U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#18-2016

Project: McNary
Biologists: Bobby Johnson and Denise Griffith
Dates: June 24 - 30, 2016

Turbine Operation

McNary had available 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.

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
13	Jun 27	10.3 hours.	Governor oil pump discharge valve replaced.
7 thru 14	Jun 27	5.7 hours total.	Trash racks cleaned.
1 thru 6	Jun 28	7.2 hours total.	Trash racks cleaned.
10 & 11	Jun 29	42 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 June 24, 26 and 28. 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 June 24 and 26. The count station window brush failed to rotate on June 24. The device was subsequently repaired and returned to service on June 27.

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

Both ladders met all inspection points criteria.

The Oregon ladder collection channel surface velocities averaged 1.7 feet per second.

Auxiliary Water Supply System: The Wasco County Public Utility District (PUD) turbine unit in the Washington ladder remains out of service for runner replacement, which is scheduled for completion in October. The bypass continues to function satisfactorily.

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 delayed by six weeks for bearing repair. Completion is now scheduled for mid-November.

The juvenile facility continued to supply 450 cubic feet per second (cfs) to the north powerhouse pool.

Juvenile Fish Passage Facility

The fish passage season consists of alternating days of primary and secondary bypass modes. The switch occurs every morning at 0700 hours. There was one deviation from this schedule. The system was in primary bypass on June 27, from 1320 to 1324 hours, to remove a stick from B side secondary bypass line where the B side direct barge loading gate had been replaced. No fish mortalities were observed and no samples were missed.

Secondary bypass occurred on June 25, 27 and 29. This week, 200 juvenile lamprey and 1,153,809 smolts were bypassed.

Six bird-regurgitated subyearling Chinook were found on the deck by spillbay 10 on June 30.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained very light. Most of the debris was along the Oregon shore. The debris consisted 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. Trash racks were cleaned on June 27 and 28. There were seven ten-yard truckloads of woody material, tumbleweeds and aquatic vegetation removed. One large log was also removed. No fish mortalities were observed.

No problems were observed in the gatewell slots. Woody debris was removed from the gatewells slot as trash racks were cleaned.

ESBSs/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections occurred in units 4, 10 and 11 this week. No problems were found. The ESBSs in slots 6B and 12C remained in timer mode.

VBS differential monitoring revealed no screens out of criteria and none were cleaned. VBS rehabilitations continued with new mesh being installed on torn VBS sections.
Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: Forty-two orifices were in use. During trash rack cleaning, orifices in the affected slots were closed, with makeup water

coming from orifices in adjacent slots. An orifice valve actuator in slot 9C was repaired on June 30.

The side screen cleaning brush tripped a timing alarm on June 28 at 0037 hours. The biologist noted the drive chain off the lower drive gear at 0810 hours. The chain came off while the brush was in cleaning mode. The brush was two feet upstream of the park limit switch and near the access platform. This was fortunate as it allowed the mechanics to repair the brush without dewatering the channel. The mechanics found the upper drive gear had slid out of position, which removed the chain from the lower gear. Repairs began at 0810 hours and were completed at 1315 hours. The brush was operated multiple times to insure the side screen was clean.

Otherwise, all systems operated satisfactory when in automatic mode.

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

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

Algae removal throughout the facility continued.

River Conditions

River condition data during the week was provided by the smolt monitoring staff and is outlined in Table 2 below. The data period runs from 0700 to 0700 hours each day. Flows and spill are recorded in one-thousand cubic feet per second. Temperatures are recorded in degrees Fahrenheit.

Temperature monitoring continued. The probe from the barge dock was moved to the unit 1 tailwater site on June 25. A probe will be installed off the dock on July 1. 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
207.4	181.7	104.0	91.1	66.7	63.3	6.0	6.0

Other

Inline Cooling Water Strainers: Cooling water strainer examinations will occur on July 5.

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
Jun 24	Forebay	1	0	2	0	19
	Spill	9	3	81	18	0
	Powerhouse	0	0	2	3	0
	Outfall	12	8	0	14	0
Jun 25	Forebay	0	1	0	0	29
	Spill	0	0	18	19	0
	Powerhouse	0	0	0	4	0
	Outfall	0	0	2	10	0
Jun 26	Forebay	0	0	0	1	0
	Spill	0	3	57	13	0
	Powerhouse	0	7	0	1	0
	Outfall	0	9	0	5	0
Jun 27	Forebay	0	1	0	2	50
	Spill	0	0	8	15	0
	Powerhouse	0	0	3	0	0
	Outfall	7	1	4	20	0
Jun 28	Forebay	0	1	0	1	2
	Spill	0	0	18	17	0
	Powerhouse	0	0	0	3	0
	Outfall	0	3	0	16	0
Jun 29	Forebay	0	0	0	1	0
	Spill	0	2	4	16	0
	Powerhouse	0	0	0	1	0
	Outfall	0	3	3	14	0
Jun 30	Forebay	0	1	0	5	0
	Spill	0	7	28	14	0
	Powerhouse	0	0	2	5	0
	Outfall	0	2	0	3	0

