U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#11-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: May 6 – 12, 2016

Turbine Operation

McNary had available 11 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
9	May 5 to 6	18.5 hours.	Torn vertical barrier screen (VBS) found and replaced.
10	May 5 to 6	26.4 hours.	Torn VBS found and replaced.
5	May 5 to 9	About 4 days.	Torn VBS found and replaced.
1 & 2	May 10	56 minutes total.	Extended-length submersible bar screen (ESBS) camera inspections.

Adult Fish Passage Facilities

The McNary fisheries biologists performed measured inspections of the adult fishways on May 7, 9 and 11. Fisheries technicians monitored the ladders as shifts allowed. Adult fish counts resumed April 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.

In the Washington exit area, debris loads were minimal to light. The tilting weirs triggered an alarm and were reset on May 7. An exit alarm was reset on May 11. The regulating and tilting weir set points were adjusted on May 11.

At the Oregon exit, debris loads were minimal. However, woody debris was scattered along the Oregon shoreline. The regulating weir set point was adjusted on May 7 and 11. The tilting weir set point was adjusted on May 9 and 11.

Oregon exit traveling screen differential monitoring revealed no problems. The mechanics performed scheduled maintenance on the screens on May 9.

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

At the Washington ladder, all inspection points met criteria.

At the Oregon north powerhouse entrance, weirs NFEW2 and NFEW3 measured 7.8 feet in depth on May 11. Higher tailwater elevations possibly contributed to these readings. All other Oregon ladder inspection points met criteria.

Collection channel surface velocities averaged 1.8 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 no interruptions in service this week. Both pumps operated with blade angles of 26 degrees. 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 were no deviations from this schedule. Secondary bypass occurred on May 6, 8, 10 and 12. This week, 3,493 juvenile lamprey and 438,865 smolts were bypassed.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained heavy, consisting mostly of woody material. Some of the debris 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). A light debris load remained along the spillway.

The log tug (also known as a “log bronc”), which will be used for forebay debris removal, was tested on May 6 after repairs were completed.

No high trash rack differential measurements were recorded. Trash racks are scheduled to be cleaned May 16 to 19.

No problems were observed in the gatewell slots.

ESBSs/VBSs: ESBSs are deployed in all units. ESBS camera inspections in units 1 and 2 revealed no problems. Sixteen smolt mortalities were noted in the slots during the inspections. Fourteen of these were in slot 1C. The ESBS in slot 12C returned to timer mode on May 6. The ESBS brush on the screen in slot 1B was found to be not completing a full cycle and was recalibrated on May 6.

VBS differential monitoring revealed six screens out of criteria. These screens and two others were cleaned on May 6, 7 and 10. During the cleaning, 17 smolt and10 juvenile lamprey mortalities were noted.

As reported last week, the screen in slot 9A was replaced with the screen from slot 10A. Unit 9 returned to service May 6. Good sections of VBS (each VBS has three sections top, middle and bottom), were assembled from VBS sections from slots 9A and 10B to produce a good VBS for slot 10B. A VBS from slot 5B was moved to slot 10A. Unit 10 returned to service May 6. That left unit 5 with two VBSs requiring replacement. On May 7, two rehabilitated VBS sections were brought up from the yard on May 7 and added to a good section left over from the VBSs that had the seam tears. This VBS went in slot 5B. On May 9, two VBS sections were re-meshed on the intake deck. These were added to one remaining good section. This VBS went into slot 5A and the unit returned to service May 9.

The screens in slots 5B and 10A were cleaned before they were moved. One smolt mortality was observed.

VBS rehabilitations continued with the torn sections being replaced from May 10 to 12. A spare VBS will be ready by May 12. VBS examinations will resume May 13.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: Forty two orifices were in use. During VBS cleaning and prior to VBS removals, orifices in the affected slots were closed, with makeup water coming from orifices in adjacent slots. Orifice valve actuators were repaired in slots 1B and 14C.

All systems functioned satisfactory in automatic mode. The rectangular screen brush mechanism was lubricated this week.

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.

