U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#20-2016

Project: McNary
Biologists: Bobby Johnson and Denise Griffith
Dates: July 8 - 14, 2016

Turbine Operation

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

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
7 & 8	Jul 11 to 14	3.3 days.	Doble testing and annual maintenance.
1 thru 3	Jul 12	49 minutes total.	Extended-length submersible bar screen (ESBS) camera inspections.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on July 8, 10 and 12. Fisheries technicians monitored the ladders as shifts allowed. Adult salmonid fish counts, adult lamprey video monitoring and ladder water temperature monitoring continued.

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

At the Oregon exit, the regulating weir set point was adjusted on July 10. The mechanics performed scheduled maintenance on both exit traveling screens.

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

Both ladders met all inspection point criteria except the north powerhouse entrances, NFEW2 and NFEW3 measured 7.9 feet in depth on July 10 and 12. A possible explanation is low tailwater elevation.

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 no deviations from this schedule. Secondary bypass occurred on July 9, 11 and 13. This week, 50 juvenile lamprey and 55,002 smolts were bypassed.

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

No high trash rack differential measurements were recorded and no trash racks were cleaned. No problems were observed in the gatewell slots.

ESBSs/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections occurred in units 1 through 3. No problems were found. The ESBSs in slots 6B and 12C remained in timer mode. The electrical staff resolved the programing issue with the screen in slot 12C reported last week. The screen in slot 6C tripped an alarm on July 13. After repeated alarms and recalibration attempts, the screen was switched to timer mode.

VBS differential monitoring revealed no screens out of criteria. However, the screens in slots 1A, 1B, 3A and 3B were cleaned as a preventive measure on July 13. 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 systems operated satisfactory when in automatic mode. The channel hoist underwent scheduled maintenance on July 12.

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

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

Algae removal throughout the facility continued. Light fixtures above the separator and sample tanks received new covers this week.

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. Facility staff determined on July 10 that many of the probes had been recalibrated improperly last week. All probes were removed and recalibration was begun immediately. The probes were redeployed on July 11. The navigation lock wing wall continued to be without a probe. A new probe has been ordered. The probe in gatewell slot 2B was lost on July 12. It was replaced by the probe that had been in the sample recovery raceway. This probe will not be replaced. The barge dock probe was moved to the bypass outfall this week. Anchor QEA contractors continue 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
185.0	128.0	92.6	64.1	67.2	66.2	6.0	6.0

Other

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

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

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 8	Forebay	1	2	0	2	20
	Spill	0	7	31	11	0
	Powerhouse	0	0	17	1	0
	Outfall	0	8	1	1	0
Jul 9	Forebay	1	0	0	3	16
	Spill	0	0	12	2	0
	Powerhouse	0	0	7	0	0
	Outfall	0	1	0	4	0
Jul 10	Forebay	0	4	0	2	23
	Spill	0	34	175	17	0
	Powerhouse	0	0	3	0	0
	Outfall	0	13	7	5	0
Ju1 11	Forebay	0	0	1	0	33
	Spill	0	3	7	10	0
	Powerhouse	0	0	0	0	0
	Outfall	0	7	2	1	0
Jul 12	Forebay	0	0	1	1	31
	Spill	3	25	19	18	0
	Powerhouse	0	0	3	0	0
	Outfall	0	9	2	3	0
Jul 13	Forebay	3	3	0	0	35
	Spill	0	0	2	8	0
	Powerhouse	0	0	3	0	0
	Outfall	0	2	0	4	0
Jul 14	Forebay	0	0	0	2	40
	Spill	0	0	10	5	0
	Powerhouse	0	0	5	0	0
	Outfall	0	1	0	4	0

Gull numbers remained low. Caspian tern numbers remained stable as they continued to feed in the spill, powerhouse and bypass outfall zones. Pelicans and cormorants continued to feed at the bypass outfall. Cormorant numbers continued to increase slightly and they were also roosting around the spillway. Pelican numbers remained stable as they appear to be also feeding on adult shad along the shorelines and in the forebay. Pelicans continued to feed in the tailrace below the juvenile facility separator at night and were observed inside the Oregon ladder exit on July 10.

