**U.S. ARMY CORPS OF ENGINEERS**
**WALLA WALLA DISTRICT**
**FISH FACILITIES WEEKLY REPORT**
**#15-2016**

**Project: McNary**
Biologist: Bobby Johnson and Denise Griffith
Dates: June 3 - 9, 2016

## Turbine Operation

McNary had available 12 to 14 units (out of 14 total units) for power generation this week. Turbine unit outages are recorded in Table 1 below. The hard 1 percent peak efficiency constraint criteria began April 1. No turbine units ran outside the constraint.

Table 1. Unit Outages at McNary Project.

| Units | Outage Dates | Outage Length | Reason |
|---|---|---|---|
| 3 & 4 | May 31–Jun 8 | About 8 days. | Delta bus tie in. |
| 1, 2 & 5 thru 8 | Jun 7 | 11.8 hours total. | Induce floating debris to move to spillway. |
| 1 & 2 | Jun 8 | 7.5 hours total. | Induce floating debris segments to combine. |

## Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on June 3, 5 and 9. Fisheries technicians monitored the ladders as shifts allowed. Adult fish counts continued. Adult lamprey video monitoring and counting will begin June 15. Temperature monitoring continued. The Oregon entrance water temperature probe was lost on June 9. A replacement probe will be installed next week.

Fish Ladder Exits: The head over weir criteria at both exits are to be within 1.0 to 1.3 feet. The differential criteria at the count stations are to be within 0.0 to 0.5 feet. Both ladder exits met all criteria during measured inspections. Debris loads were minimal at both exits.

At the Washington exit, the regulating weir set point was adjusted on June 9.

At the Oregon exit, the regulating weir and tilting weir set points were adjusted on June 5. The exit trash rack was cleaned on June 8.

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. All ladder entrances met all criteria during measured inspections.

Scheduled maintenance occurred on the Oregon south powerhouse entrance weirs this week. The Oregon ladder collection channel surface velocities averaged 1.7 feet per second.

Auxiliary Water Supply System: The Wasco County Public Utility District (PUD) turbine unit in the Washington ladder remains out of service for runner replacement, which has been delayed to an undetermined date. The bypass continues to function satisfactorily.

Two of the three Oregon ladder fish pumps operated satisfactorily with 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 with completion scheduled for September 2016. The overhaul contractor remains on project.

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

## Juvenile Fish Passage Facility

The fish passage season consists of alternating days of primary and secondary bypass modes. The switch occurs every morning at 0700 hours. There were three deviations from this schedule. On June 7, from 1000 to 1530 hours, the system was in primary bypass during the first day of the debris spill operation, which will be discussed in the Forebay Debris section below. Seventeen samples were missed. On June 8, at 0648 hours, the system was switched to primary bypass 12 minutes early for the second day of the debris spill operation. No samples were missed. On June 9, from 0800 to 1130 hours, the system was in primary bypass during a debris movement operation. Seven samples were missed.

Secondary bypass occurred on June 3, 5, 7 and 9. This week, 1,850 juvenile lamprey and 63,301 smolts were bypassed.

Temperature monitoring continued. The barge dock and unit 1 tailwater sites are without probes as the new probes ordered have not yet been delivered. Anchor QEA will report temperature data in a separate report.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained heavy until June 8, when the debris spill operation took place. Debris load quantities are now very light, consisting mostly of woody material. The quantity of new incoming debris along the powerhouse remained light and consisted mostly of aquatic vegetation. A light debris load remained along the Oregon shore. Debris loads along the spillway remained minimal.

A debris spill was scheduled for the June 6 to 8 timeframe. No efforts were made on June 6 as the boat operator was in training. On June 7, from 0900 to 1200 hours, the log bronc attempted to push the debris to the spillway as units were being “rolled” (brought in and out of service). The debris would not move past unit 9. From 1200 to 1300 hours, a boom was used to move one load of debris to the spillway. However, the debris was drawn back to the powerhouse. The

operation concluded when the bronc developed a hydraulic leak. The spillgate in bay 22 was set in the spilt leaf configuration and opened from 1045 to 1258 hours.

On June 8, an oil leak was found on the tug. The debris spill operation did not begin until about 1030 hours. Units 1 and 2 were removed from service so an aquatic vegetation mat would "roll" over to the woody material. The log bronc with boom took nine loads of debris to the spillbay reducing debris load quantities from heavy to very light. At 1500 hours, a severe thunder storm warning was announced so the operation was halted. The top spillway weir (TSW) in bay 20 was open from 1157 to 1511 hours.

