U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#23-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: July 29 – August 4, 2016

Turbine Operation

McNary had available 11 to 13 units (out of 14 total units) for power generation. Turbine unit outages are recorded in Table 1 below. The hard 1 percent peak efficiency constraint criteria began April 1. No turbine units ran outside the constraint. The saw tooth unit priority for warm water temperature abatement continued.

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
1	Jul 25–Sep 23	About 2 months.	Nine year over haul.
14	Aug 1–4	3.4 days.	Annual maintenance.
4	Aug 2	6.6 hours.	Upper guide bearing relay calibration.
11 thru 13	Aug 2	1.0 hours.	Extended-length submersible bar screen (ESBS) camera inspections.
8	Aug 3	5.0 hours.	Replaced oil head packing.
6	Aug 3	8.0 hours.	Hub tapped.
4	Aug 3–4	23.3 hours.	Upper guide bearing relay.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on July 29, August 1 and 4. Fisheries technicians monitored the ladders as shifts allowed. Adult salmonid fish counts, adult lamprey video monitoring and ladder water temperature monitoring continued. The cable for the Oregon ladder midpoint temperature probe was switched from parachute cord to braided steel cable this week.

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 Oregon ladder count station differential was noted to be 0.9 feet on August 2 during casual observations. The general maintenance staff immediately cleaned the picketed leads.

At the Washington exit, debris loads ranged from minimal to light. The operators flushed aquatic vegetation downstream through the navigation lock on August 1. The regulating and

tilting weir set points were adjusted July 29. The regulating weir tripped an alarm and was reset on August 1.

At the Oregon exit, debris loads ranged from light to heavy. Debris loads along the shoreline were light to heavy. The debris mostly consisted of aquatic vegetation. The regulating weir set point was adjusted on July 29, August 1 and 4. The tilting weir set point was adjusted August 4.

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 entrance, NFEW2 measured 7.9 and 7.5 feet in depth on July 29 and August 4, respectively. North powerhouse entrance, NFEW3 measured 7.6 feet in depth on August 4. South powerhouse entrances, SFEW1 and SFEW2 measured 7.9 feet in depth on July 29. A possible explanation is low tailwater elevation. The pool differentials remained in criteria.

SFEW1 tripped an alarm by raising and triggering its upper limit switch on July 31 at approximately 1500 hours. Since SFEW1 is the master weir, SFEW2 raised and triggered its upper limit switch. Operators switched both weirs to manual mode and lowered them to criteria depth. Since the alarm did not clear, the operators left the weirs in manual mode overnight. Both upper limit switches were examined on August 1 and the weirs returned to automatic mode at 1018 hours.

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 were no deviations from this schedule. Secondary bypass occurred on July 29, 31, August 2 and 4. This week, 35 juvenile lamprey and 900 smolts were bypassed. The juvenile shad out migration has begun.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads were minimal to heavy 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.

ESBSs/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections occurred in units 11 through 13. The ESBS cleaning brush bar in slot 12C could not be located with the video camera. However, the screen was clean. The ESBS cleaning brush had been in timer mode and required calibration prior to the inspection. Following the inspection, the ESBS brush cycle was recalibrated and left inadvertently in automatic mode. The next day, maintenance staff again recalibrated the brush operating cycle and returned the ESBS to timer mode.

The ESBSs in slots 6B and 6C also remained in timer mode. The cleaning brush cycle for the ESBS in slots 12A and 12B were recalibrated August 2.

VBS differential monitoring revealed no screens out of criteria. A total of seven screens were cleaned on July 30 and August 4. VBS rehabilitations continued with new mesh being installed on torn VBS sections. VBS replacements will begin next week.

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.

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

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

Algae removal and cleaning throughout the facility continued.

River Conditions

River condition data during the week was provided by the smolt monitoring staff and is outlined in Table 2 below. The data period runs from 0700 to 0700 hours each day. Flows and spill are

recorded in one-thousand cubic feet per second. Temperatures are recorded in degrees Fahrenheit (F).

Temperature monitoring continued. The contractor, Anchor QEA, continues to document temperature data in a separate report.

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
169.2	131.6	84.8	65.9	71.5	69.6	6.0	6.0

Other

Inline Cooling Water Strainers: Cooling water strainer examinations occurred on August 2. One juvenile lamprey mortality was removed. No smolts were observed.

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

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

All avian species have decreased in number. The gulls observed on project were mostly juveniles. Caspian terns continued to feed in the forebay and spill. Cormorants were feeding mostly in the spill zone. Pelicans were scattered throughout the project. Grebes were observed in the forebay and ospreys were noted at times. Pelicans and cormorants continued to roost 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. Their last day will be August 6.

