U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#43-2016

Project: McNary
Biologists: Bobby Johnson and Denise Griffith
Dates: December 16 – 22, 2016

Turbine Operation

Available turbine units operated outside the soft 1% peak efficiency criteria on December 17 through 20 and 22. 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 thru Feb 28	5 months.	9 year over-haul then thrust bearing issue.
14	Dec 16	8.0 hours.	Extended-length submersible bar screen (ESBS) removal.
10 thru 12	Dec 17	11.9 hours total.	ESBS removal.
7 thru 9	Dec 18	14.5 hours total.	ESBS removal.
4 thru 6	Dec 19	15.6 hours total.	ESBS removal.
1 thru 3	Dec 20	15.2 hours total.	ESBS removal.

Adult Fish Passage Facilities

McNary fish biologists performed measured inspections of the Oregon shore fishway on December 16, 18 and 20.

The Washington ladder remains out of service. The contractor continues adding lamprey passage slots to fishway weirs. The count station back board was cleaned and painted on December 19. The entrance pool dewatering pumps were tested for two hours on December 20. The pool was drawn down about 1.5 feet. No attempt was made to observe the diffuser grating due to the amount of ice on the pool surface.

Fish Ladder Exits: Debris loads were minimal at the Oregon exit and along the shore.

The Oregon shore fishway exit was in criteria (head differential 1.0 to 1.3 ft). The regulating weir set point was adjusted on December 16 and 20. The tilting weir set point was adjusted on December 20. Weir 338 is out of service until repairs can be made during 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.

The Oregon shore ladder entrance weirs measured between 7.2 to 7.6 feet in depth all week. These low readings were probably because the juvenile facility was in emergency bypass. Both pool differentials remained in criteria. The north entrance control panel display exhibited faulty readings on December 16. The electrical staff resolved the issue on December 19.

Oregon ladder collection channel surface velocities averaged 1.7 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 was completed on December 16. Turbine unit testing may occur in February, 2017 at the earliest.

Oregon ladder fish pumps 1 and 3 operated satisfactorily with no interruptions in service. Both pumps operated with blade angles of 25 degrees. Fish pump 2 is currently being overhauled but the main shaft replacement has delayed progress. Pump 2 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 concluded on December 21 at 0800 hours when all collection channel orifices were closed for the winter maintenance season.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads at the powerhouse were minimal to light.

Trash rack differential measurements were within normal levels. Trash rack differentials will be measured twice a week during the winter. No problems were observed in the gatewell slots, which will be monitored twice a week during the winter. The general maintenance staff rehabilitated the gatewell "dipping" trap in November.

ESBSs/Vertical barrier screen (VBSs): ESBSs were removed from all units on December 16 through 20. ESBSs were visually inspected on December 21. All screens were cleaned. Approximately 21 juvenile shad, one adult shad and three stickleback mortalities were removed from the screens. No smolts or juvenile lamprey were observed.

The ESBSs in slots 1A, 1B, 6B, 6C, 8C, 12A and 12C remained in timer mode until the screens were removed. The brush cycle for the screen in 1B slot was reset on December 17, 18 and 20. The ESBSs in slots 2B and 9C were switched to timer mode on December 17. The brush cycle for the screen in 2B slot was reset on December 18 and 19. The ESBS in slot 3B was switched to timer mode on December 19. It appears several proximity switches failed before screen removal.

VBS differential monitoring revealed no screens out of criteria and none were cleaned. Monitoring concluded on December 20 with ESBS removal. 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 until emergency bypass concluded on December 21 at 0800 hours. Moisture continued to be bled from the orifice air supply line daily. Moisture in the air lines and on top of the orifice knife gates caused several orifices to freeze open or closed early in the week. More bleeding points were added to the air supply line later in the week.

After orifice closure, approximately 25 steelhead adults, two to three steelhead smolts, one Chinook subyearling smolt, six adult shad, 12 small mouth bass, four channel catfish and a couple of sculpins were evacuated from the emergency bypass channel to the river. Salmonids were not examined for clips, though clipped and non-clipped fish were observed. Three to four adult shad were the only mortalities noted.

All dewatering and cleaning systems remain out of service for scheduled winter maintenance, which has been completed on the rectangular and transition screen cleaning brushes. The side screen brush rehabilitation will begin next week. Maintenance on the south side dewatering valve was completed this week. Lubrication points were added, which should improve the valve function. The north side dewatering valve was found to have worn guides. These will be replaced later in the season. An air leak in the line suppling the air hoists was repaired this week.

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.

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
156.4	143.0	0.0	0.0	43.0	41.0	6.0	6.0

Other

Inline Cooling Water Strainers: The next cooling water strainer examinations will occur on January 3.

Invasive Species: Mussel station examinations will occur on December 27.

