U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#14-2014

Project: McNary
Biologists: Carl Dugger and Bobby Johnson
Dates: May 30 – June 5, 2014

Turbine Operation

McNary had 12 units available for power generation this week. On April 1, the hard constraint one percent criteria began. No units ran outside the criterion. Headgates have been lowered in their stored operating gate (SOG) positions in units 2, 3, 5, 6 and 8 to 10 in support of research . On May 30 from 0700 hours to June 1 at 0700 hours, on June 2 at 0700 hours to June 3 at 0700 hours and from June 5 at 0700 hours to June 6 at 0700 hours, these units were ran at 50MW (lower one percent) to see if this would have an effect on the descaling issue previously reported. No significant change in descaling has been noted. Unit outages are recorded in Table 1.

Table 1. Unit Outages at McNary Dam.

Units	Outage Dates	Outage Length	Reason
11	Sep 18 to Jul 31	About 10.5 months.	Turbine bearing issue continues.
4	Mar 27 to Jul 31	About 4 months.	Turbine bearing issue continues.
9 & 13	Jun 3	A total of 2.4 hours.	Trash rack cleaning.
6	Jun 4	4.9 hours.	Tap the hub.
12	Jun 4	22 minutes.	Trash rack cleaning.

Adult Fish Passage Facilities

On May 30, June 1 and 3, the McNary fisheries biologist performed measured inspections of the adult fishways. Visual adult fish counting continues. The fisheries staff is checking the exits on all shifts when the juvenile system is in primary bypass. On June 15, the adult lamprey passage season and ladder exit temperature monitoring will begin.

On June 5, at 1540 hours, the lamprey passage structure at SFEW2 was opened six inches. At this time, we could not fully open the structure to one foot. On June 13, we will plan to try a camera inspection of the structure.

Fish Ladder Exits: During measured inspections, both ladder exits met all Fish Passage Plan criteria except on May 30, when the Washington ladder's count station differential measured 0.6 feet. Immediate cleaning of the picketed leads resolved the issue.

Debris loads remained fairly low near the exits. However, the Washington exit generally has more debris, with tumbleweed being an issue at times. On May 30, weir 339 alarmed and the operator reset it. On June 1, the Washington exit's set points were adjusted.

At the Oregon exit, our differential monitoring of the traveling screens revealed no problems. Four false differential alarms occurred, which the operator reset. On May 30, the operator reset one exit alarm. On June 1, the operator adjusted the regulating weir's set point.

Fishway Entrances and Collection Channel: On June 2, all tailwater and pool sensors were examined.

At the Washington ladder entrance, all inspection points were in criteria. Occasionally, both weirs have a very slight amount of slack in their cables. Slack occurs most often at W3's south cable. In the near future, the project will replace the LED's for W2 and W3 with a panel view, which will integrate into the new control system better. The panel view has been ordered.

At the Oregon ladder's entrances, all inspection points were in criteria. On June 2, SFEW2, which continues to drift in and out of calibration, was examined. We hope to complete the upgrades of the Oregon entrances in the near future.

Also, on June 2, we attempted to free floating entrance 14. We were unable to free the weir and will have to examine it during the winter maintenance season.

The collection channel velocity averaged 1.6 feet per second. We took these readings from surface observations.

Auxiliary Water Supply System: For the report week, the PUD turbine unit had no interruptions in service. Fish pumps 1 and 3 operated satisfactorily with blade angles of 30 degrees. Pump 2 remains out of service for major overhaul which will require a contract for the winter of 2014–2015. The juvenile facility continues to supplying the usual 450 cfs to the north powerhouse pool. The system had no interruptions in service, which would have affected the ladder.

Juvenile Fish Passage Facility

The bypass season continues with alternating days of secondary and primary bypass with the switch occurring every morning at 0700 hours. There were three deviations from this schedule. On May 30, from 0937 to 1103 hours, the system was in primary bypass for forebay debris removal and channel orifice adjustments, which affect separator conditions with high and low water flows occurring just before the switch to primary bypass. At 4.0 percent, nine samples were missed. On May 31 and June 2, for 10 and 8 minutes, respectively, the system was in and out of secondary bypass for technician training. The sample gates were off. On June 2, the adult full flow flush line's supply valve had to be reset after the training was completed.