On June 9, from 0800 to 1100 hours, the bronc took three loads of debris from the powerhouse to the spillway. No unit outages or special spill operations were used. It was anticipated the debris would remain on the spillway pier noses and possibly pass later. However, overnight, the debris returned to the powerhouse.

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

No problems were observed in the gatewell slots.

Extended-length Submersible Bar Screens (ESBSs)/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections did not occur due to the debris spill operation. The ESBSs in slots 6B and 12C remained in timer mode.

VBS differential monitoring revealed 19 screens out of criteria. These screens and 23 others were cleaned from June 5 through 9. Seven smolt mortalities were observed. The majority of the VBS cleaning occurred after the debris spill operation. 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. A partial blockage was removed from the orifices in slots 2A and 5B on June 3 and 9, respectively. All blockages appeared to consist of woody material. No fish mortalities were noted. The technicians were instructed to increase the number of channel checks as scheduling allowed. During VBS cleaning, orifices in the affected slots were closed, with makeup water coming from orifices in adjacent slots.

For the debris spill operation, orifices were closed as follows. On June 7, from 0930 to 1300 hours, the orifices in units 8 to 14 were closed with makeup water coming from orifices in units 1 to 7. On June 8, from 0800 to 1500 hours, orifices in units 1 to 8 were closed at times, with makeup water coming from orifices in adjacent units. On June 9, from 0800 to 1045 hours, orifices in units 3 to 7 were closed, with makeup water coming from orifices in adjacent units.

During the debris spill operation, the offices and dewater structure were monitored for debris blockages. None occurred.

The side screen brush triggered an alarmed on June 4 at 0125 hours. The brush was found stalled while traveling upstream. Efforts to restart the brush failed. At about 1000 hours, the biologist reset the brush overload relays. The brush was returned to the park position and automatic mode. No other problems occurred. It appears debris had cause an overload on the brush drive motor. While examining the side brush, the "checker", which is used to determine if the brush is in the cleaning positon, was lost. The "checker" was retrieved off the transition screen on June 5. Use of the "checker" was discontinued. The fisheries staff now observe the brush shaft rotate from the side brush access platform instead.

All other systems operated satisfactory in automatic mode.

Bypass Facility: During the bypass season, primary and secondary bypass modes return all fish to the river. Passive integrated transponder (PIT) tag detection occurs in the full flow pipe during primary bypass and throughout the facility during secondary bypass. Smolt monitoring occurs only on secondary bypass days.

All operational systems functioned well. The sample gates are turned on and off every other day so that they are in service only during secondary bypass. The PIT tag sample gates remained turned off. The facility bypass lines provide a superior route for the fish over the PIT tag sample release lines downstream of the PIT tag sample gates.

Two sticks were removed from the junction of the secondary bypass and sample return to river lines this week.

Algae removal throughout the facility continued.

## River Conditions

River condition data during the week was provided by the smolt monitoring staff and is outlined in Table 2 below. The data period runs from 0700 to 0700 hours each day. Flows and spill are recorded in one-thousand cubic feet per second. Temperatures are recorded in degrees Fahrenheit.

Routine spring spill in support of fish passage continued with both TSWs in place and operating until the TSWs were closed on June 8, at 0001 hours, per the Fish Passage Plan. Spillbay 22 and the TSW in bay 20 were used for the debris spill operation as described above in the Forebay Debris section. The TSWs in bay 19 and 20 were replaced with standard spillgates on June 9 and 13, respectively. Forty percent of river flow is spilled in the spring season. The summer spill season, with fifty percent of river flow spilled, will begin on June 16, at 0001 hours.

Table 2. River Conditions at McNary Dam.

| Daily Average River Flow | | Daily Average Spill | | Water Temperature (Unit 1 scroll case) | | Water Clarity (Secchi disk - feet) | |
|---|---|---|---|---|---|---|---|
| High | Low | High | Low | High | Low | High | Low |
| 240.2 | 208.0 | 96.2 | 83.3 | 64.3 | 60.3 | 6.0 | 5.5 |

## Other

Inline Cooling Water Strainers: The next cooling water strainer examinations will occur on July 5.

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

Avian Activity: Avian counts are recorded in Table 3 below.

