U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#14-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: May 27 – June 2, 2016

Turbine Operation

McNary had available 12 to 14 units (out of 14 total units) for power generation this week. 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
3 & 4	May 31–Jun 8	About 8 days.	Delta bus tie in.
7, 8 & 9	May 31	1.5 hours total.	Extended-length submersible bar screen (ESBS) camera inspections.
6	Jun 1	8.5 hours.	Hub tapped.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on May 27, 29 and June 2. Fisheries technicians monitored the ladders as shifts allowed. Adult fish counts continued. Temperature probes were deployed on May 27 and monitoring began June 1.

The lamprey passage structure at Oregon entrance SFEW2 was opened on June 1. This structure will remain open until October 1.

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. Debris loads were minimal at both exits.

At the Oregon exit, the regulating weir set point was adjusted on May 29.

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. All ladder entrances met all criteria during measured inspections.

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 has been delayed to an undetermined date. The bypass continues to function satisfactorily.

Two of the three Oregon ladder fish pumps operated satisfactorily with one interruption in service this week. On June 1, at 0608 hours, high oil temperatures triggered an alarm for the fish pump 1 governor oil pump, and the fish pump was removed from service. At 0740 hours, the Oregon ladder entrance weir configuration was set per 2016 Fish Passage Plan (FPP) McNary section 3.3.2.4.iv. The governor filter indicator had failed. Filters, which required replacement, had not been replaced. This resulted in the governor oil pump remaining on and pumping oil back into the actuator. The remaining oil in the pump reached 200 degrees Fahrenheit, which resulted in the high oil temperature alarm. Mechanics replaced the indicator and filters and the governor pump and fish pump returned to service at 0928 hours. The entrance weirs were returned to normal configuration at 0935 hours.

Both pumps operated with blade angles of 26 degrees before the outage and 24 degrees after the outage. Fish pump 2 is currently under contract for major overhaul with completion scheduled for September 2016. The overhaul contractor remains on project.

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

Juvenile Fish Passage Facility

The fish passage season consists of alternating days of primary and secondary bypass modes. The switch occurs every morning at 0700 hours. There was one deviation from this schedule. On June 1, from 1523 to 1536 hours, the system was in primary bypass so a debris blockage could be removed from the B side secondary bypass line downstream of the bypass gate. The blockage occurred on the same joint reported in Weekly #12 on May 19. The new access hatch allowed for expedient debris removal and no fish mortalities were observed. Ice block checks revealed no other problems. One sample was missed. A stand light had been previously installed on May 30 to better illuminate this area.

On May 28 and June 1, a debris blockage was removed from the B side flume at the passive integrated transponder (PIT) detector downstream of the separator. On May 29, woody material was removed from the flume at a joint just upstream of the B side sample gate. No fish mortalities were observed.

On May 30, flume covers at both the A and B side PIT tag detectors downstream of the separator were removed for better access in the event blockages form. This week, improved debris plungers were built to aid in blockage removal. In addition, technicians were instructed to increase the number of system checks and blockage procedures were reviewed.

Descaling for the week ranged from 1.2 to 3.9 percent. Sample tank mortality rates ranged from 0.54 to 1.23 percent.

Secondary bypass occurred on May 28, 30, and June 2. This week, 1,850 juvenile lamprey and 52,752 smolts were bypassed.

By May 31, 35 of 43 temperature probes were deployed by Anchor QEA staff. Six of the 8 remaining probes were deployed on June 2. The barge dock and unit 1 tailwater sites are without probes as the new probes ordered have not yet been delivered. Anchor QEA will report temperature data in a separate report.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained heavy, consisting mostly of woody material. A light debris load remained along the Oregon shore. The quantity of new incoming debris along the powerhouse remained light. Some debris is passing over the top spillway weirs (TSWs). Debris loads along the spillway remained minimal.

A debris spill has been scheduled for the June 6 to 8 timeframe. The new log bronc will be used.

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

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 7, 8 and 9 this week. No problems were found. The ESBS in slot 12C remained in timer mode. The screen in slot 6B tripped an alarm and was reset on May 29. After a second alarm, the screen brush cycle in slot 6B was set to timer mode on May 31. The wiring to unit 1 and 2 ESBS controllers was upgraded on June 1.

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. A partial blockage was removed from the orifice in slot 4A on May 30. Partial blockages were also removed from the orifice in slot 1B on May 31 and June 1. Two more partial blockages were removed from the orifice in slots 2A and 2B on June 2 (i.e.: one blockage in each orifice). All blockages appeared to consist of woody material. No fish mortalities were noted. The technicians were instructed to increase the number of channel checks as scheduling allowed.