Secondary bypass occurred on May 30, June 1, 3 and 5. We bypassed 34,029 smolts and 9,375 juvenile lampreys this week. Also, though not seen, our PIT tag system detected one bull trout, which had been tagged in the Touchet River.

Descaling continues to be a concern. Trash rack and VBS cleaning along with removal of forebay debris is described below. Our system checks have not yet revealed a local cause for the descaling. All operations have been proceding well. All work is being performed promptly. Repeated inspections reveal no problems. On June 3, we again examined the full flow pipe with the sea snake camera. This time we inspected the pipe section from the collection channel to the primary bypass gate. Nothing unusual was found.

Forebay Debris/Gatewell Debris/Oil: Floating forebay debris, which was mostly woody material and tumbleweeds, was moderate to very light to heavy and was mostly at the powerhouse. On June 3, after the debris had been removed, fresh tumbleweed mats with fine material arrived at the project. Project operations and weather patterns continue to move the debris.

After much preparation, on May 29 and 30, we used a tug (also known as a "log bronc"), a second vessel and a log boom to move the debris to the spillway for removal. Half of the debris was removed each day. After the operation, the remaining debris load was very light.

We recorded no high trash rack differentials this week. On June 3 and 4, the project tested trash racks in slots 9A, 9B, 12A, 13A and 13B. We removed four ten-yard truck loads of very muddy tumbleweeds from the bottom of the racks. No fish were seen in the debris. One lost smolt was noted in a gatewell slot at unit 9. On June 3, the work was delayed due to issues with the debris truck. Also, on June 4, from 0730 to 1219 hours, we removed floating debris from in front of slots 3C, 6C to 8C and 12C to 14A with the trash rack clam shell, which is not a very effective technique. We removed six ten-yard truck loads of debris. No ESA listed fish or lamprey were noted during this work.

We observed no problems in the gatewell slots. After trashing cleaning, we removed sticks that fell from the truck from the slots.

ESBSs/VBSs: ESBSs are deployed in at all operational units. Only units 4 and 11 are without ESBSs. No camera inspections occurred this week to allow for trash rack cleaning. The screens in slots 7A and 13C remain in timer mode. On June 2, the screen in slot 8C "short cycled" (i.e.: cleaner brush reversing direction earlier than expected). The operator recalibrated the screen afterwards. Occasionally, during the week, unit 6's controller panel view needed a tap to get it to light up.

VBS differential monitoring revealed two screens out of criteria. From June 2 to 5, we cleaned these screens and 12 other screens (as a precautionary measure). We noted 6 smolt mortalities and 15 juvenile lamprey mortalities.

On May 27, the VBS at slot 2A was not replaced. The general maintenance staff installed tabs on the VBS guides in slots 2B and 2C. This will decrease VBS reinstallation time in these slots. On

June 2 and 5, the VBSs in slots 7A, 3C and 6C were replaced. On June 6, the VBS in slot 7C will be replaced. VBS rehabilitation continues.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: Forty two orifices were open all week. No harm to fish was noted. When trash rack and VBS cleaning along with VBS and forebay debris removal, we closed the orifices at the slots the work was being done and opened spare orifices at adjacent slots.

During forebay debris removal activities on May 29 and 30, we closed all orifices associated with units 8 to 14 and opened spares in units 1 to 7. This was the best way to avoid possible channel debris issues, since the debris was being removed from the middle of the powerhouse and taken north. Water level alarms occurred during the orifice swaps, before and after the debris removal operation. On May 30, we had to switch the system into primary bypass. This development will be discussed further in next week's report. The orifice swaps occurred over periods of 4 and 2 hours respectively on May 29 and 30.

On June 2, the mechanics conducted scheduled maintenance of channel systems. There are no issues to report and all systems functioned well in automatic mode. The transition screen cleaning device will remain out of service until winter.

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

Sample gates are in services only during secondary bypass operations (i.e.: in service every-other-day). The gates functioned well. The primary PIT tag system remains off as the bypass lines provide a better return route for the fish than the PIT tag return lines. The secondary PIT tag gates remain off and open for bypass. PSMFC personnel continue to perform weekly examinations of the PIT tag detection system.

On May 31, we changed the fish counters for the A side of the system due to poor correction factors. Juvenile lamprey clinging to the count tunnels may have also contributed to these correction factors. On June 1, four juvenile lampreys were lost on the perforated plate. We reminded the staff to make sure flume barrier was fully in place. On June 5, due to safety concerns, we began to have night shift technicians carry radios.

