U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#38-2014

Project: McNary
Biologists: Carl Dugger and Bobby Johnson
Dates: November 14 - 20, 2014

Turbine Operation

McNary had 11 units available for power generation this week. On November 1, the soft constraint one percent criterion began. This week, operational units ran outside the criteria most of the week at BPA's request due to the severe winter weather. The week began with snow, included freezing temperatures with fog and ended with freezing rain, all of which made operations difficult. Unit outages are recorded in Table 1 below.

Table 1. Unit Outages at McNary Dam.

Units	Outage Dates	Outage Length	Main Reason for Outage
11	Sep 18, 2013 to Jan 31, 2015	About one year and 4.5 months.	Turbine bearing issue continues.
4	Mar 27 to Jan 31, 2015	About 10 months.	Turbine bearing issue continues.
9	Aug 11 to Mar 25, 2015	About 7.5 months.	Maintenance then rewind contract.
8, 10, 13 & 14	Nov 14	About 9.6 hours total.	Study equipment installation on ESBS.
3	Nov 16	3.0 hours.	Thrust bearing oil pump issue.
14	Nov 17 to 20	About 3.5 days.	Annual Maintenance.
5 to 8	Nov 18	About 1.6 hours total.	ESBS camera inspections.

Adult Fish Passage Facilities

On November 14, 16 and 17, the McNary fisheries biologist performed measured inspections of the adult fishways.

Fish Ladder Exits: During measured inspections, both ladder exits met all Fish Passage Plan criteria. The exits had no debris issues.

At the Washington exit, the operators reset several false 339 and 340 weir alarms. On three occasions, we found the window brushes in the lowered position and quickly raised them. The project resolved the issue later in the week.

At the Oregon exit, on November 14, the electrical staff adjusted the exit's settings and reset the set points. On November 16, several 340 weir alarms occurred with the operator setting the weir to manual, which had no ill effect on exit operations. The weir had encoder and lower limit issues, which were resolved the next day. The traveling screens' differentials remain low. The operators reset two false differential alarms. On November 16, we noted the walkway grating adjacent to the picketed leads was missing retainer clips. On November 18, the project replaced these clips.

Fishway Entrances and Collection Channel: At the Washington ladder entrance, all inspection points were in criteria. In the near future, the project will replace the LED's for W2 and W3 with a panel view.

At the Oregon ladder entrances, all inspection points were in criteria except on November 17, when NFEW2 and NFEW3 measured 7.9 feet. This is probably due to the juvenile system was no longer supplying flow to the north powerhouse entrance. At the south powerhouse entrance, SFEW1 and the SFEW2 continue to have calibration drift issues. Electrical upgrades of the Oregon entrances will be completed in the near future.

As mentioned last week, bulkheads are in place at floating entrance W-14. Removal of the weir for rehabilitation will wait for the winter ladder outage.

The collection channel velocity averaged 1.9 feet per second. We took these readings from surface observations.

Auxiliary Water Supply System: For the report week, the PUD at the Washington ladder had no interruptions in service.

Fish pumps 1 and 3 ran satisfactorily with blade angles of 30 degrees. Pump 2 is currently out of service for major overhaul under contract. This work should be completed by September, 2015. The juvenile facility is no longer supplying the usual 450 cfs to the north powerhouse pool.

Juvenile Fish Passage Facility

The fall bypass season continues with the system in emergency bypass due to severe winter weather. This will protect the channel and avoid freeze breakage at the facility. Due to the fog effect in the channel and icy conditions throughout the facility, winter maintenance proceeded very slowly.

Forebay Debris/Gatewell Debris/Oil: Floating forebay debris, which was milfoil along with woody material, was minimal. We noted no fresh incoming debris and there was no debris at the spillway. Our trash rack differential readings revealed no problems and none were cleaned. We observed no problem in the gatewell slots.

ESBSs/VBSs: ESBSs are installed at all units except units 4 and 11, which are out of service. The screens at 1A, 1B, 2B, 6A and 13C slots remain in timer mode. On November 18, the screen

in 6A slot appeared to be “short cycling” (i.e.: cleaning brush reversing direction before reaching the end of the screen). The operator reset the screen. On November 16 and 17, we found the screen in 8B slot short cycling. The operator reset the screen each day and on November 17, switched it to timer mode. Also, on November 17, we found the screen in 8C slot “short cycling”. The operator recalibrated the screen and set it to timer mode as well. Later that day, the operator noted the screen had excessive cycle counts and recalibrated it again. On November 18, camera inspections at units 5 to 8 revealed no problems.

