U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#10-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: April 29 – May 5, 2016

Turbine Operation

McNary had available 13 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	May 2 to 4	About 50 hours.	Vertical barrier screen (VBS) out of position and jammed in 3C slot. Replaced.
6	May 4	4.8 hours.	Hub tapped.
9	May 5 to 6	18.5 hours.	Torn 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.

Adult Fish Passage Facilities

The McNary fisheries biologists performed measured inspections of the adult fishways on April 29, May 1 and 5. 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 light. Tilting weir 337 trigger an alarm and was reset. Tilting weir set point adjustments followed on May 5.

At the Oregon exit, debris loads were minimal. The regulating weir set point was adjusted on May 5.

Oregon exit traveling screen differential monitoring revealed no problems.

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 south powerhouse entrance, weir SFEW1 measured 7.9 feet in depth on May 1. Higher tailwater elevations possibly contributed to these readings. The adjustments to the weir set points and fish pumps blade angles mentioned in last week appear to have improved flow conditions. All other Oregon ladder inspection points met criteria.

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 three interruptions in service this week during backup cooling water testing. Fish pump 1 was out of service for 33 and three minutes on April 29 and 30, respectively. Fish pump 3 was out of service for one minute on May 2. 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 April 30, May 2 and 4. This week, 5,200 juvenile lamprey and 853,863 smolts were bypassed.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained heavy, consisting mostly of woody material. A storm moved some of the debris to the Oregon shore on the evening of May 5. The quantity of new incoming debris along the powerhouse remained light. Storms on May 4 and 5 resulted in minimal new debris and no debris issues. Some debris is going over the top spillway weirs (TSWs). A light debris load remained along the spillway.

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

No problems were observed in the gatewell slots.

Extended-length submersible bar screens (ESBSs)/VBSs: ESBSs are deployed in all units. ESBS camera inspections will begin on May 10. The ESBS in slot 12C remained in timer mode

until May 2 when the brush cycle was returned to automatic mode and recalibrated. The unit 8 ESBS controller panel view back light operated intermittently through most of the week until the electrical staff resolved the issue.

VBS examinations (preventative maintenance (PMs)) were performed on the screens in units 2 and 3 on May 2. All screens are cleaned when examined. Eight smolt mortalities were noted in slot 3B.

The screen in slot 3C jammed in the slot. The unit was removed from service. Initial attempts to release the screen failed. A late camera inspection of the guide slots on May 3 revealed nothing unusual. A camera inspection on May 4 revealed the screen had jammed on the downstream side of the north guide slot bracket. The VBS was later removed and a rehabilitated VBS was installed in 3C slot. Another camera inspection of both guide slot reveal the new screen was in proper position. The unit 3 then was returned to service.

VBS differential monitoring revealed one screen out of criteria. This screen and four others were cleaned on May 5. During the cleaning, no smolt or lamprey mortalities were noted on the screen mesh. However, smolt mortalities were noted behind the mesh on the screens in slots 5A, 9A and 10B. Units 5, 9 and 10 were removed from service.

During a heavy out migration of smolts, it appears the fish wedged themselves through a small seam break on each VBS, resulting in their entrapment behind the mesh. The seam tears in which the smolts wedged themselves, appeared to have opened recently. Fish recoveries are recorded below by slot.

5A: 5 live clipped Chinook yearlings.
18 live clipped steelhead.
12 clipped steelhead mortalities.
2 non-clipped steelhead mortalities.

9A: 14 live clipped steelhead.
35 clipped steelhead mortalities.
2 non-clipped steelhead mortalities.
65 clipped Chinook yearling mortalities.
2 non-clipped Chinook yearling mortalities.

10B: combining two tally sheets.

1 live clipped steelhead.
154 clipped steelhead mortalities.
25 non-clipped steelhead mortalities.
206 clipped Chinook yearling mortalities.
23 non-clipped Chinook yearling mortalities.
4 Chinook fry mortalities.
3 non-clipped sockeye mortalities.
2 non-clipped coho mortalities.