The sample gates are turned on and off every other day so that they are in service only during secondary bypass. A biologist noted that the B side sample gate was operating slowly on May 6. The gate would be open ten seconds for a nine second sample. The nuts that hold the actuator to the flume frame were found loose. The nuts were tightened. However, the bolts were too short to allow for a lock washer and the nuts continued to loosen over time. The fisheries staff monitored the gate. The mechanics installed longer bolts with lock washers on May 9. The B

side sample rate for May 6 and 8 was calculated to be 0.56 percent instead of the 0.5 percent programmed into the sample system.

All other operational systems functioned well. 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.

The fisheries mechanics installed a new sample return to recovery raceway line on May 9 and 10. The previous line had four openings in it.

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. This week, due to flows in excess of powerhouse capacity, 40 to 46 percent of flow was spilled.

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
296.1	269.8	130.3	115.1	56.6	55.2	6.0	5.3

Other

Inline Cooling Water Strainers: The next cooling water strainer examinations will occur May 31.

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

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
May 6	Forebay	2	0	0	0	3
	Spill	82	2	0	1	0
	Powerhouse	29	0	0	0	0
	Outfall	0	0	0	0	0
May 7	Forebay	8	0	0	0	1
	Spill	129	0	0	0	0
	Powerhouse	15	0	0	0	0
	Outfall	0	0	0	0	0
May 8	Forebay	18	0	0	4	6
	Spill	175	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	55	0	0	1	0
May 9	Forebay	45	0	0	0	2
	Spill	235	1	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	73	1	0	1	0
May 10	Forebay	56	0	0	0	6
	Spill	178	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	10	0	0	0	0
May 11	Forebay	0	0	0	0	2
	Spill	277	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	83	0	0	0	0
May 12	Forebay	3	0	0	0	0
	Spill	55	0	0	1	0
	Powerhouse	0	0	0	0	0
	Outfall	4	0	0	0	0

Gull numbers have increased and they continued to feed in the spill zone. Most gulls at the bypass outfall were unsuccessful. The inverted sprinklers at the outfall appear to be affecting feeding patterns. Most birds observed in the other zones appeared to be roosting. Ospreys and loons 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.

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. The bird distress calls deployed around project were inspected this week.

Research

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

USGS: A United States Geological Survey (USGS) fisheries biologist conducted non-lethal smolt stomach content examinations on May 11. Forty Chinook smolts, five of which were non-clipped, were examined.

Project: Ice Harbor
Biologist: Ken Fone
Dates: May 6 – 12, 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 to prepare the unit for 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 9, 10, and 11.

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 operated during the week. Six of the eight south shore AWS pumps were operated throughout the week.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of approximately 3 square yards of debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 10%. Oil sheens were observed in 5A and 5C gatewell slots during the week. Oil absorbent pads were in the slots. The sheens were residual oil from the unit 5 blade packing oil

leak. 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 and 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. Units 1, 2, 3, 4, and 6 STSs were inspected on April 19 and 20. The next monthly STS inspections are scheduled for the week of May 16.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass is operating with 20 orifices open. Due to a burned out orifice 5AN light, this orifice was closed on May 5 and orifice 5AS was opened, until the light was replaced on May 9. The avian abatement hydrocannon at the end of the outfall pipe was out of service from the start of the season until May 9 to replace a cracked expansion joint in the hydrocannon water line.

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.

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

May 9:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	60	1	0	4
UC-CH	6	0	0	0
C-CH-O	0	---	---	---
UC-CH-O	0	---	---	---
C-SH	88	2	0	5
UC-SH	20	0	0	0
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	174	3	0	9

May 12:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	40	0	0	0
UC-CH	7	0	0	0
C-CH-O	0	---	---	---
UC-CH-O	3	0	0	0
C-SH	99	5	0	1
UC-SH	19	0	0	0
C-COHO	1	0	0	0
UC-COHO	1	0	0	0
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	170	5	0	1

Removable Spillway Weir: Spill for fish passage began on April 3 at midnight. The RSW is operating normally.

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
120.5	93.1	71.3	40.2	56.0	54.0	6.1	5.3

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Monthly turbine cooling water strainer inspections occurred on April 19 and 20. A total of 1 unclipped juvenile Chinook and 4 juvenile lamprey (all mortalities) were found. The next inspections are scheduled for the week of May 16

Invasive Species: No new exotic species have been found.