Avian Activity: Casual avian observations were performed during other inspections. A gull flock appears to be roosting at various locations near the project. Bald eagles, a loon, blue herons and kingfishers were also observed. One blue heron was observed inside the Oregon ladder exit.

Gull and cormorant numbers in the tailwater area appeared to fluctuate. The birds 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, cormorants and gulls were noted at times. Gulls and cormorants were occasionally roosting on the rocks by the Washington shore boat dock.

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

Fish Salvage: One walleye mortality measuring approximately three feet was removed from the navigation lock on December 22.

Project: Ice Harbor
Biologist: Ken Fone/Charlie Dennis
Dates: December 16 – 22, 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 the runner replacement. Units 1 and 3 were out of service on December 21 from 0700 hours to 1610 hours to accommodate dive work for reducing the water leakage past the stop logs into unit 2 draft tube. Divers were unsuccessful in reducing the leakage into the draft tube.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on December 19, 20, and 22.

Upper Fish Ladders: The upper 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 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 are raised out of the water for 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 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 three north shore AWS pumps were in operation during the week. Five of eight south shore AWS pumps were in operation, except on December 21 when all of the south shore pumps were out of service from 1200 hours to 1540 hours for the unit 2 dive.

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 3%. Slot 2C was unwatered on July 6 to facilitate the unit 2 head gate sill plate repair.

STSs/VBSs: The STS for slot 5B was never installed this year to facilitate the work on unit 5. Unit 2 STSs have been raised up and stored in their gatewell slots, since unit 2 has been out of service for the runner replacement. The rest of the STSs were removed for annual winter maintenance on December 19, 20 and 21.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 19 orifices open, until they were closed and the bypass was unwatered for winter maintenance on December 21. The following fish were found/recovered from the collection channel:

39 clipped adult steelhead
10 unclipped adult steelhead
4 clipped juvenile steelhead
3 channel catfish
1 juvenile American shad
20 juvenile American shad that were already dead

All of the live fish were released back to the river in good condition.

Juvenile Fish Facility: The juvenile fish facility is unwatered for the season.

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.

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
26.0	19.4	0	0	44	41	7.2	7.1

*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, 8, 9, 10, 13, 15, 17, 18, 19 and 22. A total of approximately 14,830 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**
Biologist: Chuck Barnes
Dates: December 16 - 22, 2016

Turbine Operation

Unit 1 was removed from service on December 10, 2014 for rehabilitation with an estimated return to service 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 and 3 were rotated out of service (OOS) during day time operating hours for forebay debris removal on December 16, 20, 21 and 22. Units 4 and 5 were OOS during daytime operating hours for forebay debris removal December 20 and 22. Units 2 and 3 were OOS December 19 from 7:20 to 15:45 for STS removal. Units 4 and 5 were OOS December 20 from 7:13 to 15:48 for STS removal.

Adult Fish Passage Facility

The adult fishway was inspected by Corps biologists on December 19, 20 and 22.

Fish Ladders: Fishway exit head differentials and depths over the weirs were within criteria (≤ 0.5' and 1.0'-1.3', respectively) on all inspections.

Picketed lead head differentials were in criteria (≤ 0.4' and ≤ 0.3' for north and south shore fishways, respectively) on all inspections.

Fishway Entrances and Collection Channel: NSE1 and NSE2 weir gates were in depth criteria (criteria: ≥ 8' or on sill) on all inspections. North shore channel/tailwater head was in criteria (1'-2') on all inspections.

SPE1 and SPE2 weir gates were in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill readings were 5.8, 6.7 and 7.0 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 readings were 7.2, 7.3 and 8.4 feet.

SSE2 was in criteria (6' above sill) on all inspections. The 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 4 square yards of forebay debris observed during this period. Gatewell debris ranged from 0 - 12% surface coverage. No oil problems observed in gatewells.

STSs/VBSs: STS's were operated in cycle mode throughout the beginning of the period. They were removed December 19 and 20. All STS screens have been removed for the winter.

Orifices, Collection Channel, Dewatering Structure, and Flume: The collection channel was operated with 15 orifices open during the inspection on December 19 due to the removal of STS screens. The juvenile collection channel and primary dewatering structure were dewatered for the winter on December 21.

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

Transport Summary: Transport is not occurring.

River Conditions

River conditions during the week are outlined in Table 1.

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
23.1	19.3	0	0	43	40	5.0	5.0

*Scrollcase temperatures.

Other

Spill: Summer spill operations ended at 2400 hours on August 31.

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

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

Avian Activity: Daily tailrace counts ceased at end of collection season on September 30.

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

Project: Little Goose
Biologists: Scott St. John and Richard Weis
Dates: December 16 - 22, 2016

Turbine Operation

All turbine units were available for service except unit 1. Unit 1 was placed out of service on December 12 for a shaft packing leak and was returned to service on December 19. No 1% violations to report.

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 auto 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 19, 20 and 21.

