U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#39-2016

Project: McNary
Biologists: Bobby Johnson and Denise Griffith
Dates: November 18 - 24, 2016

Turbine Operation

Available turbine units operated outside the soft 1% peak efficiency criteria on November 18, 19, 21, 22 and 23 as requested by the Bonneville Power Administration. McNary turbine unit outages are recorded in Table 1 below.

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
13	Oct 3 to Dec 2	About 2 months.	Nine year over-haul.
11 & 12	Nov 9 to 23	About 14 days.	Station service contract upgrades.
1, 7 & 14	Nov 22	53 minutes.	Extended-length submersible bar screen (ESBS) camera inspections.
12	Nov 24	9.1 hours.	Failed ESBS in slot 12C.

Adult Fish Passage Facilities

McNary fish biologists performed measured inspections of the adult fishways on November 19, 20 and 22. The Washington ladder will be dewatered from December 1 to January 31 for the installation of lamprey passage improvements.

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. Debris loads were minimal at both exits and along the Oregon shore. Eurasian milfoil remained an issue at the Washington exit as the trash rack required repeated cleaning.

The Washington exit met all criteria during measured inspections.

The Oregon exit also met all criteria. Weir 338 remains out of service until the winter maintenance season.

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 ladder, south powerhouse entrances SFEW1 and SFEW2 measured 7.8 and 7.7 feet in depth, respectively on November 19. There appeared to be a calibration drift in the south pool and tailwater elevation sensors, which will be monitored. All other inspection points remained in criteria.

The Oregon ladder collection channel surface velocities averaged 1.4 fps.

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 will be completed in December. Turbine unit testing may occur in February, 2017 at the earliest. The bypass continues to function satisfactorily.

Two of the three Oregon ladder fish pumps operated satisfactorily with no interruptions in service this week. Both pumps operated with blade angles of 24 degrees. Fish pump 2 is currently under contract for major overhaul. Main shaft replacement has delayed completion. Testing is scheduled for early March.

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

Juvenile Fish Passage Facility

The fall primary bypass season continues.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads at the powerhouse were light. No high trash rack differential measurements were recorded and no trash racks were cleaned. No problems were observed in the gatewell slots.

ESBSs/Vertical barrier screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections at units 1, 14, slots 7B and 7C occurred on November 22. No problems were observed. The ESBSs in slots 1A, 6B, 6C, 8C, 12A and 12C remained in timer mode. The ESBS in slot 1B tripped multiple alarms and was switched to timer mode on November 19.

Issues with the ESBSs in slots 12A and 12C are outlined in Table 2 below.

Table 2. ESBS Issues at Unit 12.

Date	Time	Issue	Result
Nov 23	2103	12C ESBS tripped alarm.	Operator reset.
Nov 23	2250	12A ESBS tripped alarm.	Operator reset.
Nov 24	0001	12A and 12C ESBSs tripped alarms.	Operator reset.
Nov 24	0013	12C ESBS tripped alarm.	ESBS would not reset. Unit out of service.
Nov 24	0919	12C ESBS failed.	Electrician helped operator to reset 12A and 12C ESBSs in timer mode.

VBS differential monitoring revealed one screen out of criteria. The prototype VBS in slot 4B measured a differential of 1.8 feet when unit 4 was operating at 72 megawatts. This screen was cleaned on November 21. Nine other screens were cleaned on November 18, 21 and 22. A scheduled VBS inspection occurred in slot 4C on November 21. This is the other prototype VBS and no problems were found. VBS rehabilitations continued with new mesh being installed on torn VBS sections.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: Forty-two orifices were in use. During VBS cleaning and inspection, orifices in the affected slots were closed, with makeup water coming from orifices in adjacent slots. Since November 11, moisture has been bled daily from the orifice air supply line.

The side screen cleaning brush tripped an over load limit breaker while traveling upstream on November 24 at 0200 hours. The roving operator reset the limit breaker and parked the brush at 0240 hours.

The south side dewatering valve jammed when valve stem travel reached 25 inches open on November 18. The valve was monitored and freed itself after about two hours. Later, the valve opened to 33 inches. At about 1200 hours, the west floor valve was closed one inch. This increased the south side dewatering valve opening about six inches. This was an attempt maintain the valve within an increased operating range, where jams had not occurred in the past. This valve had jammed at about 20 inches open in previous years. This problem needs to be addressed during the winter outage.

All other dewatering and cleaning systems operated satisfactory in automatic mode.