Gull numbers remained low. Caspian tern numbers remained stable as they continued to feed in the spill zone. They were also noted in the powerhouse and bypass outfall zones. Pelicans and cormorants continued to feed at the bypass outfall. Cormorant numbers remained fairly low. Pelican numbers remained stable as they appear to be also feeding on adult shad along the shorelines. Pelicans continued to feed in the tailrace below the juvenile facility separator at night. Grebe numbers fluctuated 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 continued working two shifts and boat hazing three days a week. The McNary assistant fisheries biologist accompanied WS personnel during boat hazing on June 24.

The bypass outfall sprinklers have been functioning satisfactory. The sprinklers' supply pump intake is being cleaned twice a week. The inverted sprinklers became less effective as tailwater elevations decreased. The inverted sprinklers supply lines were lowered on June 30 and the supply pump was switched to manual mode.

Research

GBT: Gas bubble trauma (GBT) monitoring continues with monitoring occurring twice a week during the spill season. The GBT flush line pump intake check valve was replaced on June 27. The new chiller system at the GBT examination station was installed on June 29.

USGS: United States Geological Survey fisheries biologists did not conduct non-lethal smolt stomach content examinations on June 28, the last scheduled examination day.

Project: Ice Harbor
Biologist: Ken Fone
Dates: June 24 - 30, 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, due to the GDACS (General Data Acquisition and Control System) program needing 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 June 27, 28, and 29.

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/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 13%. The maintenance bulkhead is installed in gatewell slot 5B and the slot is unwatered to reduce the water leakage into unit 5.

STSs/VBSs: The STSs have been in continuous run mode since May 3, due to the presence of sockeye or subyearling Chinook in the sample with average fork lengths under 120 mm. The STS for slot 5B has not 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 1, 3, 4, and 6 STSs and unit 6 VBSs were inspected on June 21 and 22, with no problems found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 to 21 orifices open. Orifices are routinely cycled and back-flushed three times per day.

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. Sampling results are contained in Table 1 below.

Table 1. Fish condition sampling results at Ice Harbor Dam (continued on the next page)

June 27:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	0	---	---	---
UC-CH	0	---	---	---
C-CH-O	28	1	0	0
UC-CH-O	80	1	0	0
C-SH	0	---	---	---
UC-SH	0	---	---	---
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	108	2	0	0

June 30:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	0	---	---	---
UC-CH	0	---	---	---
C-CH-O	29	0	0	0
UC-CH-O	64	0	0	1
C-SH	2	0	0	0
UC-SH	0	---	---	---
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	95	0	0	1

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

River Conditions

River conditions during the week are outlined in Table 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
45.9	33.4	34.7	10.0	66.0	65.0	8.3	6.4

*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.

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 below. The numbers of gulls, cormorants, and pelicans generally increased from last

week. Contracted land-based hazing of piscivorous birds for 8 hours per day ended on June 30. The hazing was effective at keeping birds out of the zones immediately adjacent to the dam.

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

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
June 24	5	10	1	0	49
June 25	8	17	0	0	20
June 26	8	4	0	0	16
June 27	11	12	0	0	32
June 28	19	10	0	0	17
June 29	23	16	0	0	25
June 30	17	19	0	0	25

Research

NOAA Fisheries: Beginning on April 21, tissue samples were taken as often as weekly from clipped juvenile Chinook and monthly from clipped juvenile steelhead obtained from the smolt monitoring sample by NOAA (National Oceanographic and Atmospheric Administration) Fisheries researchers to study the relationship of the physiological condition of Chinook and the incidence of delayed mortality, as well as the physiological benefit salmonids derive from estuarine habitat restoration.

PNNL: Beginning on May 7, PNNL (Pacific Northwest National Laboratory) researchers began weekly releases of acoustic-tagged dead juvenile salmonids through the RSW for an assessment of whether dead tagged fish are falsely recorded as live fish downstream at the detection station. This information will help in the formulation of the study design of next year's Biological Opinion performance standard evaluation.

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: June 24 - 30, 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 at 0700 hours on June 27 for annual maintenance with an estimated return to service on July 25, 2016.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on June 24, 25, 26 and 29.