VBS differential monitoring revealed no screen out of criteria even with the units running to as high as 80 megawatts. On November 20, the project cleaned the screen in 1B slot as a preventative measure. On November 18, a scheduled maintenance check and cleaning was performed on the screen at 14B slot. During both cleanings, we observed no ESA-listed fish mortalities or lamprey mortalities. VBS rehabilitation continues with unit 11 as the staging area.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: With emergency bypass, 42 orifices remained open all week. We continue to note moisture in the orifice air supply line and to bleed the moisture off daily. Due to the severe winter weather, we had to thaw out several of these air bleeding lines daily. Also, we had to install new intake ports on several more orifice operators. On November 18, we had to thaw out the orifice valve at 4C slot because it was frozen open and would not cycle. On November 19, the south orifice at 6A slot was closed due to excessive splashing, which was making the walkway icy. It is unclear if the orifice is partly clogged. We opened the north orifice to compensate.

The channel systems are winterized and light winter maintenance will continue as weather allows. The project does have approximately one extra month for maintenance.

On November 17, we noted that last week’s wind storm had filled the stilling well for the forebay elevation indicator with woody material, which was now frozen in place. We will remove the debris next week when the weather moderates.

Bypass Facility: The facility remained dewatered and protected from possible freeze breakage. Winter maintenance continues as the weather allows. No PIT tag detection occurs during emergency bypass.

The fisheries staff continues rehabilitation of the separator and removal of the direct barge loading line from the barge dock. Also, we completed some general inside maintenance.

River Conditions

River conditions during the week are outlined in Table 2 as provide by COE data. Our data day runs from 0000 to 2400 hours each day.

On November 15, at 0001 hours, the TSW in bay 20 was opened in support of the adult fallback study. This week, the TSW was opened from November 15 to 17. For the remainder of the week,

the TSW was closed. Interestingly, during the cold weather, the TSW produced its own fog bank. The spill recorded below occurred only during TSW operations.

Table 2. River conditions at McNary Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temp. (^{o}F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
151.4	132.8	9.0	0.0	53	48	6.0	6.0

* Readings taken from the unit 1 scroll case.

Other

Inline Cooling Water Strainers: The next cooling water strainer examination will occur in early December.

Invasive Species: The next zebra mussel station examination will occur in late November.

Avian Activity: Bird counts are no longer occurring.

Repairs to the outfall water cannon pump are still being arranged with January or February, 2015 as the target date.

During other inspections, we noted in the tailwater area, gulls feeding in the powerhouse flow. We observed gulls and cormorants roosting on the navigation lock wing wall and feeding in the TSW flow, which is part of the spill zone. Finally, we observed gulls and cormorants at the emergency bypass outfall. Bird numbers are affected by the juvenile shad out migration, their own migratory patterns and the weather. Foggy conditions made observations difficult.

While working on the barge dock, we noted night heron tracks along with dung in the area and on the shore.

In the forebay area, we observed an occasional gull or group of gulls along with an occasional cormorant. Only an occasional grebe or small group of grebes was noted. On November 18, we removed a grebe from the gatewell slot at 14A. No grebes were observed elsewhere. We observed gulls occasionally on the rock by the Washington boat dock.

Research: On November 14, the last ESBS transducers were installed, which allowed the adult steelhead fallback study to begin the next day. The University of Idaho appears to have their equipment in place their winter adult steelhead radio tracking study.

Project: Ice Harbor
Biologist: Ken Fone
Dates: November 14 - 20, 2014

Turbine Operation

Unit 3 was taken out of service on July 7 at 1346 hours to investigate a generator electrical grounding problem and for annual maintenance, and remains out of service due to an oil leak from the hub. The plan for the fall and winter is to convert unit 3 into a fixed-blade unit to remedy the problem. Unit 6 was taken out of service at 1048 hours on October 6 for annual maintenance. Unit 2 was removed from service on October 14 at 0940 hours for digital governor installation. Units that were not already out of service were removed from service one at a time for STS inspections on November 17 and 19. Units were operated within 1% of peak turbine efficiency as specified in the Fish Passage Plan.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on November 18, 19, and 20.

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. Fish ladder exits were clear of debris and the bubblers were operating satisfactorily. The north and the south shore picketed leads were put in their raised positions on November 3. The counting of adult fish ended for the season on October 31.