Table 3. McNary Project's Daily Avian Count.

| Date | Zone | Gull | Cormorant | Tern | Pelican | Grebe |
|---|---|---|---|---|---|---|
| Jun 3 | Forebay | 0 | 0 | 1 | 1 | 83 |
| | Spill | 0 | 0 | 2 | 3 | 0 |
| | Powerhouse | 0 | 0 | 0 | 2 | 0 |
| | Outfall | 0 | 0 | 0 | 0 | 0 |
| Jun 4 | Forebay | 0 | 0 | 1 | 1 | 25 |
| | Spill | 0 | 1 | 0 | 4 | 0 |
| | Powerhouse | 0 | 0 | 0 | 0 | 0 |
| | Outfall | 3 | 0 | 0 | 1 | 0 |
| Jun 5 | Forebay | 0 | 0 | 0 | 1 | 45 |
| | Spill | 2 | 0 | 0 | 5 | 0 |
| | Powerhouse | 0 | 0 | 0 | 1 | 0 |
| | Outfall | 0 | 1 | 0 | 2 | 0 |
| Jun 6 | Forebay | 0 | 0 | 0 | 1 | 35 |
| | Spill | 6 | 0 | 1 | 7 | 0 |
| | Powerhouse | 0 | 1 | 0 | 0 | 0 |
| | Outfall | 5 | 0 | 0 | 0 | 0 |
| Jun 7 | Forebay | 0 | 0 | 1 | 1 | 4 |
| | Spill | NA | NA | NA | NA | NA |
| | Powerhouse | NA | NA | NA | NA | NA |
| | Outfall | NA | NA | NA | NA | NA |
| Jun 8 | Forebay | 0 | 0 | 0 | 0 | 9 |
| | Spill | 4 | 0 | 7 | 11 | 0 |
| | Powerhouse | 0 | 0 | 0 | 0 | 0 |
| | Outfall | 0 | 0 | 0 | 0 | 0 |
| Jun 9 | Forebay | 0 | 0 | 0 | 0 | 9 |
| | Spill | 8 | 0 | 0 | 11 | 0 |
| | Powerhouse | 0 | 0 | 0 | 1 | 0 |
| | Outfall | 0 | 0 | 0 | 6 | 0 |

No avian counts occurred on June 7 due to the debris spill operation. Gull numbers remained low. They continued to feed in the spill zone. Most birds at the bypass outfall were unsuccessful. The inverted sprinklers at the outfall appear to be affecting feeding patterns. Cormorant numbers remained low. Pelican numbers have slightly increased as they appear to be feeding on adult shad. A small number of Caspian terns continued to feed in the spill and

forebay. Grebe numbers have decreased in the forebay. Blue herons and ospreys were noted at times. Gulls, pelicans and cormorants were roosting on the rocks by the Washington shore boat dock, which is outside the forebay zone.

No grebes were observed in the gatewell slots. The grebe in the juvenile collection channel was removed on June 6.

United States Department of Agriculture – Animal and Plant Health Inspection Service – Wildlife Services (USDA–APHIS–WS) hazing personnel continued two shifts and boat hazing three days a week. Boat hazing did not occur on June 8 due to the debris spill operation. Lethal take removed 37 gulls and five cormorants in May.

The bypass outfall sprinklers have been functioning satisfactory. The sprinklers supply pump intake is being cleaned twice a week. The pump remained in manual mode. One bird call solar panel was replaced this week.

## Research

GBT: Gas bubble trauma (GBT) monitoring continues with monitoring occurring twice a week during the spill season. Monitoring did not occur on May 3 due to low fish numbers. On May 9, eighteen subyearling Chinook smolt mortalities were removed from the sample raceway after GBT monitoring had concluded. Procedures were reviewed. Pacific States Marine Fisheries Commission (PSMFC) personnel will purchase a chiller. The McNary fisheries staff will install the chiller and secondary recovery tank, which should improve the GBT monitoring system.

USGS: A United States Geological Survey fisheries biologist did not conduct non-lethal smolt stomach content examinations this week. The next scheduled examinations are on June 14 for subyearling Chinook.

**Project: Ice Harbor**
Biologist: Ken Fone
Dates: June 3 - 9, 2016

## Turbine Operation

Unit 5 was taken out of service on March 14 at 1117 hours, due to an oil leak from the blade packing. The packing is being replaced to fix the leak. Unit 2 was taken out of service on April 25 at 0606 hours for runner replacement. Units are being operated within the 1% peak efficiency range (hard constraint).

## Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on June 6, 7, and 8.