Facility staff have suspected that the outfall pipe has been missing paint since the summer of 2015. The area in question is the upstream side of the 300 yard section of pipe that terminates at the outfall. This is a difficult area to observe safely. A camera inspection confirmed that paint was missing on November 20.

Bypass Facility: Facility winterization and maintenance continues.

River Conditions

River conditions during the week are outlined in Table 3 below as provided by the McNary control room. The data period runs from 0000 to 2400 hours each day. Flows and spill are recorded in one-thousand cubic feet per second (kcfs). Temperature is recorded in degrees Fahrenheit. Scheduled spillway hoist maintenance and testing continued, which did not influence the daily average spill recorded below.

Table 3. River Conditions at McNary Dam.

Daily Average River Flow		Daily Average Spill		Water Temperature		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
147.5	122.9	0.0	0.0	55.0	52.0	6.0	6.0

Other

Inline Cooling Water Strainers: The next cooling water strainer examinations will occur on December 6.

Invasive Species: Mussel station examinations on November 20 revealed no problems.

Avian Activity: Casual avian observations were performed during other inspections. A gull flock appears to be roosting at various locations near the project. Over 100 gulls were observed. Mergansers, a kingfisher and a loon were also observed.

Gulls and cormorants numbers in the tailwater area remained high at times. The birds were roosting on the navigation lock wing wall and other structures. They appeared to be feeding on juvenile shad in the powerhouse flow or at the juvenile bypass outfall on occasion.

In the forebay area, grebes, gulls and cormorants were noted at times. Gulls were also roosting on the rocks by the Washington shore boat dock.

Research: No on site research is occurring at this time.

Project: Ice Harbor
Biologists: Ken Fone
Dates: November 18 - 24, 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 was replaced and the blades will be welded in place to fix the leak. Unit 2 was taken out of service on April 25 at 0606 hours for runner replacement. Unit 6 was out of service from October 31 at 1103 hours to November 23 at 1120 hours for annual maintenance.

Available units were operated within the 1% operating efficiency range (soft constraint), except for unit 3. Unit 3 was routinely operated a few megawatts below the operating efficiency range during this reporting period, due to the GDACS (Generic Data Acquisition and Control System) needing to be updated with the narrower operating efficiency range of unit 3 since it became a fixed-blade unit.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on November 21, 22, and 23.

Fish Ladders: The north fish ladder inspection areas (head differentials at the fishway exit and picketed leads, and depth over the weirs) were in criteria on all inspections. The south fish ladder inspection areas (head differentials at the fishway exit and picketed leads, and depth over the 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. The picketed leads were previously raised out of the water at the end of the fish counting season.

Fishway Entrances and Collection Channel: The south shore entrance (SFE-1) depth and channel/tailwater head differential were in criteria, except when the gate was raised 6’ off of sill at 1320 hours for about 30-40 minutes on November 21 to fix an alignment issue. 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 per second.

Auxiliary Water Supply (AWS) System: Two of the three north shore AWS pumps were in operation during the week. Five of the eight south shore AWS pumps were in operation except on November 21. On November 21, all of the south shore pumps were taken out of service from

1330 hours to 1410 hours to reduce the water pressure against SFE-1 so it could be lowered into place while being aligned.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 5 square yards of debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 8%. Slot 2C was unwatered on July 6 to facilitate the unit 2 head gate sill plate repair.

STSs/VBSs: The STSs are in cycle-run mode. The STS for slot 5B remains uninstalled to facilitate the work on unit 5. Unit 2 STSs are raised and stored in their gatewell slots, since unit 2 will not be operated for the rest of the year. Units 1, 3, 4, and 6 STSs were inspected on November 15 and 16, with no problems found. STSs will be removed for the season after December 15.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 orifices open. Orifices were routinely cycled and back-flushed once per day.

Juvenile Fish Facility: The juvenile fish facility is operating in bypass mode.

Fish Sampling: Sampling is done for the year.

Removable Spillway Weir (RSW): Spill for fish passage and operation of the RSW are done for the year.

River Conditions

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

Table 1. 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
29.9	16.1	0.0	0.0	55.0	53.0	7.7	7.5

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Turbine cooling water strainers with high pressure differentials due to accumulations of dead shad were cleaned on November 2, 3, 8, 11, 14, 15, 16, 17, 19, 21, 22, and 23. A total of approximately 19,595 juvenile shad (all mortalities) were found.

Invasive Species: No new exotic species have been found.

