are scheduled for the week of August 15.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 orifices open. Orifices were routinely cycled and back-flushed once per day.

Juvenile Fish Facility: The juvenile fish facility is operating in bypass mode.

Fish Sampling: Sampling is done for the season.

Removable Spillway Weir (RSW): Spill for fish passage began on April 3 at midnight. On July 29 at 0845 hours, the RSW was closed as per the 2016 Fish Passage Plan, Chapter 6, subsection 2.3.3.7.v. The RSW remains closed and spill is being distributed in accordance with the spill patterns in Table IHR-9.

River Conditions

River conditions during the week are outlined in Table 1 below.

Table 1. River conditions at Ice Harbor Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
28.7	25.1	17.7	14.3	71.0	71.0	9.1	8.7

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Turbine cooling water strainer inspections occurred on July 19 and 20. A total of 2 juvenile lamprey and 19 Siberian prawns (all mortalities) were found. The next monthly inspections will occur during the week of August 15.

Invasive Species: No new exotic species have been found.

Avian Activity: There were a moderate number of piscivorous birds observed around the project. Most of the birds were roosting on Eagle Island and on the BRZ (Boating Restricted Zone) buoys in the forebay.

Research: No on-site research is actively occurring at this time.

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: August 5 - 11, 2016

Turbine Operation

The units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 was removed from service on December 10, 2014 for unit rehabilitation with an estimated return to service date of January 12, 2017. Units 2, 3, 4, 5 and 6 were taken out of service on July 29 at 0653 hours for Doble testing and maintenance on Transformer 1 and Transformer 2. During this period, unit 5 operated at speed-no-load for station service daily from approximately 0600-1700 hours. Units 5 and 6 were available for generation nightly from approximately 1700-0600 hours. Units 2, 3, 4, 5 and 6 returned to service at 1216 hours on August 5. Unit 4 was taken out of service at 0730 hours on August 8 for annual maintenance with an estimated return to service of September 6. Units 2, 3, 5 and 6 were rotated out of service on August 9 and 10 for STS inspections.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on August 5, 6, 7 and 10.

Fish Ladders: Fishway exit head differentials and depths over the weirs were within criteria (≤ 0.5' and 1.0'-1.3', respectively) on all inspections. Picketed lead head differentials were in criteria (≤ 0.4' and ≤ 0.3' for north and south shore fishways, respectively) on all inspections.

Fishway Entrances and Collection Channel: NSE1 and NSE2 weir gates were in depth criteria (criteria: ≥ 8' or on sill) on all inspections. North shore channel/tailwater head was in criteria (1'-2') on all inspections.

SPE1 and SPE2 weir gates were in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, readings were 5.0, 5.5, 5.5 and 5.7 feet. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, readings were 5.8, 6.2, 7.3 and 6.0 feet.

SSE2 was in criteria (6' above sill) on all inspections. South shore channel/tailwater head was in criteria (1'-2') on all inspections.

Auxiliary Water Supply System: AWS pumps 2 and 3 were operated throughout this period. Pump 1 was out of service throughout this period due to a bushing problem. This pump will be replaced with the spare pump as time permits.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 0 square yard of forebay debris observed during this period. Gatewell debris ranged from 0 - 10% surface coverage. No oil problems were observed in the gatewells.

STSs/VBSs: STS's were operated in cycle-run mode throughout the period. STS inspections were conducted August 9 and 10 with all screens found in good operating condition.

Orifices, Collection Channel, Dewatering Structure, and Flume: The collection channel was operated with 19 opened orifices.

Collection Facility: No problems occurred this period.

Transport Summary: Fish transport by barge has been taking place on an every-other-day basis since May 25.

River Conditions

Summer spill operations were initiated at 0001 hours on June 21. Spill was either halted or limited during tailrace transitioning, and barge docking and loading operations. Spill gate 2 was removed from service on June 28 due to a position indication failure and returned to service at 1755 on August 9. Normal spill patterns also resumed when spill gate 2 returned to service. River conditions during the week are outlined in Table 1 below.

Table 1. River conditions at Lower Monumental Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature (^{o}F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
25.3	22.5	14.1	10.4	71.5	69.0	5.0	4.0

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on August 2. There were no live fish recovered. Mortalities included 4 Siberian prawns and 6 American shad fry.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on August 1.