Fish Ladders: The north fish ladder inspection areas (head differentials at fishway exit and picketed leads, and depth over weirs) were in criteria on all inspections. The south fish ladder inspection areas (head differentials at fishway exit and picketed leads, and depth over weirs) were in criteria on all inspections. Criteria for head differentials at ladder exits and picketed leads, and depth over the weirs are 0.5 feet or less, 0.3 feet or less, and 1.0-1.3 feet, respectively. The water surface above the fish ladder exits were clear of debris and the bubblers were operating satisfactorily.

Fishway Entrances and Collection Channel: The south shore entrance (SFE-1) depth and channel/tailwater head differential were in criteria, except for depths of 7.6' and 7.7' on June 6 and 8, respectively. These out of criteria readings may be related to calibration issues, but that possibility is not certain at this point. 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 6.5' on June 7. This out of criteria reading was the result of the entrance gate being set in manual control at too high an elevation. The gate was lowered down to bring it back into depth criteria. Fishway entrance criteria are 8 feet depth or greater, or on sill. Channel/tailwater differential criteria are 1 – 2 feet.

The south shore channel velocity was in criteria. The channel velocity criterion is 1.5 - 4.0 feet/second.

Auxiliary Water Supply (AWS) System: Two of the three north shore AWS pumps were in operation during the week. Five of the eight south shore AWS pumps have been operating since May 17 (instead of six pumps). High channel/tailwater head differentials at the south shore entrance occur when six pumps are in service.

## Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 15 square yards of debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 15%. The maintenance bulkhead is installed in gatewell slot 5B and the slot is unwatered to reduce water leakage into unit 5.

STSs/VBSs: The STSs have been in continuous run mode since May 3, due to the presence of sockeye or subyearling Chinook in the sample with average fork lengths under 120 mm. The STS for slot 5B has not been installed yet 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 and unit 3 VBSs were inspected on May 17 and 18, with no problems found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass operated with 20 orifices open. Orifices are routinely cycled and back-flushed three times per day. The avian abatement hydrocannon at the end of the outfall pipe is operating normally.

Juvenile Fish Facility: The juvenile fish facility is operating in bypass mode except when collecting fish for the sample.

Fish Sampling: Fish sampling occurs twice a week, on Mondays and Thursdays. Sampling results are contained in Table 1.

Table 1. Fish condition sampling results at Ice Harbor Dam (continued on next page).

June 6:

| Species | Sampled | #Descaled | Morts | Avian Marks |
|---|---|---|---|---|
| C-CH | 1 | 0 | 0 | 0 |
| UC-CH | 1 | 0 | 0 | 0 |
| C-CH-O | 14 | 0 | 0 | 0 |
| UC-CH-O | 27 | 0 | 0 | 0 |
| C-SH | 74 | 2 | 0 | 3 |
| UC-SH | 28 | 0 | 0 | 0 |
| C-COHO | 0 | --- | --- | --- |
| UC-COHO | 4 | 0 | 0 | 0 |
| C-SOCK | 0 | --- | --- | --- |
| UC-SOCK | 0 | --- | --- | --- |
| TOTAL | 149 | 2 | 0 | 3 |

June 9:

| Species | Sampled | #Descaled | Morts | Avian Marks |
|---|---|---|---|---|
| C-CH | 0 | --- | --- | --- |
| UC-CH | 0 | --- | --- | --- |
| C-CH-O | 27 | 0 | 1 | 0 |
| UC-CH-O | 15 | 0 | 0 | 0 |
| C-SH | 12 | 3 | 0 | 2 |
| UC-SH | 2 | 0 | 0 | 0 |
| C-COHO | 0 | --- | --- | --- |
| UC-COHO | 0 | --- | --- | --- |
| C-SOCK | 0 | --- | --- | --- |
| UC-SOCK | 0 | --- | --- | --- |
| TOTAL | 56 | 3 | 1 | 2 |

Removable Spillway Weir (RSW): Spill for fish passage began on April 3 at midnight. On May 17, spill gate 2 was completely closed from 1010 hours to 1014 hours in an attempt to free up any stuck submerged debris that could possibly be causing observed turbulence in the water flowing over the RSW. The turbulence returned when the gate was re-opened and seemed to be formed from certain hydraulic conditions further upstream in the forebay. With a few minor exceptions, there has been less turbulence observed in the flow over the RSW since then, even when dam operations at the time of the observations are similar to the operations occurring on May 17.