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.

VBS rehabilitations will continue with the torn sections being rehabilitated May 10 to 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 examination, orifices in the affected slots were closed, with makeup water coming from orifices in adjacent slots.

All systems functioned satisfactory in automatic mode.

Bypass Facility: During the bypass season, primary and secondary bypass modes return all fish are 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. The sample gates and all 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.

Two Chinook fry mortalities occurred on the perforated plate on April 29. A foam barrier was installed and the separator water level was lowered. No further mortalities occurred.

One stick was removed from the junction of the secondary bypass and sample return to river lines on May 4.

The electrical staff completed lighting upgrades at the facility 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. This week, due to flow in excess of powerhouse capacity, 40 to 42 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
313.9	260.5	140.0	104.4	55.5	52.5	6.0	5.0

Other

Inline Cooling Water Strainers: The cooling water strainer examination results for May 3 are recorded in Table 3 below. NC equals non-clipped. C equals clipped. CH equals Chinook smolt. SO equals sockeye smolt. SH equals steelhead smolt.

Table 3. Cooling Water Strainers at McNary Dam.

Unit	Live Lamprey	Lost Lamprey	Live Smolts	Lost Smolts
1	1	58	0	12 CH fry, 2 NC SO, 6 NC CH & 1 C SH
2	0	0	0	1 CH fry
3	2	2	0	6 CH fry
4	0	1	0	1 CH fry
5	0	1	0	0
6	0	4	0	6 CH fry
7	0	1	0	0
8	0	2	0	1 CH fry
9	0	0	0	0
10	0	1	0	0
11	0	7	0	0
12	0	1	0	1 CH fry
13	0	0	0	0
14	0	1	1 NC CH	6 NC CH & 5 C CH
Total	3	79	1	48

The next cooling water strainer examinations will occur May 31.

Invasive Species: The mussel station examinations on April 29 revealed no problems.

Avian Activity: Avian counts are recorded in Table 4 below.

Table 4. McNary Project's Daily Avian Count.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
Apr 29	Forebay	12	0	0	0	0
	Spill	101	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	14	0	0	0	0
Apr 30	Forebay	1	0	0	0	0
	Spill	95	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	15	0	0	0	0
May 1	Forebay	0	0	0	0	0
	Spill	65	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	12	0	0	1	0
May 2	Forebay	12	0	0	0	0
	Spill	102	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
May 3	Forebay	0	0	0	0	0
	Spill	112	1	0	1	0
	Powerhouse	0	0	0	0	0
	Outfall	7	0	0	0	0
May 4	Forebay	3	2	0	0	0
	Spill	156	3	0	0	0
	Powerhouse	54	2	0	0	0
	Outfall	47	0	0	0	0
May 5	Forebay	13	0	0	1	22
	Spill	118	0	0	0	0
	Powerhouse	3	0	0	0	0
	Outfall	13	0	0	0	0

Gulls were observed feeding in the spill zone. From April 28 to May 4, a flock of Forster's terns numbering as high as 144 birds were observed feeding in the spillway. 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.

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

A United States Geological Survey fisheries biologist conducted non-lethal smolt stomach content examinations on May 3. Forty yearling Chinook smolts, five of which were non-clipped, were examined.

Project: Ice Harbor
Biologist: Ken Fone
Dates: April 29 – May 5, 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% operating efficiency range (hard constraint).

The unit 2 scroll case and draft tube were unwatered on April 29 and May 3, respectively. Five to ten Siberian prawn mortalities (already dead) were observed in the scroll case, and 23 live channel catfish were recovered from the draft tube and released in the river in good condition.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on May 2, 3, and 5.