Avian Activity: Daily tailrace counts of feeding piscivorous birds are summarized in Table 2 below. Gulls were the dominant species observed during inspections this week. Conditions met the standard from the avian action plan through this time period. Hazing ended on June 2.

Table 2. Tailrace counts of foraging piscivorous birds at Lower Monumental Dam.

Date	Time	Gulls	Cormorants	Terns	Grebes	Pelicans
August 5	1115	2	0	0	0	0
August 6	1100	1	0	0	0	0
August 7	1100	2	0	0	0	0
August 8	1100	1	0	0	0	0
August 9	1100	19	0	0	0	0
August 10	1100	9	0	0	0	0
August 11	1100	10	0	0	0	0

Research: No onsite research is in progress at this time.

Project: Little Goose
Biologists: Scott St. John and Richard Weis
Dates: August 5 - 11, 2016

Turbine Operation

All turbine units were available for service this week except unit 6. Unit 6 was placed out of service for its annual inspection on July 25 and returned to service on August 10 at 1545 hours. Hard constraint 1% peak efficiency criteria are in effect. No violations to report.

Adult Fish Passage Facility

The Fishway Control System (FCS) software was updated by RJS Construction and returned to automatic operation on August 9. All weirs were manually adjusted and returned to automatic mode to determine functionality of the new software. The system is operating sufficiently, but future calibration and maintenance still need to be performed.

Adult fishway inspections were performed on August 7, August 10 and August 11.

Fish Ladder: The ladder exit head differentials and water depth over weirs met criteria ($\leq$ 0.5 ft. and 1.0-1.3 ft., respectively). Picketed lead differentials ranged between 0.0 and 0.1 feet and also met criteria ($\leq$ 0.3 ft.) on all inspections. The air bubbler used to prevent debris from collecting near the ladder exit operated satisfactorily. Emergency cooling water pumps were running all week at the adult ladder exit.

Fishway Entrances and Collection Channel: Channel to tailwater head differentials maintained criteria (1.0 to 2.0 ft.), except on August 7 and August 10, when the FSC board at the NPE read 2.1 and 2.2 feet respectively. SSE weir depths stayed in criteria ($\geq$ 8.0 ft) on all inspections, ranging between 8.0 and 8.3 feet. NPE weir depths ranged between 4.6 and 5.7 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.1 to 4.7 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocities measured at the north powerhouse ranged between 2.0 and 2.1 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 was returned to service on August 02. The fish ladder is now operating on three pumps. The average water velocity (bottom, middle, top) of the adult channel at the NPE was 2.3 fps on July 13.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: The trash/shear boom is currently still on shore. Efforts are underway to have it repaired. Woody debris in the immediate forebay was estimated at 0 square feet.

Spillway Weir: The TSW was removed on July 11.

ESBS/VBS: ESBS brushes underwent electrical tests on July 13. Drawdowns were performed on unit 1 on July 23 and all differentials met criteria. Tests will be performed in the next report period.

Orifices, Collection Channel, Dewatering Structure, and Flume: The gearbox for the dewatering structure was fixed and placed back into operation on August 02. The juvenile bypass system is presently running with 21 open orifices. Orifices are cycled every 24 hours.

Collection Facility: Sampling is occurring every day as is the collection of fish. The JFF (Juvenile Fish Facility) continues to transport fish by barge every other day. Barge operations are scheduled to end August 15, while truck transport will commence August 17.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 3,482 fish were collected. The descaling and mortality rates were 0.8% and 0.0% respectively. This weekly report period saw 15 adult lamprey removed from the raceways or sample and released one mile above the dam at Little Goose Landing.

River Conditions

River conditions during the week are outlined in Table 1 below.

Table 1. River conditions at Little Goose Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
25.9	23.9	9.0	8.8	69.2	68.5	6.0	4.2

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on July 13. No fish were seen. Strainers are scheduled to be checked in the next report period.

Invasive Species: The zebra mussel substrate monitor was inspection on July 02. No mussels were seen.

Avian Activity: USDA Bird hazing ended on June 25. See Table 2 below for USACE counts.