## River Conditions

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

Table 2. River conditions at Ice Harbor Dam.

| Daily Average River Flow (kcfs) | | Daily Average Spill (kcfs) | | Water Temperature* ($^{o}$F) | | Water Clarity (Secchi disk - feet) | |
|---|---|---|---|---|---|---|---|
| High | Low | High | Low | High | Low | High | Low |
| 76.5 | 62.8 | 54.8 | 18.9 | 62.0 | 57.0 | 6.0 | 5.5 |

*Unit 1 scroll case temperature.

## Other

Inline Cooling Water Strainers: Monthly turbine cooling water strainer inspections last occurred on May 17 and 18. A total of 33 juvenile lamprey and 5 Siberian prawns (all mortalities) were found. Transformer cooling water strainers were inspected on June 7. A total of 6 juvenile lamprey were found, with 4 of them being alive and returned to the river in good condition.

Invasive Species: No new exotic species have been found.

Avian Activity: The numbers of cormorants and pelicans observed around the project (Table 3) increased from last week. Contracted land-based hazing of piscivorous birds occurred for 16 hours per day. Boat-based hazing occurred for 8 hours per day, 3 days per week. Land-based hazing was generally effective at keeping birds out of the zones immediately adjacent to the dam. Boat-based hazing was effective at scaring birds out of the stilling basin and the area just downstream from the end of the outfall pipe.

Table 3. Daily maximum piscivorous bird counts at Ice Harbor Dam.

| Date | Gulls | Cormorants | Caspian Terns | Grebes | Pelicans |
|---|---|---|---|---|---|
| June 3 | 0 | 12 | 0 | 0 | 12 |
| June 4 | 0 | 44 | 0 | 0 | 11 |
| June 5 | 0 | 55 | 0 | 0 | 35 |
| June 6 | 4 | 9 | 0 | 0 | 12 |
| June 7 | 0 | 9 | 0 | 0 | 12 |
| June 8 | 0 | 16 | 0 | 0 | 11 |
| June 9 | 1 | 10 | 0 | 0 | 24 |

## Research

NOAA Fisheries: Beginning on April 21, tissue samples were taken weekly from clipped juvenile Chinook and monthly from clipped juvenile steelhead obtained from the smolt monitoring sample by NOAA (National Oceanographic and Atmospheric Administration) Fisheries researchers to study the relationship of the physiological condition of Chinook and the incidence of delayed mortality, as well as the physiological benefit salmonids derive from estuarine habitat restoration.

PNNL: Beginning on May 7, PNNL (Pacific Northwest National Laboratory) researchers began weekly releases of acoustic-tagged dead juvenile salmonids through the RSW for an assessment of whether dead tagged fish are falsely recorded as live fish downstream at the detection station. This information will help in the formulation of the study design of next year's Biological Opinion performance standard evaluation.

**Project: Lower Monumental**
Biologists: Bill Spurgeon and Raymond Addis
Dates: June 3 - 9, 2016

## Turbine Operation

The units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 was removed from service on December 10, 2014 for unit rehabilitation with an estimated return to service date of January 12, 2017. Units 2, 3, 4, 5 and 6 were rotated out of service for STS inspections on June 7 and 8.

## Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on June 3, 4, 5 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 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 6.2, 6.2, 6.7 and 7.5 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 with the exception of the June 8 inspection. On this inspection, the reading was 7.6 feet and SSE1 was not on sill at 431.2 feet. The powerhouse operator was informed and SSE1 was placed back at sill. While on sill, readings were 5.6, 7.1, and 7.2 feet.

SSE2 was in criteria (6' above sill) on all inspections. South shore channel/tailwater head was in criteria (1'-2') on all inspections with the exception of the June 3 inspection with a reading of 2.1 feet. The powerhouse operator was informed and the set point was adjusted to bring the reading back into criteria.

Auxiliary Water Supply System: AWS pumps 2 and 3 were operated throughout this period. Pump 1 was out of service throughout this period and will remain out of service throughout this season unless an emergency occurs. This unit has a bushing problem.

## Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 3 square yards of forebay debris observed during this period. Gatewell debris ranged from 0-15% surface coverage. No oil problems were observed in the gatewells.

STSs/VBSs: STSs were operating in continuous-run mode. STS inspections were conducted June 7 and 8 with all screens found in good operating condition.

Orifices, Collection Channel, Dewatering Structure, and Flume: The collection channel was operated with 19 orifices open.

Collection Facility: No problems occurred this period.

