U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#41-2016

Project: McNary
Biologists: Bobby Johnson and Denise Griffith
Dates: December 2 - 8, 2016

Turbine Operation

Available turbine units operated outside the soft 1% peak efficiency criteria from December 6 through 8. 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 30	About 3 months.	After 9 year over-haul, thrust bearing issue.
8 thru 10	Dec 6	65 minutes.	Extended-length submersible bar screen (ESBS) camera inspections.
6	Dec 7	7.6 hours.	Hub tapped.

Adult Fish Passage Facilities

McNary fish biologists performed measured inspections of the Oregon shore fishway on December 2, 4 and 6. Passive integrated transponder (PIT) tag stations in both ladders were inspected December 5 to ensure the heat was on.

The Washington ladder remains out of service. The ladder was inspected in the exit weir section on December 2, from 0930 to 1130 hours. Approximately twenty adult shad and one clipped steelhead smolt were evacuated to the tailwater. Two highly decomposed Chinook adult carcasses were also removed. No significant debris was found.

The Washington entrance bulkheads were installed December 3. Exit weirs 334, 335 and 336 drive assemblies were removed for rehabilitation the same day. The ladder drain cover was rehabilitated on December 6. Scheduled maintenance was performed on the exit trash rack hoist on December 8.
The lamprey passage improvements contractor will be on site on December 12. The count station windows will be inspected and resealed on December 14 and 15.

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 the Oregon exit and along the shore.

The Oregon exit met all criteria. Weir 338 will remain 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 Oregon ladder, the north powerhouse entrances (NFEW2 and NFEW3) measured depths between 7.6 to 7.8 feet all week. At the south powerhouse entrances SFEW1 and SFEW2 measured 7.6 to 7.9 feet in depth on December 4 and 6. These readings were probably due to the juvenile facility being in emergency bypass. Both pool differentials remained in criteria.

Oregon ladder collection channel surface velocities averaged 1.6 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.

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 is no longer suppling 450 cubic feet per second (cfs) to the north powerhouse pool.

Juvenile Fish Passage Facility

The fall bypass season continues. The system will remain in emergency bypass until ESBS are removed.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads at the powerhouse were minimal to 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 removals will begin December 16. ESBS camera inspections in units 8 through 10 occurred on December 6. No problems were observed. The ESBSs in slots 1A, 1B, 6B, 6C, 8C, 12A and 12C remained in timer mode. The ESBSs in slots 12A and 12C tripped alarms on December 6 and were reset. The ESBS in 12C slot was found in automatic mode and returned to timer mode on December 7.

VBS differential monitoring revealed no screens out of criteria. The VBSs in slots 1B and 7B were cleaned on December 7. 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. Emergency bypass continues. The orifices will remain open until ESBSs are raised. Moisture continued to be bled from the orifice air supply line daily. All other dewatering and cleaning systems remain out of service for winter maintenance.

Bypass Facility: Scheduled winter maintenance continues.

River Conditions

River conditions during the week are outlined in Table 2 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 continued.

Table 2. 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
160.8	116.5	0.0	0.0	50.0	48.0	6.0	6.0

Other

Inline Cooling Water Strainers: The majority of cooling water strainer examinations occurred on December 6. Units 6 and 8 were examined on December 7 and 12, respectively. No smolts or juvenile lamprey were observed. Only juvenile shad mortalities were removed.

Invasive Species: Mussel station examinations will occur in late December.

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. A bald eagle was also observed. Cormorant numbers in the tailwater area remained low. Gulls and cormorants were roosting on the navigation lock wing wall, on other structures or on the water. They appeared to be feeding on juvenile shad in the powerhouse flow. In the forebay area, grebes and gulls were noted at times. Gulls were occasionally roosting on the rocks by the Washington shore boat dock. Overall, bird numbers appeared to have decreased.