Table 2. Daily Avian Counts at Little Goose Dam, August 5 - 11, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
August 5	1055	23	6	0	4
August 6	1015	18	4	0	0
August 7	1250	40	7	0	0
August 8	1430	38	8	0	0
August 9	1015	35	3	0	0
August 10	1030	26	3	0	0
August 11	0700	12	0	0	0

*Bird counts are taken from a single observation, Forebay and Tailrace.

Siberian Prawn: Siberian prawns continue to be collected at the Juvenile Fish Facility. Prawns are humanely euthanized by Oregon Department of Fish and Wildlife and Anchor QEA, frozen and properly disposed of in a landfill. There were 1,169 prawns collected in the sample and euthanized during this report period. Prawn numbers are outlined in Table 3 below.

Table 3. Daily Siberian Prawn Counts at Little Goose Dam, August 5 - 11, 2016.

Date	Sample	Collection*
August 5	145	290
August 6	245	490
August 7	157	314
August 8	220	440
August 9	119	238
August 10	130	260
August 11	153	306
Totals	1,169	2,338

*Collection numbers are estimated from sample rates and counts.

Gas Bubble Trauma: GBT inspections ended for the season with the July 19 report. No signs of GBT were seen.

Research: Fish Guidance Efficiency (FGE) emergency gate closure study is being performed on units 2 and 3 for 2016.

Project: Lower Granite
Biologists: Elizabeth Holdren and Robert Horal
Dates: August 5 - 11, 2016

Turbine Operation

Units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 will remain out of service through February 2017 for Kaplan blade linkage repair. Lower Granite annual Doble testing occurred August 8 - 11 as described in the 2016 Fish Passage Plan (Section 4.3.5 page LWG-26). Unit 5 operated at speed-no-load (approximately 5 kcfs) for station service power while all other units were out of service from 0600 - 1800 hours daily. Units 1-4 (T-1 Transformer) were returned to service at about 1800 hours nightly. Units 5 and 6 (T-2 Transformer) remained OOS (out of service) for the duration of Doble testing. Unit 6 remained OOS for annual maintenance with a return to service date of August 19. Doble testing was completed with T1 and T2 returning to service at about 1730 hours, August 11.

Adult Fish Passage Facility

Automatic control system adjustments to trouble shoot internal functioning errors in the program are ongoing. Observations of the fish ladder indicate the installation of a new control program has improved system performance. The fish ladder control system remained in automatic mode during the week. As of July 28, prolonged RF (radio frequency) noise events have been interfering with PIT (Passive Integrated Transponder) tag detection in the upper section of the fish ladder. PSMFC and Corps personnel continue to track down the source of the RF noise. Adult fish facilities were inspected by Corps or Anchor QEA biologists August 5, 6, 7, and 10.

Fish Ladder: Fish ladder exit head differential and depth over the weirs were in criteria (≤0.5’ and 1.0 - 1.3’, respectively) on all inspections. Picketed lead head differential was in criteria (≤ 0.3’). No debris was observed near the fish ladder exit.

Fish Ladder Entrances and Collection Channel: SSE1 and SSE2 weir gates met depth criteria (criteria ≥8’ or on sill) on all inspections. South shore channel/tailwater head differential met criteria (criteria 1’-2’) on all inspections.

NPE1 and NPE2 weir gates were in sill criteria (criteria ≥8’ or on sill) on all inspections. While on sill, the gate depth readings were 5.4’, 5.2’, 5.1’, and 4.9 feet. The control system reading for NPE elevations fluctuated between 628.0 and 628.1 while the gates are actually on sill due to vibration of the sensor in the gate channel. The North powerhouse channel/tailwater head differential was in criteria (criteria 1’-2’) on all inspections.

NSE1 was in criteria (criteria ≥7’ or on sill) on all inspections. NSE2 has been out of service since 2011 and remains set with a chain fall hoist in the closed position to improve channel/tailwater head differentials. North shore channel/tailwater head differential met criteria (criteria 1’-2’) on all inspections.

Collection Channel Velocity: The collection channel average velocity was in criteria (criteria 1.5-4.0 fps) on all inspections.

Auxiliary Water Supply System: The fish ladder is in two pump operation with AWS pumps 1 and 3 in service. Pump 2 remains in standby mode.

