U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#26-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: August 19 - 25, 2016

Turbine Operation

McNary turbine unit outages are recorded in Table 1 below. The saw tooth unit priority for warm water temperature abatement will conclude on September 1 at 0001 hours.

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
1	Jul 25 to Sep 23	About 2 months.	Nine year overhaul.
4	Aug 19 to 22 Aug 24 to 25	67.3 hours. About 20 hours.	Upper guide bearing high temperature and relay issue.
6	Aug 20 to 22 Aug 23 to 24	44.1 hours. 17.4 hours.	Extended-length submersible bar screen (ESBS) failure in slots 6B and 6A, respectively.
3	Aug 22 to 25	3.3 days.	Annual maintenance.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on August 20, 22 and 24. The fish ladder control system computer required rebooting on August 20. National Oceanic & Atmospheric Administration (NOAA) Fisheries personnel performed their monthly inspection on August 24.

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. The picketed leads were cleaned as required, including weekends.

At the Washington exit, debris loads were minimal. The count station differential measured 1.0 feet on August 19. The project biologist immediately cleaned picketed leads. The regulating weir tripped an alarm and was reset on August 20.

At the Oregon exit, debris loads were light. Along the shoreline, debris loads were light to moderate. On August 18, northeast winds began moving aquatic vegetation to and around the Oregon ladder exit. At 0110 hours on August 19, an alarm sounded in the control room. The roving operator found approximately 2 feet of flow over the picketed lead walkway. By 0150

hours, the general maintenance staff was on project to clean the leads. The ladder was switched to orifice flow. By 0300 hours, the leads were cleaned and the ladder was returned to automatic mode.

At 0453 hours, the aquatic vegetation on the leads had built up again, sounding the alarm within the control room. At 0530 hours, the ladder was again switched to orifice flow to release pressure from the leads support structure. By 0730 hours, the general maintenance staff had completed cleaning the leads again. At 0745 hours, the roving operator noted weirs 338 and 339 were not responding. The electrical staff was called in at 0757 hours. Staff also noted that weir 338 had flipped and was lying downstream instead of lying upstream. (This is probably what damaged the gear box mentioned below). By 0847 hours, the decision was made to stay in orifice flow and leave the picketed leads raised.

From 0900 hours to 1200 hours, the general maintenance staff restored weir 338 to the proper position and the leads were lowered, while the electrical staff returned power to weirs 338 and 339 along with returning the exit to automatic mode. The regulating and tilting weirs set points were adjusted.

Weir 338 remained out of service as one of the two gear boxes was found cracked. The mechanics removed all oil from the gear box and no oil had entered the river. The weir shafts could possibly be bent but this cannot be determined until the weir drive is removed during the winter maintenance season when the ladder is dewatered.

Project staff determined it would be best to defer repairs to the February ladder outage period. The exit program can regulate the ladder with weir 338 out of service and still maintain criteria. Project staff will continue to monitor the Oregon exit closely and have the operators make weir adjustments as required for forebay elevation changes. Spare gear boxes have been ordered and will be delivered in approximately two months.

On August 22, exit water velocities between the weirs were measured. The velocities ranged between 1.6 to 4.1 feet per second (fps).

On August 21, the regulating and tilting weirs set points were adjusted. On August 22, the count station differential measured 0.7 feet before the ladder inspection occurred. The picketed leads were immediately cleaned. On August 25, the encoder at weir 339 failed and it was replaced with the encoder from weir 338. In addition, the set point was adjusted on the tilting weir.

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 7.2 to 7.6 feet in depth all week. South powerhouse entrance, SFEW1 measured 7.8 to 7.9 feet in depth all week. South powerhouse entrance, SFEW2 measured 7.8 and 7.9 feet in depth on August 20 and

24, respectively. A possible explanation for these measurements is low tailwater elevation. Pool differentials remained in criteria.

The Oregon ladder collection channel surface velocities averaged 1.4 fps.