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, 5.0, 5.6 and 5.8 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 5.9, 5.6, 5.9, and 5.8 feet.

SSE2 was in criteria (6' above sill) on all inspections. South shore channel/tailwater head was in criteria (1'-2') on all inspections.

Auxiliary Water Supply System: AWS pumps 2 and 3 were operated throughout this period. Pump 1 was out of service throughout this period and will remain of service throughout this season unless an emergency occurs. This unit has a bushing problem.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 1 square yard of forebay debris observed during this period. Gatewell debris ranged from 0 - 20% surface coverage. No oil problems were observed in the gatewells.

STSs/VBSs: STSs were operating in continuous-run mode. STS inspections were conducted June 7 and 8 with all screens found in good operating condition.

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

Collection Facility: No problems occurred during this report period.

Transport Summary: Daily fish transport by barge ended on May 25, followed by every-day fish transport on May 27. No fish were transported on May 26.

River Conditions

Spring spill operations were initiated at 0001 hours on April 3, followed by the initiation of the summer spill program on June 21. Spill was either halted or limited during tailrace transitioning, barge docking and loading operations. On June 28, spill gate 2 was removed from service at 1830 hours on due to a position indication failure; the estimated return to service is undetermined. 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
42.3	32.9	17.1	16.4	64.0	63.5	5.0	4.0

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on June 1. There were no live fish recovered. Mortalities included 2 juvenile lamprey.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on June 5.

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
June 24	1050	4	0	0	0	0
June 25	1050	5	1	0	0	0
June 26	1100	0	0	0	0	0
June 27	1050	2	0	0	0	0
June 28	1100	0	1	0	0	0
June 29	1050	3	1	0	0	0
June 30	1100	3	1	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.

Project: Little Goose
Biologist: Richard Weis
Dates: June 24 - 30, 2016

Turbine Operation

All turbine units were available for service this week. Hard constraints of 1% peak efficiency criteria are in effect. There were 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 June 26, 28 and 30.

Fish Ladder: The ladder exit head differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs held steady at 1.2 feet (criteria 1.0-1.3 ft.) and picketed lead differentials ranged between 0 and 0.1 feet (criteria $\leq$ 0.3 ft.). The air bubbler used to prevent debris from collecting near the ladder exit operated satisfactorily. Installation of the ladder emergency cooling water pumps began June 27 and remains in progress.

Fishway Entrances and Collection Channel: Channel to tailwater head differentials ranged between 1.1 and 2.0 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 7.5 and 8.7 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 5.5 and 6.2 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.5 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 1.7 and 2.0 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 repairs are in progress. The estimated repair date has been extended again. Presently, fish pumps 2 and 3 are in service. Water velocities from the bottom, middle and top of the adult channel at the NPE averaged 2.4 fps on June 15.

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 spillbay 5 and special spill pattern was approved. The TSW was configured to the high crest position on May 26.

ESBS/VBS: Electrical ESBS brush tests were performed on June 15. Fish screen 2B tripped a breaker and would not reset. Electricians reset the limit switches and screen returned to service. Drawdowns tests were performed in units 1 and 2 on June 16. All differentials met criteria.

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

Transportation Facility: The sampling and collection of fish sampling is occurring daily. Fish transport by barge is taking place every-other-day.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 58,487 fish were collected. The descaling and mortality rates were 1.4% and 0.2% respectively. This weekly report period saw 0 adult lamprey removed from the raceways or sample and released in the forebay.

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
42.5	32.7	12.5	9.9	67.0	62.8	6.0	4.8

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on June 15. No fish were seen.

Invasive Species: The zebra mussel substrate monitor was inspection on June 15. No fish were seen.

Avian Activity: Bird counts and hazing commenced on April 1. See Table 2 below for details.

Table 2. Daily Avian Counts at Little Goose Dam, June 24 - 30, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
June 24	1130	0	0	0	0
June 25	1000	22	0	0	0
June 26	1230	9	4	0	0
June 27	1045	7	2	0	0
June 28	1205	25	2	0	0
June 29	0830	22	0	0	0
June 30	0900	48	1	0	0

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

Gas Bubble Trauma: GBT examinations were performed on June 27. No signs of GBT were seen.

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

Project: Lower Granite
Biologists: Elizabeth Holdren and Robert Horal
Dates: June 24 - 30, 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 removed from service at 0630 hours on June 23 to install transducers to monitor Environmentally Acceptable Lubricants (EAL) performance. Unit 6 was operated out of unit priority order from 1423 hours to 1814 hours on June 30 to test the EAL monitoring transducers. Unit 6 was returned to service at 1858 hours on June 30. Units were rotated out of service June 26 and 27 for VBS inspections. Unit 3 was forced out of service from 1330 hours on June 26 to 1609 hours on June 29 to repair a tear in the VBS in gatewell slot 3B.