From May 26 to 31, the transition screen brush latch pin would not fully insert when the mechanism parked. The device continued to properly clean the screen and the mechanics lubricated the latch pin on May 31. No other transition brush problems have occurred. The rectangular screen brush was found parked 20 feet downstream of the normal park location on May 30. No alarms had occurred, no explanation was found and no power outages were reported. The biologist reset the device, which has been functioning properly since. All other systems operated satisfactory in automatic mode.

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

All 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.

Debris issues are reported in the introduction of the Juvenile Fish Passage Facility section above. Algae removal throughout the facility began 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.

Routine spring spill in support of fish passage continued with both TSWs in place and operating. Forty percent of river flow is spilled in the spring season. The TSWs will be closed on June 8, at 0001 hours, per the Fish Passage Plan and replaced with standard spillgates.

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
239.1	202.0	95.9	81.0	60.0	58.5	6.0	6.0

Other

Inline Cooling Water Strainers: Cooling water strainer examinations on May 31 resulted in 19 juvenile lamprey mortalities being recovered. No smolt mortalities or live fish were found.

Invasive Species: The next mussel station examination will occur in late June.

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

Gull numbers have decreased. They continued to feed in the spill zone. Most birds at the bypass outfall were unsuccessful. The inverted sprinklers at the outfall appear to be affecting feeding patterns. Caspian terns have begun to feed in the spill and forebay. Grebe numbers remained high the forebay. Cormorant and pelican numbers remained low. Blue herons, Forester's terns 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.

Table 3. McNary Project's Daily Avian Count.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
May 27	Forebay	0	0	1	0	131
	Spill	35	0	0	1	0
	Powerhouse	24	0	0	0	0
	Outfall	0	0	0	0	0
May 28	Forebay	0	0	4	0	97
	Spill	46	1	0	4	0
	Powerhouse	0	0	0	0	0
	Outfall	5	0	0	2	0
May 29	Forebay	0	0	0	0	35
	Spill	34	0	0	1	0
	Powerhouse	0	0	0	0	0
	Outfall	0	1	0	2	0
May 30	Forebay	0	4	1	0	100
	Spill	19	1	12	4	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
May 31	Forebay	0	0	0	1	100
	Spill	8	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	6	0	0	1	0
Jun 1	Forebay	0	0	0	0	25
	Spill	2	2	3	2	0
	Powerhouse	0	0	0	0	0
	Outfall	1	0	0	0	0
Jun 2	Forebay	0	0	1	1	66
	Spill	15	1	15	4	0
	Powerhouse	0	0	0	1	0
	Outfall	0	1	0	0	0

One grebe was removed from gatewell slot 7B on May 29. One grebe remained in the juvenile collection channel.

United States Department of Agriculture – Animal and Plant Health Inspection Service – Wildlife Services (USDA–APHIS–WS) hazing personnel continued two shifts and boat hazing three days a week.

The bypass outfall sprinklers have been functioning satisfactory. The sprinklers supply pump intake is being cleaned twice a week. The pump remained in manual mode.

Research

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

USGS: A United States Geological Survey fisheries biologist did not conduct non-lethal smolt stomach content examinations this week. The next scheduled examinations are on June 14 for subyearling Chinook.

Project: Ice Harbor
Biologist: Ken Fone
Dates: May 27 – June 2, 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 the runner replacement.

Units are being operated within the 1% peak efficiency range (hard constraint).

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on May 31, June 1 and 2.

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, except for a depth of 6.1' and differential of 2.3' on May 31. The north powerhouse entrance (NFE-2) depth and channel/tailwater head differential were in criteria, except for a depth of 6.6' on May 31. The north shore entrance (NSE-1) depth and channel/tailwater head differential were in criteria, except for a depth of 7.1' on May 31. These out of criteria readings were the result of the entrance gates still being set in manual control at higher elevations to meet criteria when tailwater elevation was higher last week. The gates were lowered down to bring them back into depth criteria. 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 have been operating since May 17. The operation of 6 pumps results in a high channel/tailwater head differential at the south shore entrance.

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 10%. 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 yet to facilitate the work on unit 5. Unit 2 STSs were raised and stored in their gatewell slots on May 24 and 25, since unit 2 will not be operated for the rest of the year. Units 1, 3, 4, and 6 STSs and unit 3 VBSs were inspected on May 17 and 18. No problems were found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 orifices open. Orifices are routinely cycled and back-flushed three times per day. The mechanical screen cleaner at the primary dewaterer was taken out of service on May 26 when the brush lift cable was found broken. The cable was replaced and the screen cleaner was returned to service on May 31. The avian abatement hydrocannon at the end of the outfall pipe is operating normally.

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 next page).