Fish Ladder: The ladder exit head differentials and water depth at Diffuser 13 maintained within criteria ($\leq$ 0.5 ft. and 1.1-1.2 ft., respectively) and picketed lead differentials ranged between 0.1 and 0.2 feet (criteria $\leq$ 0.3 ft.). The air bubbler used to prevent debris from collecting near the fish 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 8.7 and 8.8 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 6.9 and 7.1 feet and was on sill (criteria $\geq$7.0 ft. or on sill). North powerhouse channel/tailwater head differential was in criteria (criteria 1.0-2.0 ft.) on all inspections.

NSE1 and NSE2 weir gate depths were in criteria on all of the inspections and ranged between 6.3 to 6.7 feet (criteria $\geq$ 6.0 ft or on sill.) and were in depth criteria on all inspections. North shore channel/tailwater head differential was 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 ranged between 1.7 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 3.4 fps on December 12.

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 no woody debris in the immediate forebay this week.

Spillway Weir: The TSW is out of service and removed.

ESBS/VBS: All ESBS screens were moved to the raised position during the week of December 19.

Orifices, Collection Channel, Dewatering Structure, and Flume: The Juvenile collection system was dewatered on December 21. All orifices are closed.

Collection Facility: Winter maintenance is currently underway.

Transport Summary: Winter maintenance is currently underway.

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
23.4	18.9	0.0	0.0	40.8	40.5	6.0+	6.0+

*Ladder temperature.

Other

Invasive Species: The zebra mussel substrate monitor was inspected on December 13. No mussels were seen.

Cooling Water Strainers: Cooling water strainers on all units were inspected December 12. No lamprey or salmonid species were seen.

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

Table 2. Daily Piscivorous bird counts at Little Goose Dam.

Date	Time	Gulls	Cormorants	Caspian Terns	Pelicans
12-16	None	---	---	---	---
12-17	None	---	---	---	---
12-18	None	---	---	---	---
12-19	0840	35	12	0	0
12-20	0840	37	12	0	0
12-21	None	---	---	---	---
12-22	None	---	---	---	---

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

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 fish research is in progress at this time.

Siberian Prawn: Siberian prawns are no longer being counted with the end of collection.

Project: Lower Granite
Biologists: Elizabeth Holdren
Dates: December 16 - 22, 2016

Turbine Operation

Units are being operated in soft constraint of the 1% operation criteria. Unit 1 remains out of service for Kaplan blade linkage repair. Intermittent oil sheens were observed in the tailrace December 19-21. Diesel and motor oil from phase 1 construction heavy equipment activities build up in ice and snow became apparent with melting during the warming trend. This and fueling of contractor's construction equipment by a vendor over the weekend were considered contributing factors to oil sheens. After eliminating other possibilities unit 2 was also suspected as the source and operated from 1043-1100 hours December 21. Oil was visible in the tailrace during this test. As a result unit 2 was forced out of service at 1416 hours December 21. The problem was determined to be blade seal packing failure.

Adult Fish Passage Facility

Adult fish facilities were inspected by Corps Biologists December 16, 19, 20, and 21.

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 2.5 square yards of debris was observed near the ladder exit. December 19 and 20 a slight oil sheen was visible behind the lower ladder transition pool false wall and in the powerhouse collection channel, respectively. AWS pumps were removed from service from 0827-1124 hours December 21 while the source of oil was being investigated. Construction equipment activity in the area and unit 2 blade seal packing failure are considered to be the contributing factors.

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 were in depth 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 depth 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 was in criteria (criteria 1'-2') on all inspections.

Collection Channel Velocity: Collection channel 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 1 and 3 in service. Pump 2 is in standby mode. At 1322 hours December 16 AWS pump 1 was found off. The shift operator returned AWS pump 1 to service when the problem was reported. Electricians identified the problem as a burnt relay and made necessary repairs. All AWS pumps were removed from service from 0827-1124 hours December 21 to eliminate the potential for oil from the tailrace to enter the AWS intakes and be pumped through the ladder collection channel diffusers.

Fish Ladder Temperature Control System: N/A.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: An average of about 56.5 square yards of debris was observed in the forebay this week.

ESBSs/VBSs: ESBS are removed for winter maintenance.

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

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

Transport Summary: No transport is occurring.

River Conditions

River conditions during the week are outlined in Table 1.

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
23.5	20.0	0.0	0.0	43.8	41.3	5.0	5.0

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainers were inspected December 21. No live fish were recovered. Mortalities included 4 juvenile lamprey.

Invasive Species: Zebra/quagga mussel substrate was inspected December 6. No zebra/quagga mussel were found.

Spill: No spill has occurred this week.

Avian Activity: Seasonal bird counts ended October 31.

GBT: N/A

Adult Fish Trap Operations: The adult trap is in winter maintenance mode.

Fish Rescue Operation: No rescue operation occurred this week.

Research: N/A