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 4 square yards of debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 11%. Oil sheens were observed in the 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 were switched to continuous run mode on May 3, due to the presence of sockeye measuring under 120 mm in the May 2 sample. The STS for slot 5B has not yet 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. There were no problems found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass is operating with 20 to 21 orifices open. Orifice 5AN and 5CN were opened on May 5. Later on that day, 5AN was closed and 5AS was opened, until the burned out light for 5AN can be replaced. The orifices in unit 5 gatewell slots were closed since the start of the season, because unit 5 has been out of service. Orifices in slot 5B remain closed as the bulkhead has been installed and the slot has been unwatered. The avian abatement hydrocannon at the end of the outfall pipe has been out of service this season due to a leaking expansion joint in the hydrocannon water line. A replacement expansion joint is being ordered.

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.

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

Table 1. Fish condition sampling results at Ice Harbor Dam.

May 2:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	67	0	0	0
UC-CH	12	1	0	1
C-CH-O	0	---	---	---
UC-CH-O	0	---	---	---
C-SH	67	4	0	2
UC-SH	15	2	0	1
C-COHO	0	---	---	---
UC-COHO	2	0	0	0
C-SOCK	0	---	---	---
UC-SOCK	2	0	0	0

TOTAL	165	7	0	4

May 5:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	85	0	0	0
UC-CH	17	0	0	0
C-CH-O	0	---	---	---
UC-CH-O	0	---	---	---
C-SH	91	1	0	3
UC-SH	11	0	0	1
C-COHO	0	---	---	---
UC-COHO	1	0	0	0
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	205	1	0	4

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
97.9	83.8	59.9	37.3	54	53	6.4	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.

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 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
April 29	52	33	0	0	0
April 30	0	15	0	0	65
May 1	30	5	0	0	55
May 2	48	33	0	0	11
May 3	98	19	0	0	32
May 4	40	77	0	0	7
May 5	37	25	0	0	55

Research: Beginning on April 21, tissue samples were taken weekly from clipped juvenile Chinook by NOAA Fisheries researchers to study the relationship of the physiological condition of smolts and the incidence of delayed mortality of Chinook.

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: April 29 – May 5, 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. Units 2, 3, 4, 5 and 6 were rotated out of service for STS inspections on May 3 and 4.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on April 29, 30, May 1 and 4.

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 or sill criteria (criteria: ≥ 8' or on sill) on all inspections with the exception of April 29 with readings of 7.9 on both. The operator was informed and the weir gates were manually placed on sill. While on sill, both gate depth readings were 6.3' and 7.1 feet. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in depth or sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, the gate depth readings were 6.8' and 7.9 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 108 square yards of forebay debris observed during this period. Gatewell debris ranged from 0-15% surface coverage. No oil problems observed in the gatewells.

STSs/VBSs: STSs were operating in cycle mode until 1300 hours on 5 May at which time they were changed to continuous-run mode due to average sub-yearling Chinook length being less than 120 mm. STS inspections were conducted May 3 and 4 with all screens found in good operating condition.

Orifices, Collection Channel, Dewatering Structure, Flume: The collection channel was operated with 20 orifices open.

Collection Facility: Fish collection into raceways for transport began at 0700 hours on May 1. Due to high fish numbers and a lack of available space on the transport barge the "A" side (small fish side) was placed into secondary bypass mode from 1130 hours to 1500 hours on May 2. All "A side" collected fish and "A and B" side collected sampled fish (sampled from 0700 hours on May 1 until 1500 hours on May 2) were bypassed back to the river.

Transport Summary: Every-day fish transport by barge 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 tailrace transitioning, 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
91.7	79.2	27.0	24.0	53.5	52.0	3.8	2.8

*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
April 29	1130	16	0	0	0	0
April 30	1100	11	0	0	0	0
May 1	1130	23	0	0	0	0
May 2	1110	10	0	0	0	0
May 3	1130	25	2	0	0	0
May 4	1300	33	1	0	0	0
May 5	1100	7	0	0	0	0

Research: No onsite research is in progress at this time.

Project: Little Goose
Biologist: Richard Weis
Dates: April 29 – May 5, 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 function properly. This system will remain in manual mode until repairs can be made. Adult fishway inspections were performed on May 01, 03 and 05.