May 30:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	1	0	0	0
UC-CH	1	0	0	0
C-CH-O	0	---	---	---
UC-CH-O	10	0	0	0
C-SH	4	1	0	1
UC-SH	7	0	0	1
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	2	0	0	0
UC-SOCK	0	---	---	---
TOTAL	25	1	0	2

June 2:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	3	0	0	0
UC-CH	1	0	0	0
C-CH-O	8	0	0	0
UC-CH-O	25	0	0	0
C-SH	79	1	0	2
UC-SH	24	0	0	0
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	140	1	0	2

Removable Spillway Weir (RSW): Spill for fish passage began on April 3 at midnight. On May 17, spill gate 2 was completely closed from 1010 hours to 1014 hours in an attempt to free up any stuck submerged debris that could possibly be causing observed turbulence in the water flowing over the RSW. The turbulence returned when the gate was re-opened and seemed to be formed from certain hydraulic conditions further upstream in the forebay. There was generally less turbulence observed in the flow over the RSW this week, although dam operations at the time of the observations were similar to the operations occurring on May 17.

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
69.8	64.3	54.2	19.2	57.0	57.0	7.4	7.0

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Monthly turbine cooling water strainer inspections last occurred on May 17 and 18. A total of 33 juvenile lamprey and 5 Siberian prawns (all mortalities) were found.

Invasive Species: No new exotic species have been found.

Avian Activity: The numbers of gulls, cormorants, and pelicans observed around the project was relatively low for the most part (Table 3 below). Contracted land-based hazing of piscivorous birds occurred for 16 hours per day. Boat-based hazing occurred for 8 hours per day, 5 days per

week, changing to 3 days per week beginning on May 29. Land-based hazing was generally effective at keeping birds out of the zones immediately adjacent to the dam. Boat-based hazing was effective at scaring birds out of the stilling basin and the area just downstream from the end of the outfall pipe.

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

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
May 27	0	7	0	1	10
May 28	0	8	0	0	2
May 29	0	12	0	0	5
May 30	5	9	1	0	13
May 31	2	5	0	0	7
June 1	0	11	0	0	2
June 2	8	48	0	0	13

Research

NOAA Fisheries: Beginning on April 21, tissue samples were taken weekly from clipped juvenile Chinook and monthly from clipped juvenile steelhead obtained from the smolt monitoring sample by NOAA (National Atmospheric and Oceanographic 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 Laboratories) 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: May 27 – June 2, 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.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on May 27, 28, 29 and June 1.

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 6.2, 6.3, 6.3 and 6.2 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, 5.9, 5.8 and 6.7 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 out 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 0-36% surface coverage. No oil problems were observed in gatewells.

STSs/VBSs: STSs were operating in continuous-run mode. STS inspections were conducted May 3 and 4 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: Every-day fish transport by barge changed to alternate day barge operations on May 25.

River Conditions

Routine Spring spill in support of fish passage was initiated at 0001 hours on April 3. Spill was either halted or limited during tailrace transitioning, and barge docking and loading operations.

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 (°F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
66.2	61.1	47.1	45.0	58.5	56.0	4.8	4.7

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on May 5. There were no live fish recovered. Mortalities included 360 juvenile lamprey, 71 salmon smolts, 10 steelhead smolts and 1 Siberian prawn.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on May 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. Hazing 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	CaspianTerns	Grebes	Pelican
May 27	1100	10	0	0	0	0
May 28	1100	8	0	0	0	0
May 29	1100	10	0	0	0	0
May 30	1100	11	1	0	0	0
May 31	1100	9	0	0	0	0
June 1	1100	11	0	0	0	0
June 2	1100	6	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.

Project: Little Goose
Biologist: Richard Weis
Dates: May 27 – June 2, 2016

Turbine Operation

All turbine units were available for service this week. 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 be in manual mode until repairs can be made.

Adult fishway inspections were performed on May 29, 31 and June 02.

Fish Ladder: The ladder exit head differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs held steady at 1.2 feet (criteria 1.0-1.3 ft.) and picketed lead differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.3 ft.). The air bubbler used to prevent debris from collecting near the ladder exit operated satisfactorily.

Fishway Entrances and Collection Channel: Channel to tailwater head differentials ranged between 0.9 and 1.7 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.1 and 8.4 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 5.5 and 5.8 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.7 to 5.2 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the North powerhouse ranged between 1.8 and 2.1 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 is still awaiting installation. The estimated repair date has been extended and is now the end of May. Presently fish pump 2 and 3 are in operation. Water velocity averaged (bottom, middle and top of the adult channel) was 2.0 fps on June 02.

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. The quantity of woody debris in the immediate forebay was estimated between 500 to 2,500 square feet.