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

Fish Salvage: Unit 13 did not return to service as previously scheduled due to thrust bearing issues discovered on December 5 during unit testing. The unit was dewatered on December 8 and 9. One sucker was removed from scroll case on December 8. Fourteen channel catfish (ranging from 10 inches to 2.5 feet in length) and two sturgeon (each 3 to 4 feet long) were removed from the draft tube and evacuated to the river on December 9. Six channel catfish (1 to 2 feet long) and four sturgeon (1 to 3 feet long) mortalities were also removed.

Project: Ice Harbor
Biologists: Ken Fone
Dates: December 2 - 8, 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 are being welded in place to fix the leak. Unit 2 was taken out of service on April 25 at 0606 hours for runner replacement.

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

Unit 5 and unit 2 draft tubes were unwatered on December 6 and 8, respectively. A total of 6 channel catfish were recovered, and released in the river in good condition. There were approximately 5 decayed, unidentifiable adult fish mortalities in the unit 5 draft tube.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on December 5, 7, and 8.

Upper Fish Ladders: The upper north fish ladder inspection areas (head differentials at the fishway exit and picketed leads, and depth over the weirs) met criteria on all inspections. The upper 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 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, except for a depth of 7.1' on December 5. This out of criteria reading was reported to the operator, and was due to calibration issues, which resulted in the entrance gate being slightly off of sill when in automatic control. The entrance gate control was switched to manual mode and the gate was lowered down to sill. The calibration need was reported to the electricians.

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 met 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, except only one pump was operating when pump #2 tripped off line from 1030 hours to 1145 hours on December 5. Five of the eight south shore AWS pumps were in operation.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 4 square yards of debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 3%. 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 last inspected on November 15 and 16, and no problems were 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 opened orifices. Orifices were routinely cycled and back-flushed once per day. The outfall pipe hydrocannon was shut off on December 4 when the pump intake became plugged with leaves. The pump was removed for the season and the hydrocannon water line was drained on December 5, as operation in subfreezing weather would lead to ice buildup on the end of the outfall pipe. On December 6, cold weather began to adversely affect the accuracy of water level alarm sensors in the dewatering structure, triggering the mechanical screen cleaner to repeatedly cycle. In order to save on wear and tear, the mechanical screen cleaner is only being operated four time a day in manual control. On December 7, maintenance staff discovered that a gear linkage that operates the primary dewatering weirs is broken, so that only two-thirds of the overflow weirs are adjustable. The main water level in the dewatering structure is still being adequately controlled.

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
25.2	16.4	0.0	0.0	50.0	48.0.	7.6	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 December 1, 3, 5, 7 and 8. Approximately 7,200 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: December 2 - 8, 2016

Turbine Operation

Unit 1 was removed from service on December 10, 2014 for unit rehabilitation with an estimated return to service date of May 15, 2017. Unit 6 was removed from service November 7, 2016 for routine maintenance and is scheduled to return to service December 22, 2016.
Units 2, 3, 4 and 5 were rotated out of service during day time operating hours for forebay debris removal on December 2, 5, 6, 7 and 8.

Adult Fish Passage Facility

The adult fishway was inspected by Corps biologists on December 6, 7 and 8.

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

SPE1 and SPE2 weir gates were in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, readings were 6.6, 7.0 and 7.4 feet. South powerhouse channel/tailwater head met 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, readings were 7.7 and 7.7 feet.

SSE2 was in criteria (6' above sill) on all inspections.

South shore channel/tailwater head differentials met criteria (1'-2') during all inspections.

Auxiliary Water Supply System: AWS pumps 2 and 3 were operated throughout this report period. Pump 1 was out of service throughout this period due to a bushing problem. This pump will be replaced with the spare pump as time permits.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 0 square yards of forebay debris observed during this period. Gatewell debris ranged from 0 - 30% 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.

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 operations 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
22.9	17.0	0.0	0.0	46.7	46.0	5.0	5.0

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on December 6. No live fish were recovered. Mortalities included 710 juvenile American shad.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on December 6.

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 during this report period.