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 several interruptions in service this week as recorded in Table 2 below.

Table 2. Fish Pump Outages

Pump	Date	Length	Time	Reason
1 & 3	Aug 19	5 minutes.	Afternoon.	Bus switch.
1	Aug 22	1.6 hours.	1423 to 1558 hours.	Station service upgrade contract.
3	Aug 22	2.0 hours.	1423 to 1622 hours.	Station service upgrade contract.
3	Aug 23	6 minutes.	1030 to 1036 hours.	Bus switch.
3	Aug 23	20 minutes.	1040 to 1100 hours.	Tripped off line after bus switch.
3	Aug 23	10 minutes.	1145 to 1155 hours.	Station service upgrade contract.
3	Aug 23	23 minutes.	1223 to 1246 hours.	Station service upgrade contract.
1	Aug 23	1.4 hours.	1157 to 1320 hours.	Station service upgrade contract.
1 & 3	Aug 24	5 minutes.	Afternoon.	Bus switch.

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. There were no deviations from this schedule. Secondary bypass occurred on August 20, 22 and 24. This week, 28 juvenile lamprey and 168 smolts were bypassed. Three adult lamprey were removed from the sample tanks.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads were minimal at the powerhouse and spillway. The debris predominately consisted of aquatic vegetation, which was driven to the Oregon shore by northeast winds.

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.

The ESBS in slot 6B failed August 20. The electrical staff was able to return the ESBS to service August 22 after resolving a programming issue. The ESBS in slot 6A failed again on August 23 after the camera inspection. The electrical staff resolved another programming issue and returned the ESBS to service August 24.

VBS differential monitoring revealed no screens out of criteria. The VBSs in slots 10A and 12B were cleaned August 23. 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.

All dewatering and cleaning systems operated satisfactory when in automatic mode. However, on August 24, the drive gearbox on the side dewaterer screen cleaning brush was found to be leaking oil. Plywood on the access platform caught the oil keeping it from entering the channel. The mechanics attached an absorbent pad to the gearbox so any additional leakage could be retained. The pad is being monitored daily for replacement as needed. New gearbox seals have been ordered and should arrive in about one month. The gearbox is expected to function satisfactorily until then.

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 have been functioning satisfactory. Algae removal and cleaning throughout the facility continued.

River Conditions

Routine summer spill in support of fish passage will conclude September 1 at 0001 hours. River condition data during the week was provided by the smolt monitoring staff and is outlined in Table 3 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).

Table 3. 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
159.3	117.2	79.7	58.4	71.8	70.1	6.0	6.0

Temperature monitoring will conclude August 31. The contractor, Anchor QEA, continues to document temperature data in a separate report.

Other

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

Invasive Species: Mussel station examinations on August 24 revealed no problems.

Avian Activity: Avian counts are recorded in Table 4 below.

Gull numbers fluctuated with most gulls roosting around or feeding in the spill zone. Cormorant numbers remained low as they continued to feed in the spill zone. Both species appear to be feeding on juvenile shad. No Caspian tern were observed. Pelican numbers remained fairly low as they were observed in the spill and outfall zones. Grebes were occasionally observed in the forebay zone. Ospreys were noted at times. Gulls and cormorants continued to roost on the rocks by the Washington shore boat dock, which is outside the forebay zone.

The bypass outfall sprinklers have been functioning satisfactory. The sprinklers' supply pump intake was being cleaned twice a week. On August 23, at 1600 hours, the system was removed from service due to a low oil level in the supply pump, which had to be ordered. The oil will be picked up August 31 and the system will be return to service that afternoon.