Avian Activity: There were high numbers of grebes, pelicans, cormorants, gulls, and mergansers observed around the project. Many of the birds were resting on the south shore of the tailrace across from the coffer cells, and on Eagle Island. Moderate numbers of gulls and cormorants were observed foraging in the tailrace downstream of the bypass pipe outfall. High numbers of gulls were foraging downstream of the powerhouse, presumably feeding on dead juvenile shad that were removed from the cooling water strainers and disposed of into the tailrace.

Research: No on-site research is actively occurring at this time.

Project: Lower Monumental
Biologists: Bill Spurgeon, Chuck Barnes and Raymond Addis
Dates: November 18 - 24, 2016

Turbine Operation

Unit 1 was removed from service on December 10, 2014 for unit rehabilitation with an estimated return to service of March 28, 2017. Unit 6 was removed from service on November 7, 2016 for routine maintenance and is scheduled to return to service on December 8, 2016.

Adult Fish Passage Facility

The adult fishway was inspected by Corps biologists on November 21, 22 and 23.

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 November 21 and November 22. Weir gate depth was calculated at 7.0' on November 23 due to a brief power outage causing the weir gate controllers to default to manual operation. After the difference was reported, the control room quickly turned the gate controllers back to automatic mode and brought them back into criteria. 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, 6.4 and 6.8 feet. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, readings were 7.3, 7.2 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 due to a bushing problem. This pump will be replaced with the spare as time permits.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 37 square yards of forebay debris observed during this period. Gatewell debris ranged from 0 - 10% surface coverage. No oil problems were observed in the gatewells.

STSs/VBSs: STSs were operated in cycle-run mode throughout this report period. STS inspections were conducted November 1 and 2 with all screens found in good operating condition.

Orifices, Collection Channel, Dewatering Structure, and Flume: The collection channel was operated with 18 opened orifices with the exception of the November 21 inspection when 17 opened orifices were noted. The powerhouse operator had closed one orifice because of a high water alarm. Fish facility personnel adjusted the water level at the Primary Dewaterer at which time the collection channel went back to operating with 18 opened orifices.

Collection Facility: The facility was dewatered for winter maintenance on October 1.

Transport Summary: Fish transport is not occurring at this time.

River Conditions

Summer spill in support of fish passage ended at 2400 hours on August 31. 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
26.8	20.6	0	0	52.5	52.0	4.0	4.0

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on November 1. No live fish were recovered. Mortalities included 3 juvenile lamprey, 1 Siberian prawn and 650 America shad.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on November 2.

Avian Activity: Daily tailrace counts of feeding piscivorous birds are summarized in Table 2 below. Daily tailrace counts ceased at end of collection season on September 30. No action trigger points from the avian action plan occurred this period.

Table 2. Tailrace counts of foraging piscivorous birds at Lower Monumental Dam.

Date	Time	Gulls	Cormorants	Terns	Grebes	Pelicans
November 18	---	---	---	---	---	---
November 19	---	---	---	---	---	---
November 20	---	---	---	---	---	---
November 21	---	---	---	---	---	---
November 22	---	---	---	---	---	---
November 23	---	---	---	---	---	---
November 24	---	---	---	---	---	---

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

Project: Little Goose
Biologists: Scott St. John and Richard Weis
Dates: November 18 - 24, 2016

Turbine Operation

All turbine units were available for service except for units 1 and 2. Unit 2 was placed out of service for an annual inspection on November 07. Unit 2 was returned to service for a short period of time on November 23, but was forced out of service due to an oil leak in the Kaplin head. Unit 1 was place out of service on November 23. No 1% violations to report this week.

Adult Fish Passage Facility

The Fishway control system software was updated by RJS construction and returned to automatic operation on August 9. All weirs were manually adjusted and returned to automatic mode to determine functionality of the new software. The system was not operating sufficiently and was returned to manual mode on September 19. Future calibration and maintenance still need to be performed.

Adult fishway inspections were performed on November 21, 22 and 23.

Fish Ladder: The ladder exit head differentials and water depth at Diffuser 13 maintained criteria ($\leq$ 0.5 ft. and 1.1-1.2 ft., respectively) 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: SSE1 and SSE2 weir gates met depth criteria (criteria $\geq$ 8.0 ft. or on sill) on all inspections and depths ranged between 8.9 and 9.1 feet. South shore channel/tailwater head differential was in criteria (criteria 1.0-2.0 ft.) on all inspections.