Transport Summary: The last daily barge departed the facility on May 25, followed by the first every-other-day barge departure on May 27. No fish were transported on May 26.

## River Conditions

Spring spill in support of fish passage was initiated at 0001 hours on April 3. Spill was either halted or limited during tailrace transitioning, and barge docking and loading operations. River conditions during the week are outlined in Table 1 below.

Table 1. River conditions at Lower Monumental Dam.

| Daily Average River Flow (kcfs) | | Daily Average Spill (kcfs) | | Water Temperature (°F)* | | Water Clarity (Secchi disk - feet) | |
|---|---|---|---|---|---|---|---|
| High | Low | High | Low | High | Low | High | Low |
| 71.0 | 60.2 | 41.1 | 23.0 | 65.1 | 59.0 | 5.0 | 4.0 |

*Scrollcase temperatures.

## Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on June 1. There were no live fish recovered. Mortalities included 2 juvenile lamprey.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on June 5.

Avian Activity: Daily tailrace counts of feeding piscivorous birds are summarized in Table 2 below. Gulls were the dominant species observed during inspections this week. Hazing met the standard from the avian action plan through this time period. Hazing ended on June 2.

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

| Date | Time | Gulls | Cormorants | CaspianTerns | Grebes | Pelican |
|---|---|---|---|---|---|---|
| June 3 | 1100 | 6 | 0 | 0 | 0 | 0 |
| June 4 | 1100 | 7 | 0 | 0 | 0 | 0 |
| June 5 | 1100 | 2 | 1 | 0 | 0 | 0 |
| June 6 | 1100 | 6 | 0 | 0 | 0 | 0 |
| June 7 | 1100 | 31 | 0 | 0 | 0 | 0 |
| June 8 | 1100 | 14 | 0 | 0 | 0 | 0 |
| June 9 | 1130 | 18 | 3 | 0 | 0 | 0 |

Research: Pacific Northwest National Laboratory/Battelle – Ice Harbor smolt survival study. Small numbers of smolts are taken from Lower Monumental's collection for use in this study. See the ANCHOR QEA weekly report for a summary of these fish.

**Project: Little Goose**
Biologist: Richard Weis
Dates: June 3 - 9, 2016

## Turbine Operation

All turbine units were available for service this week. Hard constraint 1% peak efficiency criteria are in effect. There were no violations to report.

## Adult Fish Passage Facility

The new Fishway Control System still does not work properly. This system will remain in manual mode until repairs can be made.

Adult fishway inspections were performed on June 5, 7 and 9.

Fish Ladder: The ladder exit head differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs held steady at 1.2 feet (criteria 1.0-1.3 ft.) 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: Channel to tailwater head differentials ranged between 0.9 and 1.7 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.4 and 9.1 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 5.8 and 6.6 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 5.1 to 5.6 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the North powerhouse ranged between 2.0 and 2.2 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 is still awaiting installation. The estimated repair date has been extended again and is now the end of June. Presently fish pump 2 and 3 are in service. Water velocity averaged from the bottom, middle and top of the adult channel was 2.0 fps on June 2.

## Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: The trash/shear boom is currently still on shore. Efforts are underway to have it repaired. Woody debris in the immediate forebay was estimated between 75 to 125 square feet.

Spillway Weir: The repair to spillbay 1 was completed by cannibalizing parts from spillbay 5 and a special spill pattern was approved. The TSW was repositioned to the high crest configuration on May 26.

ESBS/VBS: Drawdowns were performed on units 1 - 4 on June 9. All differentials met criteria.

Orifices, Collection Channel, Dewatering Structure, and Flume: The juvenile bypass system is presently operating with 22 open orifices. The number of opened orifices compensate for the removal of the weir motor gear box. Presently flume water is not controllable except by the number of open orifices. This has been an ongoing issue for a considerable amount of time.

Transportation Facility: The collection and sampling of fish is occurring daily. Fish transport by barge is taking place every other day.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 162,436 fish were collected. The descaling and mortality rates were 0.3% and 0.1% respectively. This weekly report period saw 5 adult lamprey removed from the raceways or sample and released in the forebay.

## 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 |
| 72.9 | 61.7 | 21.9 | 18.3 | 66.0 | 63.6 | 4.9 | 4.7 |

*Ladder temperature.

## Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on June 2. One juvenile lamprey mortality was removed.

Invasive Species: The zebra mussel substrate monitor was inspected on June 6. No mussels were seen.