Grebe numbers were stable in the forebay. Blue herons and ospreys were noted at times. Gulls, pelicans and cormorants were roosting on the rocks by the Washington shore boat dock, which is outside the forebay zone.

No grebes were observed in the gatewell slots.

United States Department of Agriculture – Animal and Plant Health Inspection Service – Wildlife Services (USDA–APHIS–WS) hazing personnel concluded boat hazing and the second shift on July 8 and 9, respectively. One shift land based hazing continues. Wildlife Services lethal take for June was nine cormorants and six gulls at McNary.

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

Research

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

Project: Ice Harbor
Biologist: Ken Fone
Dates: July 8 - 14, 2016

Turbine Operation

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

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

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on July 5, 6, and 7.

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 south shore picketed leads require frequent cleaning of accumulated vegetation to keep the differential within criteria. 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/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%. On July 5, the maintenance bulkhead was removed from gatewell slot 5B and the slot was filled back up with water, followed by the installation of the bulkhead into slot 2C. Slot 2C was unwatered on July 6 to facilitate the unit 2 head gate sill plate repair.

STSs/VBSs: The STSs were in continuous run mode from May 3 to July 12, due to the presence of sockeye or subyearling Chinook in the Ice Harbor and/or Lower Monumental samples with average fork lengths under 120 mm. The STSs are now in cyclic run mode, as the average fork lengths are over 120 mm. The STS for slot 5B has not yet been installed to facilitate the work on unit 5. Unit 2 STSs remain raised in their gatewell slots, since unit 2 will not be operated for the rest of the year. Units 1, 3, 4, and 6 STSs and unit 6 VBSs were inspected on June 21 and 22, with no problems found. The next monthly STS inspections are scheduled for the week of July 18.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 orifices open. An orifice for gatewell slot 5B was opened on July 13. Orifices are routinely cycled and back-flushed three times per day.

Juvenile Fish Facility: The juvenile fish facility is operating in bypass mode except when collecting fish for the sample.

Fish Sampling: Fish sampling occurs twice a week, on Mondays and Thursdays. The last sample of the season occurred on July 14. Sampling results are contained in Table 1 below. There were 2 subyearling Chinook mortalities encountered during sampling operations on July 11. These fish were most likely dead or dying when they came into the separator, but they did not exhibit any external signs of diseases or injuries upon examination.

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

Table 1. Fish condition sampling results at Ice Harbor Dam

July 11:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	0	---	---	---
UC-CH	0	---	---	---
C-CH-O	32	0	1	0
UC-CH-O	65	1	1	0
C-SH	0	---	---	---
UC-SH	0	---	---	---
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	97	1	2	0

July 14:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	0	---	---	---
UC-CH	0	---	---	---
C-CH-O	16	0	0	0
UC-CH-O	15	0	0	0
C-SH	0	---	---	---
UC-SH	0	---	---	---
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	31	0	0	0

River Conditions

River conditions during the week are outlined in Table 2 below.

Table 2. River conditions at Ice Harbor Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
36.3	27.8	24.6	8.9	68.0	66.0	9.0	7.0

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Turbine cooling water strainer inspections occurred on June 21 and 22. A total of 1 unclipped subyearling Chinook, 5 juvenile lamprey and 7 Siberian prawns (all mortalities) were found. The next monthly inspections are scheduled for the week of July 18

Invasive Species: No new exotic species have been found.

Avian Activity: The numbers of piscivorous birds counted around the project are shown in Table 3. The numbers of gulls and terns increased from last week. Most of the gulls and terns were observed roosting on Eagle Island.

Table 3. Daily maximum piscivorous bird counts at Ice Harbor Dam.