River Conditions

River conditions during the week are outlined in Table 2 as provide by the smolt monitoring staff, whose data day runs from 0700 to 0700 hours each day. On June 3, PSMFC began deploying water temperature monitoring probes for the June 15 start of temperature monitoring.

The spring spill program, which calls for 40 percent of the flow to be spilled, continued. Due to flow in excess of powerhouse capacity, 55 to 61 percent of flow was spilled this week. The TSWs remain open at bays 19 and 20. After several date changes, TSW removal is scheduled to

take place from June 9 to 11. On June 15, the summer spill program, which calls for 50 percent of total river flow to be spilled, will begin.

From May 29 from 1000 hours to May 30 at 1600 hours, bay 22 was closed and had is leaf split so debris could be spilled. However, the bay was used sparingly during the operation. From May 29 at 1100 hours to May 30 at 1000 hours, the TSW at bay 19 was closed. On May 29, from 1100 to 1700 hours, the TSW in bay 20 was closed and used sparingly for debris removal. On May 30, from 0900 to 1100 hours, the TSW in bay 20 was closed and used as needed for debris removal.

On May 29, from 1100 to 1700 hours and on May 30, from 0900 to 1100 hours bays 13 to 22 were closed, during these times, except as mentioned above, for the debris spill operation.

Table 2. River conditions at McNary 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
363.0	324.2	216.6	181.4	58.1	55.6	5.0	4.3

*Control Room Data.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on June 3. Sixty-eight juvenile lamprey mortalities, 1 live lamprey and 1 smolt mortality were recovered from the strainers. Strainers associated with turbine units 4, 10, 11 and 12 were not inspected. Turbine units 4 and 11 are out of service. At units 10 and 12, we could not open the strainers for inspection.

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

Avian Activity: Bird counts continue with each zone being counted by the fisheries staff once a day and usually in the morning. Counts are reflected in Table 4 below. This week, we observed gulls, cormorants and mostly pelicans on the rock by the Washington boat dock. We also noted ospreys on project. Bird numbers, except for grebes, appear to be decreasing with fish numbers.

Even with hazing being concentrated on the grebes, 13 grebes were observed in the gatewell slots. We removed eight of these birds with the remaining five passing to the collection channel. Four of these passed through the system to the lower river, leaving only one grebe in the channel.

USDA hazing continues with two shifts along boat hazing occurring Monday, Wednesday and Friday as conditions allow. Also, a light lethal take continues near the bypass outfall during the boat hazing. The bird distress calls deployed along the navigation lock wing wall and around the project appear to have discouraged roosting. The fisheries staff monitors and adjust all hazing equipment as needed. All hazing techniques appear to be working well as birds continue to concentrate in the spill flow. We continue to monitor the water cannon's supply pump. On June

2 and 5, the pump was briefly for exanimation. On June 9, infrasound will be test on project as a bird deterrent.

Table 3. Daily Avian Counts at McNary Dam.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
May 30	Forebay	0	0	2	3	46
	Spill	0	4	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	0	0
May 31	Forebay	0	0	1	0	27
	Spill	0	0	0	5	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	6	0
June 1	Forebay	1	0	1	0	42
	Spill	3	0	1	0	0
	Powerhouse	0	0	0	0	0
	Outfall	0	2	0	0	0
June 2	Forebay	0	0	3	0	37
	Spill	6	9	0	4	0
	Powerhouse	0	0	0	0	0
	Outfall	4	0	0	0	0
June 3	Forebay	0	1	1	0	32
	Spill	6	0	2	3	0
	Powerhouse	0	0	0	0	0
	Outfall	6	2	0	0	0
June 4	Forebay	0	0	2	0	39
	Spill	0	0	1	0	0
	Powerhouse	0	1	0	0	0
	Outfall	0	0	0	0	0
June 5	Forebay	0	0	2	0	25
	Spill	0	0	0	1	0
	Powerhouse	0	0	0	0	0
	Outfall	0	0	0	1	0

Research: GBT monitoring and the juvenile survival study continue. The adult lamprey passage study will begin June 15.