Table 4. McNary Project's Daily Avian Count.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
Aug 19	Forebay	0	0	0	0	0
	Spill	12	0	0	3	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	1	0
Aug 20	Forebay	0	0	0	0	0
	Spill	26	2	0	5	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Aug 21	Forebay	0	0	0	0	0
	Spill	11	0	0	4	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Aug 22	Forebay	0	0	0	0	0
	Spill	54	6	0	1	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	1	0
Aug 23	Forebay	1	0	0	0	0
	Spill	3	1	0	3	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Aug 24	Forebay	1	0	0	0	2
	Spill	0	0	0	5	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Aug 25	Forebay	0	4	0	0	0
	Spill	11	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0

Fish Salvage/Rescue**:** No new mortalities were observed in the unit 1 tailwater bulkhead slots this week. The unit's two bulkhead slots are being examined daily.

Research

GBT: Gas bubble trauma (GBT) monitoring did not occur this week due to low smolt numbers.

Project: Ice Harbor
Biologist: Ken Fone
Dates: August 19 - 25, 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 a protective relay tripped at the generator bus ground. The stator was repaired to fix the problem, and the unit was returned to service on August 25 at 1241 hours. Annual maintenance of unit 1 also occurred during that outage period. Unit 4 was out of service from August 18 at 1150 hours to August 19 at 1630 hours to replace a leaky bushing on the output breaker. Units 6 and 1 were operated during the week, and both were operated within the 1% peak efficiency range (hard constraint).

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on August 22, 23, and 25.

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 3%. 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 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 were inspected on August 16 and 18, with no problems found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 to 23 opened orifices. 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 per the 2016 Fish Passage Plan, Chapter 6, subsection 2.3.3.7.v. The RSW has remained 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
32.4	21.9	21.3	11.1	71.0	70.0	9.4	6.9

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Turbine cooling water strainer inspections occurred on August 16 and 18. A total of 23 juvenile shad and 1 Siberian prawn (all mortalities) were found.

Invasive Species: No new exotic species have been found.

Avian Activity: There were few piscivorous birds observed around the project. Pelicans were observed foraging downstream of the spillway, across from the coffer cells.

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

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: August 19 - 25, 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 4 was taken out of service at 0730 hours on August 8 for annual maintenance with an estimated return to service of September 6. Unit 2 was taken out of service from 0725 to 0958 hours on August 23 to "change out" the head cover pump.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on August 19, 20, 21 and 24.

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 5.6, 5.3, 5.6 and 5.6 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 6.0, 5.9, 6.2 and 6.6 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 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 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 report period.

Transport Summary: Every-other-day truck transport is occurring and scheduled to continue through 0700 hours on September 30.

River Conditions

Summer spill in support of fish passage was initiated at 0001 hours on June 21. 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
28.3	19.4	15.0	7.1	69.8	69	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.

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 19	1100	7	0	0	0	0
August 20	1100	10	0	0	0	0
August 21	1100	7	0	0	0	0
August 22	1100	11	0	0	0	0
August 23	1100	4	0	0	0	0
August 24	1100	12	0	0	0	0
August 25	1100	5	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 19 - 25, 2016

Turbine Operation

All turbine units were available for service except unit 4. Unit 4 was placed out of service for its 6-year overhaul on August 15. No 1% violations to report.

Adult Fish Passage Facility

The Fishway Control System 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. System is operating sufficiently, but future calibration and maintenance still need to be performed.

Adult fishway inspections were performed on August 23 and August 25.

Fish Ladder: The ladder exit head differentials and water depth over weirs maintained within criteria ($\leq$ 0.5 ft. and 1.0-1.3 ft., respectively) 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 in 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 23, when the FSC board at NPE2 read 2.1 feet. SSE weir depths stayed in criteria ($\geq$ 8.0 ft.) on all inspections, ranging between 8.0 and 8.1 feet. NPE weir depths ranged between 4.7 and 5.5 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.2 to 4.5 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocities measured at the north powerhouse ranged between 1.9 and 2.2 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 NPE measured 2.6 fps on August 22.

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 continues to be void of debris.

Spillway Weir: The TSW was removed on July 11.

