U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#22-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: July 22 - 28, 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
10	Jul 18 to 28	10.3 days.	Annual maintenance.
1	Jul 25 to Sep 23	About 2 months.	Nine year overhaul.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on July 23, 25 and 27. 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 remained minimal. However, a light amount of aquatic vegetation was along the shore line and at the upstream navigation lock gate. On July 23 and 27, the regulating weir tripped an alarm, which was reset. On July 25, multiple exit weir alarms were reset. On July 27, the regulating weir set point was adjusted.

At the Oregon exit, debris loads ranged from minimal to heavy. Debris loads along the shoreline were light to heavy. The debris was mostly aquatic vegetation. The regulating weir set point was adjusted on July 23, 25 and 27. The tilting weirs set point was adjusted on July 27.

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, the north powerhouse entrances, NFEW2 and NFEW3 measured 7.7 to 7.8 feet in depth on July 23 and 25. The south powerhouse entrance, SFEW1 measured 7.9 feet in depth on July 23. SFEW2 measured 7.9 feet in depth on July 23 and 27. A possible explanation is low tailwater elevation. The pool differentials remained in criteria.

The Oregon ladder collection channel surface velocities averaged 1.6 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 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 one deviation from this schedule. On July 25, at about 1441 hours, excess water overflowed during a sample at the A side passive integrated transponder (PIT) tag detector, just upstream of the count tank. From 1451 to 1507 hours, the system was placed in primary bypass mode to facilitate the cleaning and removal of fine debris and blue green algae. The areas cleaned included the A and B side flume dewatering units and flumes just downstream of the separator. One sample was missed. One subyearling Chinook mortality was recovered from the ground.

Secondary bypass occurred on July 23, 25, and 27. This week, 20 juvenile lamprey and 3,107 smolts were bypassed.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads were very light to moderate at the powerhouse and minimal at the spillway. The debris predominately consisted of aquatic vegetation.

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

No problems were observed in the gatewell slots.

Extended-length Submersible Bar Screen (ESBSs)/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections occurred in units 8 through 10. No problems were found. The units were placed in standby during the inspections. The ESBSs in slots 6B,

6C and 12C remained in timer mode. The brush cycle for the ESBS in slot 8B was recalibrated on July 26.

VBS differential monitoring revealed no screens out of criteria and none were cleaned. 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.

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. 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.

An air leak on the B side sample gate actuator was repaired on July 27. Sampling was unaffected. 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. 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 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. The spill pattern was altered for navigation as required.

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
165.0	131.8	82.8	66.0	71.1	67.7	6.0	6.0

Other

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

Invasive Species: Mussel station examinations on July 25 revealed no problems.

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 22	Forebay	0	0	2	1	12
	Spill	0	3	10	12	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Jul 23	Forebay	0	0	0	0	16
	Spill	0	1	5	3	0
	Powerhouse	0	0	0	1	0
	Outfall	0	0	0	0	0
Jul 24	Forebay	0	0	0	0	6
	Spill	0	0	1	2	0
	Powerhouse	0	0	1	0	0
	Outfall	0	0	0	0	0
Ju1 25	Forebay	0	0	1	0	5
	Spill	0	0	1	2	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Jul 26	Forebay	0	0	0	0	6
	Spill	0	4	0	3	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Jul 27	Forebay	0	0	0	1	0
	Spill	0	3	1	6	0
	Powerhouse	0	0	1	0	0
	Outfall	0	0	0	1	0
Jul 28	Forebay	0	0	0	3	6
	Spill	0	0	0	2	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0

No gulls were observed on project. All other avian species have decreased in number. Caspian tern continued to feed in the forebay, spill and powerhouse zones. Cormorants were observed in the spill zone. Pelican were scattered throughout the project. Grebes were observed in the forebay and ospreys were noted at times. 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.

Fish Rescue: On July 26, unit 1 scroll case was entered and no fish were observed. On July 27, one 4 foot sturgeon, two channel catfish and one adult lamprey were moved from the unit 1 draft tube. All fish were returned immediately to the river.

Research

GBT: Gas bubble trauma (GBT) monitoring continues. Twelve of the 20 smolt mortalities for the week were removed from the recovery raceway following GBT examinations. On July 27, GBT monitoring was reduced from twice to once a week.

Project: Ice Harbor
Biologist: Ken Fone and Charlie Dennis
Dates: July 22 - 28, 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 occurring.

Units are being operated within the 1% operating efficiency range (hard constraint), except for unit 3. Unit 3 is sometimes being operated a few megawatts below the operating efficiency range. The GDACS 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 25, 26, and 27.