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
July 8	---	---	---	---	---
July 9	---	---	---	---	---
July 10	---	---	---	---	---
July 11	69	6	36	0	13
July 12	47	26	1	0	25
July 13	20	21	2	0	29
July 14	31	20	8	0	36

*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 8 - 14, 2016

Turbine Operation

The units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 was removed from service on December 10, 2014 for unit rehabilitation with an estimated return to service date of January 12, 2017. Unit 3 was removed from service for annual maintenance on June 27 at 0700 hours with an estimated return to service date of July 25. Unit 2 was removed from service at 0658 hours on July 7 for a thrust bearing pressure switch change and returned to service at 1040 hours on July 8, 2016.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on July 8, 9, 10 and 13.

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 5.4, 5.4, 5.1 and 5.2 feet. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, readings were 5.8, 6.1, 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 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 - 18% surface coverage. No oil problems were observed in the gatewells.

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

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

Collection Facility: No problems occurred this period.

Transport Summary: Fish transport by barge has been occurring on and every-other-day basis since May 25.

River Conditions

Summer spill operation was initiated at 0001 hours on June 21. Spill was either halted or limited during tailrace transitioning, and barge docking and loading operations. Spill gate 2 was removed from service on June 28 due to a position indication failure. The estimated return to service has yet to be determined. The spill pattern was adjusted and regionally coordinated.

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

Table 1. River Conditions at Lower Monumental Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature (^{o}F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
34.7	28.2	17.0	13.6	68.8	68.0	5.0	4.6

*Scrollcase temperatures.

Other

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

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

Avian Activity: Daily tailrace counts of feeding piscivorous birds are summarized in Table 2 below. Gulls and cormorants 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 8	1130	19	2	0	0	0
July 9	1115	13	0	0	0	0
July 10	1130	14	0	0	0	0
July 11	1100	17	0	0	0	0
July 12	1130	41	0	0	0	0
July 13	1130	15	0	0	0	0
July 14	1100	4	0	0	0	0

Research: Pacific Northwest National Laboratory/Battelle – Ice Harbor smolt survival study. Small numbers of smolts are taken from Lower Monumental's collection for use in this study. See the ANCHOR QEA weekly report for a summary of these fish. The research concluded on July 7.

Project: Little Goose
Biologists: Richard Weis
Dates: July 8 - 14, 2016

Turbine Operation

All turbine units were available for service this week except unit 5. Unit 5 was placed out of service for annual inspection on July 05. 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. The system will remain in manual mode until repairs can be made.

Adult fishway inspections were performed on July 10, 11, 12 and 14.

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 ranged between 1.2 and 1.3 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 1.2 and 1.9 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 5.4 and 5.9 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.6 to 5.0 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the north powerhouse ranged between 1.9 and 2.5 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 is being serviced. The estimated repair date has been extended again. Presently fish pump 2 and 3 are operating. The average water velocity from the bottom, middle and top of the adult channel at the NPE was 2.3 fps. on June 13.

Juvenile Fish Passage Facility

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

Spillway Weir: The repair to spillbay 1 was completed by cannibalizing parts from spllbay 5 and a special spill pattern was approved. The TSW was removed on July 11.

ESBS/VBS: ESBS brushes were electrically tested on July 13. Drawdowns were performed on unit 1 on July 08. All met differentials met criteria.

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

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

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 18,109 fish were collected. The descaling and mortality rates were 1.2% and 0.9% 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
36.0	28.4	10.8	8.5	68.4	67.8	6.0	4.8

*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 inspection on July 02. No mussels were seen.

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

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

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
July 8	1000	20	2	0	1
July 9	0730	14	1	0	4
July 10	0800	32	1	0	2
July 11	0830	29	0	0	0
July 12	1000	17	1	0	1
July 13	1050	2	0	0	0
July 14	0830	9	0	0	0

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

Gas Bubble Trauma: GBT was performed on July 11. No signs of GBT were seen.