ESBS/VBS: Electrical ESBS brush tests were conducted on August 22. Drawdown tests were performed on unit 1 on August 13. All results met criteria.

Orifices, Collection Channel, Dewatering Structure, and Flume: The gear box for the weirs in the primary dewatering structure was removed from service after an oil leak was discovered. Following the shutdown, equipment surfaces were was cleaned and the oil was removed. Weirs remained off until repairs were completed. The juvenile bypass system is presently running with 21 opened 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 truck every other day. Fish transport by barge ceased with the last barge departure on August 15.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 1,029 fish were collected. The descaling and mortality rates were 0.5% and 0.7% respectively. This weekly report period saw 3 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
27.7	20.4	10.7	7.2	70.0	68.4	6.0+	6.0

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on August 22. No fish were seen.

Invasive Species: The zebra mussel substrate monitor was inspected on August 24. No mussels were seen.

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

Table 2. Daily Avian Counts at Little Goose Dam, August 19 - 25, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
August 19	1030	23	4	0	0
August 20	1015	26	6	0	0
August 21	1200	24	0	0	0
August 22	1350	44	10	0	0
August 23	1030	14	11	0	0
August 24	0803	2	4	0	0
August 25	1000	8	12	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 7,700 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 19 - 25, 2016.

Date	Sample	Collection*
August 19	767	
August 20	987	
August 21	2,031	
August 22	1,267	
August 23	1,795	
August 24	395	
August 25	458	
Totals	7,700	

*Collection and sample numbers are the same as the facility is currently sampling at 100%

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 19 - 25, 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 6 is scheduled to return to service August 26.

Adult Fish Passage Facility

Automatic control system monitoring of internal function for errors in the program are ongoing. Observations of the fish ladder indicate the installation of a new control program has improved fish ladder flow conditions. The fish ladder control system remained in automatc mode during the week. As of July 28 prolonged RF (Radio Frequency) noise events have been interfering with PIT tag detection in the upper section of the fish ladder. PSMFC and Corps personnel continue to track down the source of the RF noise. The cause of the noise has been difficult to determine due to multiple construction activities and the Lower Granite communication upgrade. Adult fish facilities were inspected by Corps or Anchor QEA biologists on August 20, 21, 22 and 24.

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. 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 5.2', 5.5', 5.7', and 5.5 feet. The control system reading for NPE elevations fluctuate between 628.0 and 628.1 while the gates are actually on sill due to the vibration of the sensor in the gate channel. North powerhouse channel/tailwater head differentials 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: Average collection channel velocities met criteria (criteria 1.5-4.0 fps) on all inspections except for a reading of 1.4 fps taken August 24.

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

Fish Ladder Temperature Control System: Fish ladder temperature control pumps remain in operation. The cooling water pumps were turned off 1400 hours to 1439 hours August 24 to re-rout power to DQ2.

Juvenile Fish Passage Facility

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

ESBSs/VBSs: ESBS/VBS inspections are scheduled for late September.

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

Collection Facility: The facility is in collection for transport mode. The sample is being processed every other day (on transport days).

Transport Summary: Every other day barge transport ended with the last barge leaving Lower Granite on August 15. Every other day truck transport started August 17 with trucks leaving Lower Granite on odd numbered days in August.

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
28.8	21.3	16.1	8.43	65.5	64.0	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 biologists euthanized 1,722 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 19	1140	0	0	0	0
August 20	1351	3	5	0	0
August 21	1017	0	4	0	0
August 22	1000	0	2	0	0
August 23	1530	2	11	0	0
August 24	1600	4	16	0	0
August 25	1600	0	11	0	0

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

Adult Fish Trap Operations: The trap operated Monday through Thursday with a sample rate of 27%. Starting August 18 the trap is being operated seven day a week with a sample rate of 19%. Fall Chinook are being collected for broodstock for Lyons Ferry Hatchery and the Nez Perce Tribe.

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.