Fishway Entrances and Collection Channel: The south shore entrance (SFE) depth and channel/tailwater differential were in criteria, except for a differential of 2.1 feet on November 19. The north powerhouse entrance (NFE) depth and channel/tailwater differential were in criteria on all inspections. The north shore entrance (NSE) depth and channel/tailwater 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.

Auxiliary Water Supply System: Two of the three north shore fish pumps were operated throughout the week. Six of eight south fish pumps were operated.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was little to no debris observed in the forebay and gatewells.

STSs/VBSs: Most of the STSs are in position for juvenile fish guidance and have been in cycle mode since July 21. Unit 3 STSs were removed for the season on November 4, since the unit will remain out of service past December 15. Unit 1, 2, 4, 5, and 6 STS inspections were performed on November 17 and 19. No significant problems were found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass was placed in operation on March 17. The collection channel operated with 20 orifices open. The bird abatement hydro-cannon was turned off and winterized for the season on November 13 due to increasing ice buildup on the outside of the hydrocannon and bypass outfall pipe.

Juvenile Bypass Facility: The bypass is in operation.

Fish Sampling: Sampling operations began on April 2 and ended on July 15.

Removable Spillway Weir: Spill in support of fish passage began on April 3 and ended on August 31. The contractor for the spill bay 2 ogee and flow deflector modifications continue concrete cutting and chipping of the ogee, as well as diving to install temporary bulkheads, in preparation for the modifications.

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
22.1	14.1	0	0	57	53	6.7	6.4

*Unit 1 scrollcase temperature.

Other

Inline Cooling Water Strainers: Monthly turbine cooling water strainer inspections took place on November 17 and 19. One juvenile lamprey mortality and several hundred juvenile shad mortalities were found.

Invasive Species: No new exotic species have been found.

Avian Activity: Contracted hazing of piscivorous birds for 16 hours per day began on April 1 and ended on June 30. The piscivorous bird count program at the project began on April 1 and ended on July 15. Approximately 80-100 gulls were observed foraging in the powerhouse tailrace near the discharges of the operating units on November 19. Moderate numbers of cormorants, grebes, and mergansers, along with a few pelicans, were also seen around the project during the week.

Research: Researchers continue releasing sensor fish through unit 1 for the turbine characterization study, and plan to continue through early December.

Project: Lower Monumental
Biologists: Bill Spurgeon and Ray Addis
Dates: November 14 - 20, 2014

Turbine Operation

The units are being operated in hard constraint of the 1% operation criteria. Unit 6 remains out of service for six year overhaul.

Adult Fish Passage Facility

The adult fishway was inspected by Corps biologists on November 17, 19 and 20.

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 the gate depth readings were 7.0', 6.7' and 6.7 feet. South powerhouse channel/tailwater head was in of criteria (1'-2') on all inspections.

SSE1 weir gate was in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, the gate depth readings were 8.0', 7.4' and 7.6 feet. SSE2 was in criteria (6' above sill) on all inspections. South shore channel/tailwater head was in criteria (1'-2') on all inspections.

The collection channel velocity remained in criteria (1.5 - 4.0 ft/sec) this week.

Any criteria violations at the fishway entrances are related to the failure of the PLC (Programmable Logic Circuit) for automated control. Without automated control, the FCRG (Fishway Control Regulating Gate) drifts closed causing the fishway entrance head to go out of criteria at the south shore entrances. Operators are manually controlling the FCRG and fish pumps to maintain head and depth criteria at fishway entrances. The loss of the fishway PLC also caused all weir gates to be placed in local control. This results in criteria violations if monitoring and adjustment does not occur as tailwater level fluctuates. To minimize this, SPE1 and SPE2 are placed on sill.

The replacement PLC for automated control of the fishway has been received. It is currently undergoing programming. The latest update on getting the automated system back in service is February 2015. The operators have been instructed to conduct a physical inspection on night shift to replace the FPP inspection via data screen conducted normally on that shift.

Auxiliary Water Supply System: All AWS pumps were in service and operating on the remaining days of the period.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 117 square yards of forebay debris observed during this period. Gatewell debris ranged from 0 - 40% surface coverage. Oil absorbent pads were placed in 4 gatewells due to a sheen that was likely caused by grain dust.

STSs/VBSs: STSs are operating in cycle mode. STSs were inspected November 4, 5 and 6. All screens passed inspection.

Orifices, Collection Channel, Dewatering Structure, Flume: The collection channel is operating with 18 orifices open.

Collection Facility: The facility was dewatered for winter maintenance on October 15.