Fish Ladder: The ladder exit head differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs ranged between 1.1 and 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 1.1 and 2.0 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 7.7 and 8.6 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 5.6 and 6.3 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 4.6 to 5.7 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 1.9 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 pump 2 and 3 are running. Water velocity measurements at the North Powerhouse using the Rickly velocity equipment were 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 4,500 to 5,000 square feet.

Spillway Weir: The repair to spillbay 1 was completed by cannibalizing parts from spillbay 5 and a special spill pattern was approved. The TSW is operating in the low crest configuration.

ESBS/VBS: Drawdowns were performed on units 1-4 on April 26.

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

Transportation Facility: Fish sampling is occurring every day and the JFF (Juvenile fish Facility) is collecting and transporting fish by barge daily.

Transport Summary: The collection and transportation facility operated within criteria during this report period. A total of 936,126 fish were collected with just 5 days of operation. The descaling and mortality rates were 0.8% and 0.01% respectively. This weekly report period saw 0 adult lamprey removed from sample and released in the tailrace. Collection for transportation began on May 01. Transport began on May 2 with the first barge departure. Minor problems were seen this first week with the season's first barge and new towboat contractor.

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
98.7	81.6	29.1	23.7	53.0	51.7	3.7	3.3

*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 counts and hazing commenced on April 01. See Table 2 below for count details.

Table 2. Daily Avian Counts at Little Goose Dam, April 22 – 28, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
April 29	1145	151	0	0	0
April 30	1400	188	8	0	0
May 1	1200	112	0	0	0
May 2	1300	192	5	0	0
May 3	1120	138	0	0	0
May 4	1100	120	0	0	0
May 5	0900	163	0	0	1

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

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, Robert Horal
Dates: April 29 – May 5, 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 at 2208 hours on May 5 due to an ESBS brush failure in slot 4A. The problem is being investigated.

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 (manual) mode until contractors make adjustments. The system remained in automatic mode this week for evaluation. Adult fish facilities were inspected by Corps or Anchor QEA biologists on April 29, 30, May 2, 3, and 4.

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 0.6 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 met sill criteria (criteria ≥8' or on sill) on all inspections. While on sill, gate depths readings were 6.8 feet April 29, 6.4' and 6.5 feet on April 30. Both gates had measured depths of 6.3 feet on May 2, 5.5 feet on May 3, and 6.2 feet on May 4. 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. 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 differentials met 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 the spill, and strong upstream winds. Mortalities included 2 sandrollers on April 29.

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 44.6 square yards of debris was observed in the forebay this week.

ESBSs/VBSs: ESBSs inspections are scheduled for the end of May. The ESBS brush in slot 4A failed to operate at 2208 hours on May 5.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: The collection channel is in operation with no problems reported. Orifices are being cycled every three hours.

Collection Facility: The collection facility was switch to collection for transport mode at 0700 hours on May 1. IDFG continued collecting genetic samples from yearling Chinook and juvenile steelhead Monday-Friday. Fish were collected for the NOAA in river survival study from May 1 through May 5. NMFS/UW collected a subsample of NOAA fish on May 2.

Transport Summary: Everyday barge transport by barge began May 2.

River Conditions

Routine 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
96.3	83.1	20.9	20.3	52.2	51.0	5.0	3.8

*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
April 29	1252	2	0	0	0
April 30	1230	4	0	0	0
May 1	1505	2	2	0	0
May 2	1415	6	0	0	3
May 3	1200	5	0	0	0
May 4	1527	2	0	0	0
May 5	1400	1	0	0	0

GBT: Gas bubble trauma sampling occurred May 5. No signs of gas bubble trauma were seen.

Adult Fish Trap Operations: The trap sample rate was changed on April 14 at 1400 hours to a 27% daily trap rate M-F (19% overall). The adult trap diversion gate in the turnpool area is changed to the ladder passage position from 1400 hours on Fridays to 1300 hours on Sundays to facilitate the sound vibration study.

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.