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

Project: Lower Granite
Biologists: Elizabeth Holdren and Robert Horal
Dates: July 8 - 14, 2016

Turbine Operation

Units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 will remain out of service through February 2017 for Kaplan blade linkage repair. Unit 4 was taken out of service at 0600 hours on July 5 for annual maintenance and is schedule to return to service on July 22. Unit 3 was out of service from 0652 hours, July 11, to 1218 hours, July 14, for VBS repairs. Unit 6 was operated within unit priority order for petroleum grease, base line testing for EAL (Environmentally Acceptable Lubricant) application from 1654 hours to 1918 hours, July 11; from 1308 hours to 1701 hours on July 12; and from 1602 hours to 2001 hours on July 13. Unit 6 was operated outside of unit priority order for petroleum grease base line testing from 1600 hours to 1704 hours on July 14.

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. The system remained in automatic mode during the week. On June 25, the control system was having difficulty reading the NSE and SSE channel water depth due to the tailwater elevation dropping to 633.0 feet. On July 14, control system contractors relocated SSE channel water sensors. Adult fish facilities were inspected by Corps or Anchor QEA biologists on July 8, 9, 10, and 13.

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 was in criteria (criteria 1'-2') on all inspections.

NPE1 and NPE2 weir gates were in sill criteria (criteria ≥8' or on sill) on all inspections. While on sill, the gate depth readings were 5.4', 5.5', 5.6', and 5.3 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. 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: The average collection channel velocity was in criteria (criteria 1.5-4.0 fps) during all inspections.

Auxiliary Water Supply System: The fish ladder is in two pump operation with AWS pumps 1 (in slow speed mode) and 3 in 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 20-21 orifices open. Orifices are being cycled every three hours. The south shore make up water value shore makeup water valve has failed. The valve is currently set/stuck within the operating range at ~30% open. The number of opened orifice valves will continue to be adjusted to control collection channel water elevation as needed.

Collection Facility: The facility is in collection for transport mode. NMFS/UW (National Marine Fisheries Service/University of Washington) researchers have concluded their activities for the season.

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
37.7	31.0	17.8	17.6	66.0	64.2	5.0+	4.9

*Cooling water intake temperature.

Other

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

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

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

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

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
July 8	1215	0	1	0	0
July 9	1106	2	1	0	0
July 10	0956	0	1	0	0
July 11	1015	0	0	0	0
July 12	1110	0	1	0	0
July 13	1242	0	1	0	0
July 14	1030	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 sound vibration study.

At about 0930 hours on July 10, one clipped and one unclipped adult Chinook mortalities were discovered near the adult trap. The unclipped Chinook was suspected of jumping out of the turn pool area of the adult trap. The clipped Chinook and at least 3 dead shad were found floating in the recovery area of the trap. At about 1145 hours on July 12, one unclipped adult Chinook mortality was discovered at the base of the stairs leading up to the trap. This fish is also suspected of jumping out of the turn pool area of the adult trap. Approximately 14 feet of netting has been installed in this location.

Fish Rescue Operation: No fish rescues occurred this week.

Research

Northwest Fisheries Science Center (NMFS) Columbia Basin Research University of Washington "Within-season indicators of fish condition related to differential delayed mortality" Smolt to Adult Survival Rates and Delayed Mortalities: NMFS are collecting out migrant juvenile spring-summer and yearling fall, subyearling Chinook for ongoing monitoring and

research project. Staff condition sampling of fish use fourteen measurements related to energetic reserves, smoltification, and health indices. Weekly sampling will occur April 5 through July 26 and approximately monthly through October.

U.S. Geological Survey (USGS) "Describing the diet of migrating juvenile fall Chinook salmon": NMFS/University of Washington is collecting stomach contents through lavage or dissection from sacrificed fish for USGS for dietary evaluation.

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 correlate 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 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.