U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#21-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: July 15 - 21, 2016

Turbine Operation

McNary had available 11 to 14 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
8	Jul 18 to 21	3.3 days.	Oil leaks repaired.
9	Jul 18 to 21	3.2 days.	Doble testing.
10	Jul 18 to 28	About 10 days.	Doble testing and annual maintenance.
5 thru 7	Jul 19	1.1 hours total.	Extended-length submersible bar screen (ESBS) camera inspections.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on July 15, 17 and 19. 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 and debris loads remained minimal.

At the Oregon exit, the regulating weir set point was adjusted and the exit traveling screens tripped two alarms, which the operators reset on July 15.

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. The operators adjusted the entrance weirs on July 15.

At the Oregon ladder, the north powerhouse entrances, NFEW2 and NFEW3 measured 7.8 to 7.9 feet in depth all week. The south powerhouse entrances, SFEW1 and SFEW2 measured 7.8 to 7.9 feet in depth on July 15 and 17. A possible explanation is low tailwater elevation. The Oregon ladder entrance weirs set points were adjusted 0.1 feet deeper on July 15. The pool differentials remained in criteria.

The Oregon ladder collection channel surface velocities averaged 1.7 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. The PUD's mobile crane left the project on July 19.

Two of the three Oregon ladder fish pumps operated satisfactorily with no interruptions in service this week. Both pumps operated with blade angles of 24 degrees. 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 was no deviations from this schedule. Secondary bypass occurred on July 15, 17, 19 and 21. This week, no juvenile lamprey and 10,900 smolts were bypassed.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained very light to minimal. Most of the debris was along the Oregon shore. The debris consisted of woody material and aquatic vegetation. The quantity of new incoming debris along the powerhouse and debris loads elsewhere remained minimal.

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

No problems were observed in the gatewell slots.

ESBSs/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections occurred in units 5 through 7. 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. However, a total of eight screens were cleaned as a preventive measure on July 18 and 21. A scheduled inspection and cleaning was performed on the screen in 7C slot on July 18. VBS rehabilitations continued with new mesh being installed on torn VBS sections.

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. The orifice valve actuator was repaired in slot 6A on July 18.

All 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 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. 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.

Temperature monitoring continued. The probe in gatewell slot 5B failed on July 18 and was replaced by the probe that had been in spillbay 12. This probe will not be replaced. The contractor, Anchor QEA, continues to document temperature data in a separate report.

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 (Unit 1 scroll case)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
181.4	139.3	90.9	69.9	68.2	67.3	6.0	6.0

Other

Inline Cooling Water Strainers: The next cooling water strainer examinations will occur on August 2.

Invasive Species: The next mussel station examinations will occur on July 25.

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
Jul 15	Forebay	0	0	0	1	36
	Spill	0	0	8	10	0
	Powerhouse	0	0	7	0	0
	Outfall	0	0	2	4	0
Jul 16	Forebay	1	0	0	2	20
	Spill	0	0	5	8	0
	Powerhouse	0	0	6	0	0
	Outfall	0	1	0	3	0
Jul 17	Forebay	4	0	1	1	30
	Spill	0	4	3	7	0
	Powerhouse	0	0	0	0	0
	Outfall	0	5	0	1	0
Ju1 18	Forebay	0	0	0	4	35
	Spill	0	8	37	11	0
	Powerhouse	0	0	3	0	0
	Outfall	0	5	0	5	0
Jul 19	Forebay	1	0	0	4	22
	Spill	0	3	11	15	0
	Powerhouse	0	0	2	1	0
	Outfall	0	5	2	3	0
Jul 20	Forebay	0	0	0	2	17
	Spill	1	0	2	9	0
	Powerhouse	0	0	1	0	0
	Outfall	0	2	0	2	0
Jul 21	Forebay	0	0	2	1	12
	Spill	0	1	0	6	0
	Powerhouse	0	0	0	0	0
	Outfall	0	4	0	1	0

Gull numbers remained low and most gulls observed were juveniles. Caspian tern numbers have decreased. They continued to feed in the spill and powerhouse zones. Pelicans and cormorants continued to feed at the bypass outfall. Cormorant numbers have decreased and they were roosting on the navigation lock wing wall. Pelican numbers remained stable as they appear to be also feeding on adult shad along the shorelines and in the forebay. Grebe numbers were stable in the forebay. Ospreys were noted at times. Gulls, pelicans and cormorants were roosting on the rocks by the Washington shore boat dock, which is outside the forebay zone.

No grebes were observed in the gatewell slots.

United States Department of Agriculture – Animal and Plant Health Inspection Service – Wildlife Services (USDA–APHIS–WS) hazing personnel continued working one 8 hour shift per day.

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

The McNary Project assistant fisheries biologist went to John Day Project to examine their hazing and avian deterrent program on July 20.