NPE1 and NPE2 weir gates were in criteria on all inspections. Weir depths ranged between 7.1 and 7.7 feet (criteria $\geq$7.0 ft. or on sill). North powerhouse channel/tailwater head differentials met criteria (criteria 1.0-2.0 ft.) on all inspections.

NSE1 and NSE2 weir gate depths were in criteria on all inspections and ranged between 6.4 to 7.5 feet (criteria $\geq$ 6.0 ft or on sill) and met depth criteria on all inspections. North shore channel/tailwater head differentials were in criteria (criteria 1.0-2.0 ft.) on all inspections.

Collection Channel Velocity: The average surface water velocity measurements were in criteria on all inspections and velocities ranged between 1.8 and 2.2 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: The fish ladder is now operating on three pumps. The average water velocity (bottom, middle, top) of the adult channel at the NPE was 3.1 fps on November 07.

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. There was woody debris in the immediate forebay ranging from 585 to 2900 square feet.

Spillway Weir: The TSW was removed on July 11.

ESBS/VBS: Electrical ESBS brush tests were performed November 08. All were operating satisfactorily.

Orifices, Collection Channel, Dewatering Structure, and Flume: The primary dewaterer weirs were returned to automatic mode on October 26. The juvenile bypass system is presently running with 18 opened orifices. Orifices are cycled every 24 hours.

Collection Facility: Collection and transport ended for the season with the last truck departing the facility on November 01.

Transport Summary: The collection and transportation facility was unwatered without any difficulties on November 03.

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
27.3	18.1	0.0	0.0	52.0	51.2	5.9	5.6

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were inspected November 21. No lamprey or salmonid species were seen.

Invasive Species: The zebra mussel substrate monitor was inspection on November 3. No mussels were seen.

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

Table 2. Daily Avian Counts at Little Goose Dam, November 18 - 24, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
November 18	None	---	---	---	---
November 19	None	---	---	---	---
November 20	None	---	---	---	---
November 21	0745	132	37	0	0
November 22	0758	99	53	0	0
November 23	0800	106	35	0	0
November 24	None	---	---	---	---

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

Siberian Prawn: Siberian prawns are no longer being counted as fish collection ended October 31.

Gas Bubble Trauma: GBT inspections ended for the season with the July 19 report. No signs of GBT were seen this season.

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

Project: Lower Granite
Biologists: Elizabeth Holdren and Robert Horal
Dates: November 18 - 24, 2016

Turbine Operation

Units are being operated within the soft constraint of the 1% peak efficiency criteria. Unit 1 remains out of service for Kaplan blade linkage repair. Unit 2 underwent shaft alignment tests from 0703 to 0728 hours on November 22 in preparation for annual maintenance, and is slated to begin annual maintenance on November 28.

Adult Fish Passage Facility

Adult fish facilities were inspected by Corps biologists November 21, 22, and 23.

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'). NSE elevation readings were taken from the ladder control system digital display this week due to the North elevator being out of service. An average of about 31.6 square yards of debris was observed near the 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 differential was in criteria (criteria 1'-2') on all inspections.

NPE1 and NPE2 weir gates met depth or sill criteria (criteria ≥8' or on sill) on all inspections. 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. North shore channel/tailwater head differential met criteria (criteria 1'-2') on all inspections.

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

Auxiliary Water Supply System: The fish ladder is in two pump operation with AWS pumps 1 and 3 in service. Pump 2 is in standby mode.

Fish Ladder Temperature Control System: This system is not in service at this time.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: Approximately 102.6 square yards of debris was observed in the forebay this week.

ESBSs/VBSs: ESBSs have been removed for winter maintenance.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The collection channel is dewatered for winter maintenance.

Collection Facility: The facility is currently in winter maintenance mode.

Transport Summary: No fish transport is occurring at this time.

River Conditions

No spill is occurred this week. 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
26.6	18.8	0.0	0.0	50.0	49.5	5.0+	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: The cooling water strainers were inspected November 21. Mortalities included one unidentifiable non-salmonid.

Invasive Species: Zebra/quagga mussel substrate was inspected November 14. No zebra/quagga mussels were found.

Avian Activity: Seasonal bird counts ended October 31.

GBT: Gas Bubble Trauma examinations have ended for the season.

Adult Fish Trap Operations: Adult trapping concluded November 20 and the trap was subsequently dewatered on November 21.

Fish Rescue Operation: No fish rescue operations occurred this week.

Research: No onsite fish research is taking place at this time.