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 had 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. NSE and SSE entrances remained in criteria during the routine physical inspections. On June 29, control system contractors reported that the SSE channel water sensors need to be relocated. Adult fish facilities were inspected by Corps or Anchor QEA biologists June 24, 25, 26, and 29.

Fish Ladder: Fish ladder exit head differentials and depth over the weirs were in criteria (≤0.5' and 1.0-1.3', respectively) on all inspections. The 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 5.6', 5.1', 4.9', and 5.6 feet. The control system reading for NPE elevations fluctuate between 628.0 and 628.2 while the gates are actually on sill due to the 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. The North shore channel/tailwater head differential was in criteria (criteria 1'-2') on all inspections.

Collection Channel Velocity: The collection channel average velocity was in criteria (criteria 1.5-4.0 fps) on all inspections.

Auxiliary Water Supply System: The fish ladder is in two pump operation with AWS pumps 1 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. Fish ladder temperature control pumps are scheduled to be shut down July 6 and 7 to install additional equipment.

Juvenile Fish Passage Facility

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

ESBSs/VBSs: ESBSs/VBSs were inspected June 26, and 27. A tear was found in the VBS in gatewell slot 3B VBS. Unit 3 was removed from service at 1330 hours on June 26 to repair the damaged screen. All other VBSs passed inspection.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: The collection channel is operating with 18-19 orifices open. Orifices are being cycled every three hours.

Collection Facility: The facility is in collection for transport mode. NMFS/UW researchers did not collect fish this week.

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. Spill operation was changed to a flat spill pattern with no RSW (Table LWG-9, Fish Passage Plan) at 1401 hours on June 29 due to increasing water temperatures. 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
43.5	34.5	18.8	17.8	62.0	65.7	5.0	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainers were inspected June 28. No live lamprey were recovered. Recovered mortalities included 31 juvenile lamprey, 1 crayfish, and 1 unidentifiable decomposed fish.

Invasive Species: The zebra/quagga mussel substrate was inspected June 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. 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
June 24	1200	0	0	0	0
June 25	1217	3	1	0	1
June 26	0951	0	0	0	0
June 27	1300	0	0	0	0
June 28	---	---	---	---	---
June 29	1505	0	0	0	0
June 30	1337	0	0	1	0

GBT: Gas bubble trauma sampling was not conducted this week and will likely conclude for the season.

Adult Fish Trap Operations: The trap sample rate was changed May 15 at 1400 hours to 27% daily trap rate M-F (20% overall). The adult trap diversion gate in the turnpool area is changed to the ladder passage position from about 1400 hours Friday to 1300 hours Sunday to facilitate sound vibration study.

Fish Rescue Operation: No fish rescues occurred this week.

Research

Nez Perce Tribe (NPT)/U. of Idaho (UI)/Columbia River Intertribal Fisheries Commission (CRITFC) – Kelt Study: NPT began steelhead kelt collection March 31. This research project investigates steelhead kelt physiology and endocrinology to evaluate the feasibility and success of rehabilitating strategies. NPT will transport up to 300 kelts to Dworshak National Fish Hatchery as part of this study. NPT collection ended at 0700 hours June 25.

National Marine Fisheries Service (NMFS)-Monitoring the Migrations of Wild Snake River Spring/Summer Chinook: This study is monitoring the migration behavior and survival of wild spring/summer Chinook salmon. The specific goals are to characterize the migration timing and

estimate parr-to-smolt survival to LGR of wild Chinook populations as they migrate from their natal rearing areas and determine migration patterns and what environmental factors influence those patterns. Fish were PIT-tagged during the summer of 2015 in natal streams and are diverted to the Sort-By-Code tanks at LGR. NMFS collection ended on June 30.

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 adult fish passage delay through the ladder in response to sound and vibration from JFF construction will continue through September 2016. Weekly PIT tag detections from the ladder exit tunnel and entrance weir 648 are correlate with sound hydrophones signals and water particle movement signals detected 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 position at about 1400 hours Friday to about 1400 hours Sunday 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 June 20 below the Lower Granite adult ladder exit to record sockeye and Chinook ladder exit success and behavior response to fish ladder temperature control system. Passage times are recorded through the PIT tag arrays in the ladder exit tunnel will be correlated with temperatures recorded through 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 be installed to 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.