Avian Activity: The numbers of gulls, cormorants, and pelicans observed around the project (Table 3 below) fluctuated during the week, but remained relatively high. Most of the pelicans and cormorants were observed on Eagle Island, while most of the gulls were observed foraging in the stilling basin adjacent to/downstream of the navigation coffer cells when the hazing boat was not present. 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. Land-based hazing was generally effective at keeping birds out of the zones immediately adjacent to the dam, including

the fish bypass outfall pipe. Boat-based hazing was effective at scaring birds out of the stilling basin.

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

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
May 6	9	16	0	0	40
May 7	6	16	0	0	60
May 8	20	90	0	0	40
May 9	70	71	0	0	26
May 10	29	92	0	0	26
May 11	31	46	0	0	2
May 12	7	5	0	0	22

Research

NOAA Fisheries: Beginning 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 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 May 7, PNNL (Pacific Northwest Naltional Laboratories) researchers began weekly releases of acoustic-tagged dead juvenile salmonids through the RSW (Removable Spillway Weir) for an assessment of whether these 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 6 – 12, 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 6, 7, 8 and 11.

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 depth criteria (criteria: ≥ 8' or on sill) on all inspections. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in depth criteria (criteria: ≥ 8' or on sill) on all inspections with the exception of the May 11 inspection with a reading of 7.0 feet. The powerhouse operator was informed and SSE1 weir gate was manually placed at sill.

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 be 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 24 square yards of forebay debris observed during this period. Gatewell debris ranged from 0-17% surface coverage. No oil problems were observed in the 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: Collection into raceways for transport began at 0700 hours on May 1. After receiving the correction factor and fish per pound count for the May 7 to 8, the "A" small fish side raceway was found to contain more than the 12,500 pound barge hold limit. Those fish were bypassed back to the river on May 8. Due to high fish numbers and a lack of available space in the raceways, the "A" small fish side was placed into secondary bypass from 1230 to 2100 hours on May 9. Collection of "A" side fish resumed after barge loading.

Transport Summary: Every-day fish transport by bargr began on May 2.

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 towboat tailrace transitioning (from the navigation lock to the Juvenile Fish Facility), 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 (^{o}F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
115.0	88.5	26.3	24.4	57.1	54.0	4.0	3.2

*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 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 and cormorants were the dominant species observed during inspections this week. Hazing met the standard from the avian action plan through this time period.

Table 2. Daily maximum piscivorous bird counts at Lower Monumental Dam.

Date	Time	Gulls	Cormorants	CaspianTerns	Grebes	Pelican
May 6	1100	6	0	0	0	0
May 7	1100	2	0	0	0	0
May 8	1100	8	0	0	0	0
May 9	1100	0	0	0	0	0
May 10	1100	8	0	0	0	0
May 11	1100	0	0	0	0	0
May 12	1100	12	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 6 – 12, 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. This system will remain in manual mode until repairs can be made.

Adult fishway inspections were performed on May 08, 10 and 12.

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 held steady at 0.0 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 8.4 and 9.4 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 6.1 and 7.1 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 6.1 to 7.1 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the North powerhouse ranged between 2.0 and 2.5 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 again and is now the end of May. Presently, fish pumps 2 and 3 are running. Water velocity measured at the north Powerhouse using the Rickly velocity equipment was not conducted this week.

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 between 4,800 to 5,800 square feet.

Spillway Weir: The repair to spill bay 1 was completed by cannibalizing parts from spill bay 5 and a special spill pattern was approved. The TSW is currently configured in the low crest position.

ESBS/VBS: Drawdown tests were performed on units 1-4 on May 12.

Orifices, Collection Channel, Dewatering Structure, and Flume: The juvenile bypass system is presently running with 22 open orifices. The number of orifices open are adjusted to compensate for the primary dewaterer weir motor gear box being removed. Presently, flume water volume is not controllable except by the number of orifices open. This has been an ongoing issue for some time.