Research

GBT: Gas bubble trauma (GBT) monitoring continues with monitoring occurring twice a week during the spill season.

Project: Ice Harbor
Biologist: Ken Fone and Charlie Dennis
Dates: July 15 - 21, 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.

Units are being operated within the 1% peak efficiency range (hard constraint), except for unit 3. Unit 3 is sometimes being operated a few megawatts below the peak efficiency range, as the GDACS (Generic Data Acquisition Control System) program needs to be updated with the narrower operating efficiency range of unit 3 since it became a fixed-blade unit.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on July 18, 19, and 21.

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 except for the south shore picketed leads with a head differential of 0.6 feet on the July 21 inspection. The south shore picketed leads require frequent cleaning of accumulated vegetation every 3 to 7 hours to keep the differential within criteria. This location was periodically out of criteria during the week due to time constraints to keep the leads clean. 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 5%. Slot 2C was unwatered 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 lengths of subyearling chinook are over 120 mm at the Lower Monumental Juvenile Fish Facility. The STS in slot 5B has not yet been installed to facilitate the work in unit 5. Unit 2 STSs are raised 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. No problems were found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 to 21 orifices open. Orifices are routinely cycled and back-flushed three times per day. The light for orifice 2BN was found burnt out on July 19. Orifice 2BS was opened in place of 2BN until the light was replaced on July 20.

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

Fish Sampling: The last sample of the season occurred on July 14.

Removable Spillway Weir (RSW): Spill for fish passage began on April 3 at midnight. In mid-May, persistent furrowing was observed in the surface of the water flowing over the RSW, which produced turbulence and splashing in the otherwise laminar flow. The furrows seemed to be formed from certain hydraulic conditions further upstream in the forebay. With a few minor exceptions, there has been less turbulence observed in the flow over the RSW since then, even when dam operations at the time of the observations are similar to the operations occurring in mid-May.

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
36.60	27.10	26.20	16.20	69.0	68.0	9.0	9.0

*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.

Invasive Species: No new exotic species have been found.

Avian Activity: The numbers of piscivorous birds counted around the project are shown in Table 2 below. Most of the birds are resting on Eagle Island and the BRZ (Boating Restricted Zone) buoys in the forebay

Table 2. Daily maximum piscivorous bird counts at Ice Harbor Dam.

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
July 15	---	---	---	---	---
July 16	---	---	---	---	---
July 17	---	---	---	---	---
July 18	34	9	4	0	26
July 19	22	7	6	0	28
July 20	45	8	14	0	13
July 21	42	12	2	0	23

*Avian counts after June 30 are taken 4 days per week.

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

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: July 15 - 21, 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. Unit 3 was removed from service for annual maintenance on June 27 at 0700 hours, with an estimated return to service date of July 25.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on July 15, 16, 17 and 20.

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 5.5, 5.0, 5.6 and 4.9 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 6.3, 5.9, 6.3 and 5.8 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 - 12% surface coverage. No oil problems were observed in the gatewells.

STSs/VBSs: STSs were operated in continuous-run mode through July 11 due to average sub-yearling chinook (CH0) length being less than 120 mm. STS operations changed to cycle-run mode on July 12 due to a consecutive 3 day period with CH0 lengths over the 120 mm criteria point. STS/VBS inspections were conducted July 5 and 6 with all screens found in good operating condition.

Orifices, Collection Channel, Dewatering Structure, and Flume: The collection channel was operated with 19 opened orifices. Orifice 6B33 was found less than fully open at 1630 hours on July 15. JFF (Juvenile Fish Facility) personnel opened it fully at that time and the shift operator was informed.

Collection Facility: No problems occurred this report period.

Transport Summary: Fish transport by barge has be occurring 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 with an estimated return to service date of July 28. The spill pattern was adjusted in coordination with the region. 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
34.0	25.7	17.0	13.4	69.0	68.5	5.0	4.4

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on July 7. There were no live fish recovered. Mortalities included 1 juvenile lamprey, 3 juvenile salmon and 5 Siberian prawns.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on July 4.

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
July 15	1100	3	0	0	0	0
July 16	1100	2	0	0	0	0
July 17	1100	3	0	0	0	0
July 18	1100	3	0	0	0	0
July 19	1100	4	1	0	0	0
July 20	1100	2	0	0	0	0
July 21	1115	1	0	0	0	0

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

Project: Little Goose
Biologists: Richard Weis and Scott St. John
Dates: July 15 - 21, 2016

Turbine Operation

All turbine units were available for service this week except for unit 5. Unit 5 was placed out of service for its annual inspection on July 05. Hard 1% peak efficiency operating criteria are in effect. No violations to report.

Adult Fish Passage Facility

The new Fishway Control System still does not work properly. RJS (contractor) attempted to install software updates on July 19 which proved unsuccessful. The system will remain in manual mode until repairs can be made

Adult fishway inspections were performed on July 17 and 21.