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

Table 3. McNary Project's Daily Avian Count.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
Jul 29	Forebay	1	0	1	0	5
	Spill	0	1	0	6	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Jul 30	Forebay	0	0	2	2	0
	Spill	0	0	0	6	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
Jul 31	Forebay	0	1	0	3	7
	Spill	0	2	15	5	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	1	3	0
Aug 1	Forebay	0	0	0	1	0
	Spill	1	3	0	6	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	1	3	0
Aug 2	Forebay	4	0	4	1	3
	Spill	0	0	16	5	0
	Powerhouse	0	0	0	1	0
	Outfall	0	0	0	0	0
Aug 3	Forebay	2	4	2	2	3
	Spill	0	2	4	2	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	2	0
Aug 4	Forebay	2	0	0	1	0
	Spill	0	1	1	0	0
	Powerhouse	0	0	0	0	0
	Outfall	0	2	0	1	0

Fish Salvage/Rescue**:** Unit 1 was removed from service and dewatering began on July 25. No adult salmonids were observed in the scroll case or draft tube when inspected on July 26 and 27, respectively.

During the July 29 ladder inspection at approximately 1200 hours, the project biologist examined unit 1's two tailwater stop log slots and discovered adult salmonid mortalities in each slot. Theses slots remain watered during the unit outage. Water filled the space above the installed stop logs.

The general maintenance staff was immediately informed since a fish salvage was necessary. The mechanical crew was immediately informed that air lines were needed for each slot. Fortunately, both crew were already on project working overtime on other jobs. By 1600 hours, all known mortalities were removed and the aeration lines were installed.

At the time of the discovery, the north slot appeared to hold two live sturgeon and three live Chinook salmon. One live sturgeon and two live Chinook salmon were observed in the south slot. There is presently no way to rescue these fish due to the structure of the slots as there is a large recess on the upstream side of the slot. The air stones will remain in place until the unit returns to service on September 23.

On July 30, the biologist noted one Chinook mortality on each slot. On August 1, from 0930 to 1045 hours, additional mortalities were removed.

There were a total of 48 adult summer Chinook salmon mortalities recovered, 12 from the north slot and 36 from the south slot. Of these, 17 were removed on July 29 and 26 were removed on August 1. Fifteen of the 48 fish recovered were adipose clipped, 28 were non-clipped and the clipped/non-clipped status of 5 fish could not be determined.

Since August 1, 5 additional mortalities (4 in the north slot and 1 in the south slot) have been observed but not removed due to the strong odor and carcass decomposition. Since carcasses were starting to decompose, most of the mortalities probably occurred within a day or two of log installation except for two fish from the north slot which appeared to have expired more recently.

Heat stress is most likely cause of mortality as air temperature was over 100 degrees Fahrenheit the week before the fish were discovered. Low oxygen levels could have possibly contributed to the morality as well. On August 1, at 1130 hours, the south slot measured 73 degrees F, the north slot measured 70 degrees F and the Oregon ladder entrance measured 70 degrees F.

Unit 1 is near the south Oregon ladder powerhouse entrance and it is possible that adult salmon have a false attraction to unit 1. No other recent unit outages resulted in salmonid mortality or required air stones to be installed. Also, the unit was dewatered per the Fish Passage Plan page MCN-27. This all suggest the fish were in the tailwater bulkhead slots before the unit outage began. In the past, salmon have been observed in unit 1's tailwater slots during the passage season. The best remedy to this problem would be moving unit 1 outages that require tailwater log installation to a different time of year when adult fish passage is minimal.

Research

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

Project: Ice Harbor
Biologist: Charlie Dennis
Dates: July 29 – August 4, 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 in progress.

All available 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 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 August 2, 3, and 4.

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 4 to 8 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 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 lengths of sub-yearling 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 were routinely cycled and back-flushed three times per day until July 31. On August 1, orifices began to be cycled and back-flushed one time per day. Once per day cycling and back-flushing will continue for the rest of the year, per the fish passage plan.

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

Fish Sampling: Sampling is done for the season.

Removable Spillway Weir (RSW): Routine 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. On July 29 at 0845 hours, the RSW was closed as per the 2016 Fish Passage Plan, section 2.3.3.7, subsection v. The RSW has remained closed and spill is being distributed in accordance with Table IHR-9 (patterns for spill with no RSW).

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
29.5	26.6	18.6	15.8	71.0	70.0	11.4	8.0

*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 roosting 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 29	31	19	0	0	24
July 30	---	---	---	---	---
July 31	---	---	---	---	---

*Avian counts after June 30 are taken 4 days per week until they end for the season on August 1.

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

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: July 29 – August 4, 2016

Turbine Operation

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

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on July 29, 30, 31 and August 3.