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 three inspections. 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 Lower Monumental Juvenile Fish Facility. The STS for slot 5B has not yet been installed to facilitate the work on unit 5. Unit 2 STSs are raised and stored 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.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 opened orifices. Orifices are routinely cycled and back-flushed three times 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. 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.

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
32.6	28.8	21.3	18.2	70.0	70.0	9.0	8.8

*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 roosting on Eagle Island and the BRZ buoys in the forebay.

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

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
July 22	---	---	---	---	---
July 23	---	---	---	---	---
July 24	---	---	---	---	---
July 25	81	11	3	0	8
July 26	33	6	5	0	20
July 27	17	12	2	0	25
July 28	37	36	3	0	31

*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 22 - 28, 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 and returned to service on July 22 at 1230 hours.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on July 22, 23, 24 and 27.

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 or sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, the reading was 7.8 feet. 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 4.9, 5.0, 4.7 and 5.0 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 6.1, 6.1, 5.7 and 6.1 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: STSs were operated in continuous-run mode through July 11 due to the 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 orifices open.

Collection Facility: No problems occurred during this period.

Transport Summary: Every-other-day fish transport by barge has been progress since May 25.

River Conditions

Summer spill operation were initiated at 0001 hours on June 21. Spill was either halted or limited during tailrace transitioning, 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 August 3. 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
31.2	26.4	17.0	13.9	68.2	68.0	5.0	4.0

*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 salmonids 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 22	1100	7	0	0	0	0
July 23	1100	2	0	0	0	0
July 24	1100	1	0	0	0	0
July 25	1100	0	0	0	0	0
July 26	1100	1	0	0	0	0
July 27	1100	2	0	0	0	0
July 28	1100	0	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 22 - 28, 2016

Turbine Operation

All turbine units were available for service this week except unit 5 and 6. Unit 5 was placed out of service for its annual inspection on July 05 and was returned to service on July 22. Unit 6 was placed out of service for its annual inspection on July 25. Hard constraint 1% peak efficiency 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 a software update on July 19 which was unsuccessful. The system will remain in manual mode until repairs can be made

Adult fishway inspections were performed on July 24, 25 and 28.

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 0.1 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 1.1 and 1.7 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.0 and 8.7 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 4.7 and 5.8 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.3 to 4.9 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the north powerhouse ranged between 1.7 and 2.0 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 is being serviced. The estimated repair completion date is August 01. 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 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. Unit 1 drawdowns were performed on July 23. All differentials met criteria.

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: Collection and sampling is occurring daily. 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 3,322 fish were collected. The descaling and mortality rates were 1.2% and 2.1% respectively. This weekly report period saw 9 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
32.0	28.5	10.6	9.0	70.3	69.1	6.0	6.0

*Ladder temperature.

Other

Inline Cooling Water Strainers: 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 counts.

Table 2. Daily Avian Counts at Little Goose Dam, July 22 - 28, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
July 22	1045	11	2	0	1
July 23	1045	37	7	0	2
July 24	0800	25	1	0	2
July 25	1230	24	11	0	1
July 26	0800	12	1	0	1
July 27	1015	11	1	0	0
July 28	1045	24	9	0	1

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

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

Research: The 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 22 - 28, 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.

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 the system performance. The system remained in automatic mode during the week. SSE collection channel water elevation sensor readings were consistent with physical readings this report week. Adult fish facilities were inspected by Corps or Anchor QEA biologists July 22, 23, 24, and 27.

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 were in depth criteria (criteria ≥8' or on sill) on all inspections. The 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 5.7', 5.5', 5.6', and 5.6 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 was in criteria (criteria 1'-2') on all inspections.

Collection Channel Velocity: 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 normal service. Pump 2 is in standby mode.

Fish Ladder Temperature Control System: Fish ladder temperature control pumps were placed into service 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.

Collection Facility: The facility is in collection for transport mode. On July 25, a 205 mm bull trout was recovered from the collection sample and released to the river.

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 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
33.5	30.5	18.0	17.7	66.0	64.2	5.0+	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainers were inspected July 25. Recovered species included 1 juvenile lamprey, 1 crayfish and 2 Siberian prawns. Mortalities included 1 juvenile lamprey, 1 Siberian prawn and 1 unclipped sub yearling Chinook.

Invasive Species: The zebra/quagga mussel substrate was inspected July 24. 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 22	1026	0	0	0	0
July 23	1100	1	0	0	0
July 24	0941	1	0	0	0
July 25	1450	0	0	0	0
July 26	1145	0	0	0	0
July 27	1415	0	1	0	0
July 28	1330	0	0	0	0

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

Adult Fish Trap Operations: The daily trap sample rate is set at 27% M-F (20% overall). The adult trap diversion gate in the turn pool 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 from July 22 to July 24 due to large numbers of shad in the adult ladder.

Fish Rescue Operations: 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.