Avian Activity: Bird counting and hazing commenced on April 1. See the chart below for details.

Table 2. Daily Avian Counts at Little Goose Dam, June 3 - 9, 2016.

| Date | Time (hours) | Gulls | Cormorants | Caspian Terns | Pelicans |
|---|---|---|---|---|---|
| June 3 | 0730 | 35 | 3 | 0 | 0 |
| June 4 | 1215 | 50 | 3 | 0 | 0 |
| June 5 | 1300 | 33 | 0 | 0 | 0 |
| June 6 | 1230 | 3 | 4 | 0 | 0 |
| June 7 | 0715 | 59 | 0 | 0 | 2 |
| June 8 | 1030 | 2 | 0 | 0 | 0 |
| June 9 | 0700 | 30 | 4 | 0 | 0 |

*Bird counts are taken from a single observation, forebay and tailrace.

Gas Bubble Trauma: GBT was performed on June 6. No signs of GBT were seen.

Research: A FGE (Fish Guidance Efficiency) emergency gate closure study is being performed on units 2 and 3 for 2016.

**Project: Lower Granite**
Biologists: Elizabeth Holdren, Robert Horal
Dates: June 3 - 9, 2016

## Turbine Operation

Units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 will remain out of service through February 2017 for Kaplan blade linkage repair.

## Adult Fish Passage Facility

Automatic control system adjustments to trouble shoot internal functioning errors in the program are ongoing. Observations of the fish ladder indicate the installation of a new control program has improved the system. The system remained in auto mode this week. Adult fish facilities were inspected by Corps or Anchor QEA biologists on June 3, 4, 5, and 8.

Fish Ladder: Fish ladder exit head differential and depth over the weirs were in criteria (≤0.5' and 1.0-1.3', respectively) on all inspections. Picketed lead head differential was in criteria (≤ 0.3'). An average of about 0.3 square yards of debris was observed near the fish ladder exit.

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

NPE1 and NPE2 weir gates were in sill criteria (criteria ≥8' or on sill) on all inspections. While on sill, the gate depth readings were 5.6', 5.8', 5.9', and 6.3 feet. The control system reading for NPE elevations fluctuate between 628.0 and 628.2 while the gates are actually on sill due to vibration of the sensor in the gate channel. North powerhouse channel/tailwater head differential was in criteria (criteria 1'-2') on all inspections.

NSE1 was in criteria (criteria ≥7' or on sill) on all inspections. NSE2 has been out of service since 2011 and remains set with a chain fall hoist in the closed position to improve channel/tailwater head differentials. North shore channel/tailwater head differential was in criteria (criteria 1'-2') on all inspections.

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

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

Fish Ladder Temperature Control System: Adult ladder temperature control system pumps were tested from 1030 hours on June 6 to 1030 hours on June 9. Fish ladder temperature control pumps were turned on for the summer passage season at 1506 hours on June 9.

## Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: An average of about 3.8 square yards of debris was observed in the forebay this week.

ESBSs/VBSs: ESBSs inspections are scheduled for late June.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: The collection channel is operating with 18-19 orifices open. Orifices are being cycled every three hours.

Collection Facility: The facility is in collection for transport mode. IDFG continued collecting genetic samples from yearling Chinook and juvenile steelhead Monday-Friday. Collection for National Oceanographic and Atmospheric Administration's (NOAA's) survival and transport study will end June 10. An adult bull trout was collected and released from the juvenile separator on June 5. United States Geological Survey (USGS) researchers collected 300 subyearling Chinook from the condition sample June 6 for 8-mm PIT tag detection efficiency testing. These fish were released June 7 in the collection facility upwell area. NMFS/UW researchers collected a subsample of NOAA fish on June 7.

Transport Summary: Every other day barge transport continues with barges leaving Lower Granite on even number days in June.

## River Conditions

Spring spill in support of fish passage is ongoing. 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 |
| 76.3 | 65.4 | 20.6 | 20.3 | 63.2 | 60.0 | 5.0 | 3.8 |

*Cooling water intake temperature.

## Other

Inline Cooling Water Strainers: Unit cooling water strainer inspections are scheduled for late June.

Invasive Species: The zebra/quagga mussel substrate was inspected June 5. No organisms were found.

Avian Activity: Piscivorous bird counts began March 26 with observations being taken from the top of the navigation lock. Avian hazing started April 1. Daily piscivorous bird counts are summarized in Table 2 below.