Fish Ladder: The ladder exit head differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs held steady at 1.2 feet (criteria 1.0-1.3 ft.) and picketed lead differentials ranged between 0.0 and 0.2 feet (criteria $\leq$ 0.3 ft.). 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 ranged between 1.0 and 1.9 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.1 and 8.6 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 5.3 and 5.6 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.5 to 4.6 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the north powerhouse ranged between 1.9 and 2.7 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 is being serviced. The estimated repair date has been extended again. Presently fish pumps 2 and 3 are operating. Water velocity averaged from the bottom, middle and top of the adult channel at the NPE was 2.3 fps on June 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 from service on July 11.

ESBS/VBS: Electrical ESBS brush tests were conducted July 13. Drawdowns were not performed for the week of July 15-21.

Orifices, Collection Channel, Dewatering Structure, and Flume: The juvenile bypass system is presently running with 22 opened orifices. The number of opened orifices compensate for the removal of the weir motor gear box. Presently, flume water is not controllable except by the number of opened orifices.

Transportation Facility: The collection and sampling of fish is occurring daily, and the JFF (Juvenile Fish Facility) is transporting fish by barge every other day.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 8,564 fish were collected. The descaling and mortality rates were 1.3% and 1.4% respectively. This weekly report period saw 6 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
33.1	28.2	10.6	8.2	68.5	68.2	6.0	3.9

*Ladder temperature.

Other

Inline Cooling Water Strainers: Inline cooling water strainers in all units were last inspected on July 13. No fish were seen.

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

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

Table 2. Daily Avian Counts at Little Goose Dam, July 8 - 14, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
July 15	0800	14	2	0	0
July 16	0800	29	1	0	3
July 17	1230	20	5	0	0
July 18	1150	13	13	0	1
July 19	0930	19	7	0	1
July 20	1000	10	8	0	2
July 21	1000	14	2	0	0

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

Gas Bubble Trauma: GBT examinations were performed on July 19. 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: July 15 - 21, 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. Unit 4 was taken out of service at 0600 hours on July 5 for annual maintenance and returned to service at 1430 hours on July 20. Unit 6 was operated outside of unit priority order for petroleum grease base line testing from1558 to 1702 hours on July 15.

Adult Fish Passage Facility

Automatic control system adjustments to trouble shoot internal functioning errors in the software program are ongoing. Observations of the fish ladder indicate the installation of a new control program has improved system performance. The system remained in automatic mode during the week. On June 25, the control system was having difficulty reading the NSE and SSE channel water depth due to the tailwater elevation dropping to 633.0 feet. SSE channel water sensors were relocated on July 14. The control system channel water elevation reading functioned during this report week. Adult fish facilities were inspected by Corps or Anchor QEA biologists on July 15, 16, 17, and 20.

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

Fish Ladder Entrances and Collection Channel: SSE1 and SSE2 weir gates were in depth criteria (criteria ≥8' or on sill) on all inspections. South shore channel/tailwater head differential was in 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', 5.6', 5.4', and 5.5 feet. The control system reading for NPE elevations fluctuated between 628.0 and 628.1 when the gates were actually on sill due to vibration of the sensor in the gate channel. The North powerhouse channel/tailwater head differential met 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 was in 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 pump 1 (in slow speed mode) and 3 in service. Pump 2 is in standby mode.

Fish Ladder Temperature Control System: The fish ladder temperature control pumps were turned on for the summer passage season at 1506 hours on June 9.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: No debris was observed in the forebay this week.

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. As reported last week, the south shore make up water valve had failed (at 0710 hours on July 7). The makeup water valve was subsequently assessed and found to be functioning on July 21 at 1300 hours. The cause of the failure is under investigation.

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

Transport Summary: Every other day barge transport continues with barges leaving Lower Granite on even number days in July.

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 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
37.3	30.6	17.9	17.6	65.0	63.0	5.0+	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainers are scheduled for inspection in late July.

Invasive Species: The zebra/quagga mussel substrate was inspected July 3. No organisms were found.

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
July 15	1011	0	1	0	0
July 16	1000	0	1	0	0
July 17	0933	0	0	0	0
July 18	1100	0	1	0	0
July 19	1238	1	0	0	0
July 20	1345	0	0	0	0
July 21	1315	0	0	0	0

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

Adult Fish Trap Operations: The trap sample rate is set at 27%, M-F (20% overall). The adult trap diversion gate in the turnpool area is changed to the ladder passage position from about 1400 hours Friday to 1300 hours Sunday to facilitate the sound vibration study. The adult trap was dewatered during the weekend of July 15-17 due to NOAA personal not being on project to monitor water levels during the weekend with large numbers of shad in the adult ladder.

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.