Spillway Weir: Spill bay 1 repairs were completed by cannibalizing parts from spill bay 5 and a special spill pattern was approved. The TSW was reconfigured to the high crest position on May 26.

ESBS/VBS: Drawdowns were performed on units 1-3 on June 02. 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 compensate for the removal of the weir motor gear box. Presently, flume water is not controllable except by the number of opened orifices. This has been an ongoing issue for some time.

Transportation Facility: Sampling is occurring every day and fish collection and transport continues. The last daily barge left the facility on May 25 followed by the first every-other-day barge departure on May 27. No fish were transported on May 26.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 44,335 fish were collected. The descaling and mortality rates were 1.0% and 0.9% respectively. This weekly report period saw 11 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.

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
67.5	62.5	20.4	18.8	59.7	56.3	5.1	4.2

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on June 02. One juvenile lamprey mortality was removed.

Invasive Species: The zebra mussel substrate monitor was inspected May 17. No mussels were seen.

Avian Activity: Bird counting and hazing commenced on April 01. See the chart below for details.

Table 2. Daily Avian Counts at Little Goose Dam, May 27 – June 2, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
May 27	0700	95	0	0	0
May 28	1100	83	4	0	0
May 29	1130	46	10	0	0
May 30	1215	114	4	0	0
May 31	0715	59	0	0	1
June 1	1115	3	3	0	0
June 2	0700	31	2	0	0

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

Gas Bubble Trauma: GBT examinations were performed on May 30. No signs of GBT were seen.

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

Project: Lower Granite
Biologists: Elizabeth Holdren, Robert Horal
Dates: May 27 – June 2, 2016

Turbine Operation

Units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 was removed from service at 0915 hours on April 12 for Kaplan blade linkage repair. Unit 1 is expected to return to service in February 2017.

Adult Fish Passage Facility

The automatic fish ladder control system was upgraded during the winter maintenance outage. 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 this week for continued evaluation. Adult fish facilities were inspected by Corps or Anchor QEA biologists on May 27, 28, 29, and June 1.

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'). An average of about 0.75 square yards of 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 5.9', 5.7', 5.9', and 6.7 feet. The physical and control system reading for NPEs continue to fluctuate above sill elevation even though the gates are actually on sill. 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 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 2 and 3 in service. Pump 1 is in standby mode pending a bulkhead swap.

Fish Ladder Temperature Control System: N/A.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: An average of about 7.0 square yards of debris was observed in the forebay this week.

ESBSs/VBSs: ESBSs were inspections are scheduled for late June.

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. IDFG continued collecting genetic samples from yearling Chinook and juvenile steelhead Monday-Friday. Fish are being collected for NOAA in river survival and transport studies. Fish marking is occurring Monday-Friday. NMFS/UW collected a subsample of NOAA fish on May 31. On June 5, an adult bull trout about 16 inches in length was collected and released from the juvenile separator.

Transport Summary: Every other day barge transport began on May 27 with barges leaving Lower Granite on even number days in June. The last daily barge departed Lower Granite on May 25, and no barge departed the facility on May 26.

River Conditions

Spring spill in support of fish passage is in progress. 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
69.7	64.5	20.6	20.6	58.0	54.5	5.0	4.6

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainer were inspected May 31. No live lamprey were recovered. Mortalities included 48 juvenile lamprey and 9 juvenile salmonids. No incidental species were recovered.

Invasive Species: Zebra/quagga mussel substrate was inspected May 29. 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
May 27	1125	2	0	0	7
May 28	1230	5	0	0	4
May 29	1115	5	0	0	4
May 30	1200	34	0	0	7
May 31	---	---	---	---	---
June 1	1444	5	3	0	8
June 2	1549	11	3	0	5

GBT: Gas bubble trauma sampling occurred June 2. No signs of gas bubble trauma were seen.

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. Two adult bull trout were collected at the adult trap June 1 and June 2. Both had genetic samples taken, were PIT tagged, and released to the fish ladder.

Fish Rescue Operation: No fish rescues occurred this week.

Research

Idaho Fish and Game (IDFG) Genetic Stock Identification: This study aims to enumerate and characterize natural production of yearling Chinook and juvenile steelhead above LGR with regards to age composition and genetic stock profiles. IDFG will sample Monday through Friday through mid-June with a goal of collecting 2,000-5,000 genetic samples from yearling Chinook and juvenile steelhead.

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 150 kelts to Dworshak National Fish Hatchery as part of this study.

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.

National Marine Fisheries Service (NMFS) In-River Survival: NMFS staff has begun PIT-tagging Chinook and steelhead smolts for their Survival Study to compare smolt to adult returns of in-river migrating smolts to the smolt to adult returns of transported smolts. PIT-tagged fish are held for 24 hours before being bypassed to the LGR tailrace.

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.