Transportation Facility: Sampling is occurring daily as is the collection and transport of fish by barge.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 865,539 fish were collected with just 7 days of sampling. The descaling and mortality rates were 1.3% and 0.02% respectively. This weekly report period saw 0 adult lamprey removed from sample and released in the tailrace. Collection for transportation began on May 1, followed by daily fish transport by barge on May 2. Minor problems encountered during the first week of operation with this season's new towboat contractor continued during this second week of transport operations.

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
116.1	88.7	31.8	26.8	56.6	55.6	4.7	3.2

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on April 17. A total of 22 juvenile lamprey mortalities were removed.

Invasive Species: The zebra mussel substrate monitor was inspection on April 28. No mussels were seen.

Avian Activity: Bird counting and hazing commenced on April 01. See Table 2 below for count details.

Table 2. Daily Avian Counts at Little Goose Dam, May 6 - 12, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
May 6	None	0	0	0	0
May 7	1030	194	2	0	0
May 8	1315	343	9	0	0
May 9	1220	219	1	0	1
May 10	1045	95	8	0	0
May 11	1035	130	5	0	1
May 12	1100	131	11	0	1

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

Research

Gas Bubble Trauma: GBT examinations were performed on May 09. No signs of GBT were seen.

FGE Study: 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, Robert Horal
Dates: May 6 – 12, 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. Unit 4 was forced out of service from 2208 hours on May 5 to 1101 hours on May 6 due to an ESBS brush malfunction in slot 4A. Unit 3 was forced out of service at 1611 hours on May 11 when the contractor hit the PMG (Permanent Magnet Generator or speed control) tripping the unit off line. Unit 3 returned to service at 1725 hours on May 11.

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. Problems continue with the system tailrace elevation sensors and gate depth sensors readings being inconsistent with physical staff gauge readings. Entrance gates found out of criteria during ladder inspections due to fish ladder control system problems are manually adjusted to depth or sill criteria and left in hand mode until contractors make adjustments. The system remained in automatic mode this week for continued evaluation. Adult fish facilities were inspected by Corps or Anchor QEA biologists May 6, 7, 8, and 11.

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 1.8 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 6.8’, 7.2’, 7.6’, and 6.8 feet. NPEs remain set at an elevation of 628.1 feet to prevent the control system from lowing the gates below their limits and spooling the cables. Control system and physical reading continue to be inconstant. 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 with the exception of a 6.0 feet reading on May 7. This reading was taken during a vessel lockage. The gate depth was 7.2 feet when checked later that day. 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.

Fish have been found stranded on the North shore collection channel walkway due to the combination of increased river flows, the close proximity to spill, and strong upstream winds. Mortalities included 3 sandrollers on May 7.

Collection Channel Velocity: 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 30.0 square yards of debris was observed in the forebay this week.

RSW: A clipped yearling Chinook mortality was found on the north powerhouse walkway adjacent to the RSW (Removable Spillway Weir). This was likely related to total river outflow exceeding 110.0 kcfs and spill exceeding 25.5 kcfs the date of the inspection.

ESBSs/VBSs: ESBS inspections are scheduled for May 21 and 22.

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 (Idaho Department of Fish and Game) continued collecting genetic samples from yearling Chinook and juvenile steelhead from Monday through - Friday. Fish are being collected for NOAA Fisheries' in river survival and transport studies. Fish marking is occurring Monday through Friday. NMFS/UW collected a subsample of NOAA Fisheries fish May 9.

Transport Summary: Everyday fish transport by barge is occurring.

River Conditions

Spring spill in support of fish passage is ongoing. Spill exceeded 20 kcfs this week due to high river flow conditions. 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
120.7	91.5	31.5	20.4	56.0	53.0	5.0	3.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainer inspections are scheduled for late May.

Invasive Species: The zebra/quagga mussel substrate was inspected May 1. 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 6	1230	7	0	0	5
May 7	1300	5	0	0	0
May 8	1230	6	2	0	0
May 9	1532	13	0	0	1
May 10	1428	10	0	0	1
May11	1347	29	0	0	7
May 12	1430	5	0	0	0

GBT: Gas bubble trauma sampling occurred May 12. No signs of gas bubble trauma were seen.

Adult Fish Trap Operations: The trap sample rate was changed May 9 at 1400 hours to 21% daily trap rate M-F (15% 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 Operations: 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.