Table 2. Daily piscivorous bird counts at Lower Granite Dam.

| Date | Time (hours) | Gulls | Cormorants | Caspian Terns | Pelicans |
|---|---|---|---|---|---|
| June 3 | 1052 | 1 | 0 | 0 | 6 |
| June 4 | 1100 | 4 | 0 | 0 | 5 |
| June 5 | 0813 | 1 | 0 | 0 | 4 |
| June 6 | 1332 | 2 | 0 | 0 | 0 |
| June 7 | 1549 | 1 | 0 | 0 | 1 |
| June 8 | 1340 | 6 | 0 | 0 | 7 |
| June 9 | 1130 | 6 | 0 | 0 | 1 |

GBT: Gas bubble trauma sampling occurred June 9. No signs of gas bubble trauma were seen.

Adult Fish Trap Operations: The trap sample rate was changed May 15 at 1400 hours to 27% daily trap rate M-F (20% overall). The adult trap diversion gate in the turnpool area is changed to the ladder passage position from about 1400 hours on Fridays to 1300 hours on Sundays to accommodate the sound vibration study.

Fish Rescue Operation: No fish rescues occurred this week.

## Research

Idaho Fish and Game (IDFG) Genetic Stock Identification: This study aims to enumerate and characterize natural production of yearling Chinook and juvenile steelhead above LGR with regards to age composition and genetic stock profiles. IDFG will sample Monday through Friday through mid-June with a goal of collecting 2,000-5,000 genetic samples from yearling Chinook and juvenile steelhead.

Nez Perce Tribe (NPT)/U. of Idaho (UI)/Columbia River Intertribal Fisheries Commission (CRITFC) – Kelt Study: NPT began steelhead kelt collection March 31. This research project investigates steelhead kelt physiology and endocrinology to evaluate the feasibility and success of rehabilitating strategies. NPT will transport up to 300 kelts to Dworshak National Fish Hatchery as part of this study.

National Marine Fisheries Service (NMFS)-Monitoring the Migrations of Wild Snake River Spring/Summer Chinook: This study is monitoring the migration behavior and survival of wild spring/summer Chinook salmon. The specific goals are to characterize the migration timing and estimate parr-to-smolt survival to LGR of wild Chinook populations as they migrate from their natal rearing areas and determine migration patterns and what environmental factors influence those patterns. Fish were PIT-tagged during the summer of 2015 in natal streams and are diverted to the Sort-By-Code tanks at LGR.

National Marine Fisheries Service (NMFS) In-River Survival: NMFS staff has begun PIT-tagging Chinook and steelhead smolts for their Survival Study to compare smolt to adult returns of in-river migrating smolts to the smolt to adult returns of transported smolts. PIT-tagged fish are held for 24 hours before being bypassed to the LGR tailrace.

Northwest Fisheries Science Center (NMFS) Columbia Basin Research University of Washington "Within-season indicators of fish condition related to differential delayed mortality" Smolt to Adult Survival Rates and Delayed Mortalities: NMFS are collecting out migrant juvenile spring-summer and yearling fall, subyearling Chinook for ongoing monitoring and research project. Staff condition sampling of fish use fourteen measurements related to energetic reserves, smoltification, and health indices. Weekly sampling will occur April 5 through July 26 and approximately monthly through October.

U.S. Geological Survey (USGS) "Describing the diet of migrating juvenile fall Chinook salmon": NMFS/University of Washington is collecting stomach contents through lavage or dissection from sacrificed fish for USGS for dietary evaluation.

Anchor QEA "Sound and Vibration Effects on Adult Fish Passage through the Lower Granite Ladder": The second year of monitoring for any adult fish passage delay through the ladder due to sound and vibration from the JFF construction will continue beginning 1 March through September 2016. The new PIT antennas in the ladder exit tunnel and capped on entrance weir 648 are queried weekly to correlate with sound signals from hydrophones and water particle movement signals from three triangulated accelerometers in each of three ladder locations: entrance weir, weir downstream of Diffuser 14, and exit pool. No fish are handled specifically for this study, only passage histories from previously PIT-tagged fish for other evaluations are recorded, but the turn pool swing gate used to direct adult fish into the adult trap and sort-by-code loop is moved into the loop closure position every Friday at 2:00 PM until Sunday at 2:00 PM between 1 March through 17 August to allow for passage rate PIT detection of un-obstructed adult spring/summer Chinook and Sockeye salmon and steelhead. Weekly progress reports are available for in-season review.