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

River Conditions

Summer spill ended at 0000 hours on September 1. 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
21.6	14.9	0.0	0.0	50.5	48.5	5.0	4.2

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on November 3. Live fish included 1 prawn. Mortalities included l5 prawn and 90 shad.

Invasive Species: No zebra mussels were observed at the monitoring stations on November 3.

Avian Activity: Bird counts are presently being done with ladder inspections. This will continue until April 1, 2015.

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

Project: Little Goose
Biologist: Richard Weis
Dates: November 14 - 20, 2014

Turbine Operation

Turbine units 1, 4, 5 and 6 were available for all of this report period. Unit 3 was placed out of service on July 7 at 0700 for a planned six year overhaul. Unit 2 was placed out of service on November 3 for its planned annual maintenance. Unit 1 was placed out of service on November 18 to fix a water leak on the head pump. Outage was from 1600 to 1715. BPA performed a line outage on Thursday the 19. Spill was used to keep Forebay from rising. Outage lasted 2 hours. All available turbine units were operated within 1% peak efficiency range.

Adult Fish Passage Facility

Adult fishway inspections were performed on November 17 and 20.

Fish Ladder: Ladder exit differentials held steady at 0 ft. (criteria $\leq$ 0.5 ft.). Water depths over diffuser 13 weirs held steady at 1.2 feet (criteria 1.0-1.3 ft.). No differential was observed at the picketed leads (criteria $\leq$ 0.3 ft.). No debris was observed at the picketed leads or the ladder exit. The air bubbler used to prevent debris from collecting near the ladder exit operated satisfactorily.

Fishway Entrances and Collection Channel: Channel to tailwater head differentials ranged between 0.8 and 1.5 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.1 and 8.2 feet (criteria $\geq$ 8.0 ft). NPE weirs rested on sill and ranged between 6.4 and 7.2 feet (criteria $\geq$7.0 ft). NSE weirs are in manual and depths ranged between 6.9 and 7.4 feet (criteria $\geq$ 6.0 ft.). North powerhouse surface water velocity measured between 1.8 and 1.9 fps. Collection channel surface water velocity near north shore entrance ranged between 2.1 to 2.4 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: All fish pumps operated within criteria.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: Estimated amounts of woody debris in the immediate forebay ranged held steady at 0 sq ft.

Spillway Weir: Spillway Weir was removed from service on August 4.

ESBS/VBS: ESBS operated within criteria this report period. All brushes operated as designed. All screens met criteria. Drawdowns were performed on Unit 1 and met criteria.

Orifices, Collection Channel, Dewatering Structure, and Flume: The Juvenile system was operated with 18 open orifices.

Transportation Facility: The Juvenile collection and transportation facility is dewatered and is in primary by-pass.

Transport Summary: Transportation system has ended for the season.

River Conditions

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
21.4	15.7	0	0	50.9	49.1	6.0+	6.0

*Ladder temperature.

Other

Invasive Species: No zebra mussels were observed on the substrate monitor on October 21. The next inspection is scheduled for November 21.

Inline Cooling Water Strainers: Cooling water strainers were checked on November 20. Nothing was found.

Avian Activity: USDA-APHIS bird hazing ended on June 20.

Table 2. Tailrace counts of foraging piscivorous birds at Little Goose Dam.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
November 14	---	---	---	---	---
November 15	---	---	---	---	---
November 16	---	---	---	---	---
November 17	0825	23	5	---	---
November 18	1550	8	10	---	---
November 19	0814	8	10	0	0
November 20	0850	8	11	0	0

*Observations not taken from November 14 through November 16.

Gas Bubble Disease: WDFW Gas Bubble Trauma monitoring concluded July 28.

Research: The University of Idaho continues their adult Salmon and adult Lamprey passage study.

Project: Lower Granite
Biologists: Elizabeth Holdren and Ches Brooks
Dates: November 14 - 20, 2014

Turbine Operation

Units are being operated in soft constraint of the 1% operation criteria. Unit 1 was removed from service for annual maintenance at 0716 hours on October 21. The expected return to service date for unit 1 is November 24. Unit 5 was returned to service from annual maintenance at 1058 hours on November 18. As scheduled, unit 2 was out of service from 0705 until 1041 hours on November 14 in order raise this unit's ESBS screens. As scheduled, unit 3 was out of service from 1200 until 1415 hours on November 17 in order to conduct relay testing. Due to a short suspense line outage conducted to test the 500KV line, the powerhouse went to zero generation at 1453 hours on November 19. By 1457 hours unit 5 was being run at speed-no-load to supply station service power. At 1603 hours the testing was complete and the plant load was returned to 85MW. At 1635 hours on November 19 station service power was lost due to an unplanned BPA RAS (remedial action scheme) line trip. By 1801 hours on that evening the power plant (and the fish pumps – as noted below) had returned to normal operation.