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, 4.9 and 5.1 feet. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, readings were 5.7, 6.3, 6.0 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 - 12% surface coverage. No oil problems were observed in the gatewells.

STSs/VBSs: STSs were operated in cycle-run mode throughout this period. 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.

Collection Facility: No problems occurred this period.

Transport Summary: Since May 25, fish have been transported by barge every-other-day.

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 indicator failure. The estimated return to service date is yet to be determined. 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
28.0	23.2	17.0	12.6	71.2	70.0	5.0	4.4

*Scrollcase temperatures.

Other

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

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

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

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

Date	Time	Gulls	Cormorants	Terns	Grebes	Pelicans
July 29	1100	0	0	0	0	0
July 30	1100	3	0	0	0	0
July 31	1100	4	0	0	0	0
August 1	1100	4	0	0	0	0
August 2	1100	2	0	0	0	0
August 3	1100	4	0	0	0	0
August 4	1100	1	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: July 29 – August 4, 2016

Turbine Operation

All turbine units were available for service this week except unit 6. Unit 6 was placed out of service for its annual inspection on July 25 and is estimated to return to service on August 12. Hard constraint 1% peak efficiency criteria are in effect. No violations to report.

Adult Fish Passage Facility

The new Fishway Control System (FCS) still does not work properly. RJS (contractor) attempted to install software update on July 19 which was unsuccessful. This system will remain in manual mode until repairs can be made. Adult fishway inspections were performed on July 31, August 2 and August 4.

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

Fishway Entrances and Collection Channel: Channel to tailwater head differentials ranged between 1.1 and 1.9 feet (criteria 1.0 to 2.0 ft.), except on August 4 when the FSC board at NPE read 2.1 feet. SSE weir depths stayed in criteria (≥ 8.0 ft) on all inspections, ranging between 8.2 and 8.7 feet. NPE weir depths ranged between 5.4 and 5.8 feet (criteria ≥7.0 ft.) and were on sill. NSE weir depths ranged between 4.5 to 4.8 feet (criteria ≥ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the north powerhouse ranged between 1.7 and 2.7 fps (criteria 1.5 to 4.0 fps).

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

Juvenile Fish Passage Facility

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

Spillway Weir: The TSW was removed on July 11.

ESBS/VBS: Electrical ESBS brush tests were performed on July 13. Drawdowns were performed on unit 1 on July 23. All differentials met criteria.

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

Collection Facility: Fish collection and sampling is occurring every day. The JFF (Juvenile Fish Facility) continues to transport fish by barge every other day.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 3,720 fish were collected. The descaling and mortality rates were 1.4% and 0.8% respectively. This weekly report period saw 11 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
28.6	25.0	10.5	8.9	69.8	67.5	6.0	4.2

*Ladder temperature.

Other

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

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

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

Table 2. Daily Avian Counts at Little Goose Dam, July 29 – August 4, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
July 29	1030	22	3	0	0
July 30	1030	39	3	0	0
July 31	1315	35	9	0	0
August 1	1250	27	8	0	0
August 2	1045	36	0	0	0
August 3	1045	11	47	4	0
August 4	1115	15	0	0	0

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 29 – August 4, 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 was taken out of service 0606 hours August 1 for annual maintenance and is scheduled to RTS (Return to Service) on August 19.

Adult Fish Passage Facility

Automatic control system adjustments to trouble shoot internal functioning errors in the program are ongoing. Observations of the fish ladder indicate the installation of a new control program has improved system performance. The system remained in automatic mode during the week. Adult fish facilities were inspected by Corps or Anchor QEA biologists on July 30, 31, August 2, and 3.

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 differentials were 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 6.0', 5.9', 5.8', and 5.5 feet. The control system reading for NPE elevations fluctuated between 628.0 and 628.1 while the gates are actually on sill due to sensor vibrations 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: Collection channel average velocity met criteria (criteria 1.5-4.0 fps) on all inspections except for August 3 with a reading of 1.4 fps.

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

Fish Ladder Temperature Control System: 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 opened orifices. Orifices are being cycled every three hours.

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

Transport Summary: Every other day barge transport continues with barges leaving Lower Granite on odd number days in August with the last barge scheduled to leave August 15.

River Conditions

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

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

Table 1: River conditions at Lower Granite Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (F^o)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
30.7	26.1	17.9	13.4	64.1	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: Zebra/quagga mussel substrate was inspected August 5. 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 29	1225	0	0	0	0
July 30	1415	1	2	0	0
July 31	1315	0	1	0	0
August 1	1407	1	1	0	0
August 2	1345	0	0	0	0
August 3	1524	0	1	0	0
August 4	1541	0	1	0	0

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

Adult Fish Trap Operations: The trap sample rate is 27% daily trap rate 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 July 29-31 due to 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.