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

Date	Time	Gulls	Cormorants	Terns	Grebes	Pelicans
December 2	---	---	---	---	---	---
December 3	---	---	---	---	---	---
December 4	---	---	---	---	---	---
December 5	---	---	---	---	---	---
December 6	---	---	---	---	---	---
December 7	---	---	---	---	---	---
December 8	---	---	---	---	---	---

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

Project: Little Goose
Biologists: Scott St. John and Richard Weis
Dates: December 2 - 8, 2016

Turbine Operation

All turbine units were available for service except unit 1. Unit 1 was place out of service on November 21 for an annual inspection. Unit 1 returned to service on December 08. 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 December 05, 06 and 07.

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 0.2 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 ranged between 8.3 and 9.0 feet. South shore channel/tailwater head differentials met 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 6.5 and 7.3 feet and weirs were on sill (criteria $\geq$7.0 ft. or on sill). The North powerhouse channel/tailwater head differential met criteria (criteria 1.0-2.0 ft.) on all inspections.

NSE1 and NSE2 weir gates met criteria on most of the inspections and depths ranged between 5.7 to 6.6 feet (criteria $\geq$ 6.0 ft or on sill). The North shore channel/tailwater head differential met 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 1.9 and 2.4 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 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 27 to 130 square feet.

Spillway Weir: The TSW was removed on July 11.

ESBS/VBS: Electrical ESBS brush tests were performed on November 08. All were found in satisfactory working order. Drawdowns were performed on unit 3 on December 08. All measurements met criteria.

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

Collection Facility: Winter maintenance is under way.

Transport Summary: The collection and transportation facility was unwatered without any problems 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
20.4	17.3	0.0	0.0	47.5	46.5	6.0	5.8

*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, December 2 - 8, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
December 2	None	---	---	---	---
December 3	None	---	---	---	---
December 4	None	---	---	---	---
December 5	0920	20	22	0	0
December 6	0915	8	17	0	0
December 7	0945	25	30	0	0
December 8	0814	40	20	0	0

*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: December 2 - 8, 2016

Turbine Operation

All available turbine units are being operated within the soft constraint 1% peak efficiency criteria. Unit 1 remains out of service for Kaplan blade linkage repair. Unit 2 was removed from service at 0605 hours on November 28 for a unit annual. Unit 6 was taken out of service from 0805 - 1313 hours on December 8 for a caisson installation in the juvenile fish collection channel.

Adult Fish Passage Facility

Adult fish facilities were inspected by Corps Biologists December 5, 6, and 8.

Fish Ladder: Fish ladder exit head differentials and depth over the weirs were in criteria (≤0.5' and 1.0-1.3', respectively) on all inspections. Picketed lead head differential was also in criteria (≤ 0.3'). NSE elevation readings were taken from the ladder control system digital display on December 5 and 6 due to the north elevator being out of service. An average of about 2.7 square yards of debris was observed near the ladder exit.

Fish Ladder Entrances and Collection Channel: SSE1 and SSE2 weir gates met depth criteria (criteria ≥8' or on sill) on all inspections. South shore channel/tailwater head differentials also met criteria (criteria 1'-2') on all inspections.

NPE1 and NPE2 weir gates were in depth criteria (criteria ≥8' or on sill) on all inspections as were North powerhouse channel/tailwater head differentials (criteria 1'-2').

NSE1 met criteria (criteria ≥7' or on sill) on all inspections with the exception of a 6.8 feet reading December 8. The gate was likely out of criteria due to a delay in the control system adjusting to changing tailwater elevation. NSE2 has been out of service since 2011 and remains set with a chain fall hoist in the closed position. The North shore channel/tailwater head differential was in 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: An average of about 66.7 square yards of debris was observed in the forebay this week.

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

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The collection channel was dewatered November 17 to facilitate phase 1a construction.

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

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

River Conditions

No spill 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
20.8	16.9	0.0	0.0	48.5	47.8	5.0	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: No inspections occurred this week.

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

Avian Activity: Seasonal bird counts ended October 31.

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

Adult Fish Trap Operations: The adult trap was previously unwatered for winter maintenance on November 21.

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

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