Adult Fish Passage Facility

The fish ladder was inspected by Corps biologists on November 14, 18, and 19.

Fish Ladder: Fishway exit head differentials and depths over the weirs were in criteria (≤0.5' and 1.0-1.3', respectively) on all inspections. Picketed lead head differentials were in criteria (≤ 0.3') on all inspections.

Fishway Entrances and Collection Channel: NSE1 was out of criteria (criteria ≥7' or on sill) on all inspections with depth readings ranging from 4.5 to 5.1 feet. NSE2 was out of criteria (criteria ≥7' or on sill) on all inspections with depth readings ranging from 4.6 to 5.6 feet. North shore channel/tailwater head differentials were out of criteria (criteria 1'-2') on the November 14 and 18 inspections. The out of criteria head differential readings were both 0.9 feet. NSE2 has been out of service since 2011 and is currently suspended with a hoist system at a compromised depth of 630.0 feet. The gate requires a complete rehab and will remain out of service until funding is available. Entrance weir depths are being sacrificed in an attempt to maintain channel/tailwater head differential. NPE1 and NPE2 weir gates were in sill criteria (criteria ≥8' or on sill) on all inspections. While on sill the weir gate depth readings ranged from 6.6 and 7.6 feet. North powerhouse channel/tailwater head differentials were in criteria (criteria 1'-2') on all inspections. 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

Collection channel velocity was out of criteria (criteria 1.5-4.0 fps) on all inspections. The daily average channel velocity readings averaged 1.1 feet per second. Powerhouse electrical crew is investigating the velocity meter and looking into alternatives for replacement.

Auxiliary Water Supply System: All AWS pumps were available for service for the majority of the report week. Pumps one and three were operated. AWS pump two was in standby mode. Fish pump 1 is operating at fast speed to supply additional water to the fishway channel. During the 500KV line test the fish pumps were out of service from 1501 until 1507 hours on November 19. After which the pumps remained in service until 1615 hours when the pumps were cycled out of service while unit 5 was secured from station service keeping. As planned the pumps were returned to service at 1633 hours. From 1635 until approximately 1650 hours the pumps were again out of service because of the above noted BPA RAS line trip. At 1757 hours the pumps were again shut down and restarted at 1801hours when the station line power was restored. During the time periods when the AWS pumps were not operating lower sections of the adult fish ladder would have been out of criteria.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: Forebay debris varied during the week due to wind strength and direction. Daily monitoring and removal of gatewell debris continues.

ESBSs/VBSs: ESBS/VBS inspections have concluded for the year. Due to very cold weather conditions, removal of the ESBSs began on November 12 and concluded on November 14.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: The collection channel has been dewatered for the year.

Transportation Facility: The fish facility began the week in secondary bypass. Due to very cold weather conditions, the powerhouse mechanical crew began pulling fish screens on November 12 and completed pulling all screens the morning of November 14. The juvenile fish collection gallery and collection/transportation facility were dewatered for the winter season on the afternoon of November 14.

Transport Summary: The final transport truck for the season departed Lower Granite on October 31.

River Conditions

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

Table 1: River conditions at Lower Granite Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (F^o)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
21.5	18.2	0.8	0.0	51.0	47.5	5.0+	4.7

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainer inspections last took place on October 28. There were no lamprey mortalities. No other fish species were recovered. The combined unit run time was 1,003.1 hours. The next inspections are scheduled for November 25.

Invasive Species: No zebra/quagga mussels were observed at the monitoring station on November 19.

Spill: No spill is occurring at this time.

Avian Activity: Daily Piscivorous bird counts concluded on November 13.

Adult Fish Trap Operations: The adult fish trap facility was shut down and dewatered on November 11.

Fish Salvage Operation: Lower Granite fish facility and powerhouse personnel conducted a fish rescue operation in the scrollcase of turbine unit 1 on November 17 in support of unit annual maintenance and wicket gate testing. No salmonids were encountered during the dewatering. One ~42" sturgeon, one ~32" sturgeon, two catfish and 14 sandrollers were retrieved and released in good condition into the tailrace. The operation was well coordinated, with no problems whatsoever.

Research

Research: Onsite juvenile fish research has concluded for the year.