Fish Ladder Temperature Control System: Fish ladder temperature control pumps remain in operation.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: No debris was observed in the forebay this week. Oil sheens were observed in gatewell slots 2A, 3C, and 4A August 11, likely due to rain runoff from the roadway deck.

ESBSs/VBSs: ESBSs are scheduled to be inspected in late August.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: The collection channel is operating with 18 - 20 orifices open. Orifices are being cycled every three hours.

Collection Facility: The facility is in collection for transport mode.

Transport Summary: Every other day barge transport continues with barges leaving Lower Granite on odd number days. The last barge is scheduled to depart Lower Granite Dam on August 15.

River Conditions

Summer spill in support of fish passage began at 0005 hours on June 21. Due to increasing water temperatures, a flat spill pattern with the no RSW (Table LWG-9, Fish Passage Plan) was implemented at 1401 hours on June 29.

River conditions during the week are outlined in Table 1 below.

Table 1: River conditions at Lower Granite Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (F^o)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
29.1	25.1	16.4	14.0	65.0	62.0	5.0+	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainers are scheduled to be inspected in late August.

Invasive Species: The zebra/quagga mussel substrate was inspected August 5. No zebra/quagga mussel were found. Smolt monitoring biologist euthanized 795 Siberian prawns from the collection sample this week.

Avian Activity: Piscivorous bird counts began March 26 with observations being taken from the top of the navigation lock. Avian hazing started April 1 and concluded June 30. Daily piscivorous bird counts are summarized in Table 2 below.

Table 2. Daily piscivorous bird counts at Lower Granite Dam.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
August 5	1409	1	1	0	0
August 6	1300	1	0	0	0
August 7	1120	0	1	0	0
August 8	1330	0	3	0	0
August 9	1000	3	4	0	0
August 10	1625	2	4	0	0
August 11	1547	2	7	0	0

GBT: Gas bubble trauma sampling has concluded for the season.

Adult Fish Trap Operations: The trap is operating Monday through Thursday with a sample rate of 27%. The diversion gate in the turn pool area is changed to the ladder passage position from about 1400 hours on Fridays to about 1300 hours on Sundays to facilitate volitional fish passage and ongoing monitoring of sound vibration influence on fish behavior. Dewatering occurred from August 5 through 7 to flush large numbers of shad in the adult trap fish return channel. All shad in the return channel were routed to the river and no direct handling was necessary.

Fish Rescue Operation: No fish rescues occurred this week.

Research

Anchor QEA "Sound and Vibration Effects on Adult Fish Passage through the Lower Granite Ladder": The second year of monitoring for adult fish passage delay through the ladder in response to sound and vibration from JFF construction will continue 1 March through September 2016. Weekly PIT tag detections from the ladder exit tunnel and entrance weir 648 are correlated with sound signals from hydrophones and water particle movement signals from three triangulated accelerometers at the entrance weir, weir downstream of Diffuser 14, and exit pool. Passage histories from fish previously PIT-tagged for other evaluations are used. The turn pool swing gate used to divert fish into the adult trap is moved to the non-trapping ladder passage position at about 1400 hours Friday to about 1400 hours Sunday March 1 through August 17 to

allow for unobstructed passage rate PIT tag detections. Weekly progress reports are available for in-season review.

Anchor QEA "Lower Granite Ladder Temperature Reduction Structures Post-construction Evaluation of Adult Sockeye and Chinook Salmon Ladder Exit Success and Behavior": A Sonar camera was installed 20 June below the Lower Granite adult ladder exit to record sockeye and Chinook salmon ladder exit success and behavior in response to cooler water at the forebay exit and Diffuser 14 intake chimney. Passage time is recorded through the PIT tag arrays in the ladder exit tunnel. Passage time will be correlated with temperatures recorded through existing temperature probe stations and a temperature depth string at the outside edge of spray bar. Three optical cameras above the water surface at the ladder exit will record behavioral response of fish to the spray plume trajectories. Remote control boat transects of the spray affected forebay area will map velocity magnitudes and trajectories measured by ADCP (Acoustic Doppler Current Profiler) early July and mid-August. Weekly progress reports are available for in-season review.