Project: Ice Harbor
Biologist: Ken Fone
Dates: May 30 – June 5, 2014

Turbine Operation

Turbine unit 2 tripped off on a protective relay action at 1142 hours on May 18 and remained out of service through the end of this reporting period to allow investigation into the problem. All other units were available for service.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on June 2, 3, 4, and 5.

Fish Ladders: The north fish ladder inspection areas (picketed leads, head differentials, fishway exit, and depth over weirs) were in criteria on all inspections. The south fish ladder inspection areas (picketed leads, head differentials, fishway exit, and depth over weirs) were in criteria on all inspections. Both the north and the south shore picketed leads are down in their deployed positions.

Fishway Entrances and Collection Channel (inspection date order): The south shore entrance (SFE) depth and channel/tailwater differential were in criteria on all inspections. 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 without problems. Six of eight south fish pumps were operated.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: Fish ladder exits were clear of debris and the bubblers were operating satisfactorily. There was little to no debris observed in the forebay and gatewells.

STSs/VBSs: STSs are in position for juvenile fish guidance and have been in continuous run mode since May 27. STS inspections and unit 3 VBS inspections were performed on May 19 and 21, with no problems found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass was placed in operation on March 17. Twenty orifices are open.

Juvenile Bypass Facility: The bypass is in operation.

Fish Sampling: The first sample of the season occurred on April 2. Sampling days continue to alternate weekly on Mondays and Wednesdays, and Tuesdays and Thursdays. Sampling occurred on May 30, June 3 and 5, because of the holiday on May 26. Sampling results are outlined in the tables below.

Table 1. Fish condition sampling results at Ice Harbor Dam

May 30.

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	4	0	0	0
UC-CH	0	---	---	---
C-CH-O	10	0	0	0
UC-CH-O	40	1	0	0
C-SH	42	2	0	2
UC-SH	30	2	0	2
C-COHO	0	---	---	---
UC-COHO	5	0	0	0
C-SOCK	0	---	---	---
UC-SOCK	6	1	0	0
TOTAL	137	6	0	4

June 3.

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	2	0	0	0
UC-CH	0	---	---	---
C-CH-O	17	1	0	0
UC-CH-O	61	1	0	0
C-SH	29	1	0	5
UC-SH	18	0	0	2
C-COHO	0	---	---	---
UC-COHO	1	0	0	0
C-SOCK	0	---	---	---
UC-SOCK	3	1	0	0
TOTAL	131	4	0	7

June 5:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	1	0	0	0
UC-CH	2	0	0	0
C-CH-O	38	1	0	1
UC-CH-O	65	2	1	0
C-SH	16	2	0	4
UC-SH	3	0	0	0
C-COHO	0	---	---	---
UC-COHO	1	1	0	0
C-SOCK	0	---	---	---
UC-SOCK	3	0	0	0
TOTAL	129	6	1	5

Removable Spillway Weir: The RSW is in operation position. Spill in support of fish passage began April 3, 2014.

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
132.1	116.4	74.0	53.7	56	54	3.8	2.8

*Unit 1 scrollcase temperature.

Other

Inline Cooling Water Strainers: Turbine cooling water strainer inspections took place on May 19 and 21. A total of 13 juvenile lamprey mortalities and one juvenile coho mortality was recovered. Transformer cooling water strainer inspections occurred on June 4. Seven live juvenile lamprey were recovered, with no mortalities observed.

Invasive Species: No new exotic species have been found.

Avian Activity: Piscivorous bird hazing began on April 1. On May 30, personnel observed that the water spray shooting from the hydrocannon at the bypass outfall pipe was significantly reduced. The hydrocannon was turned off at 1000 hours for about two hours on May 30 to allow any debris that was impinged on the intake screen to wash off. This was unsuccessful, so the hydrocannon was shut off from 0750 hours to 0830 hours on June 2 to raise the pump and clean

the intake screen and restore the full water spray. The avian deterrent program has generally been effective at reducing the numbers of piscivorous birds near the dam. Over the last several weeks, efforts were concentrated at the end of the outfall pipe and in the forebay close to the powerhouse to haze away stubborn cormorants. Pyrotechnics and a propane cannon were used to successfully haze the cormorants in the forebay. Bird numbers continue to decrease, as reflected in Table 3 below.

Table 3. Daily Morning Piscivorous Bird Counts at Ice Harbor Dam

Date	Gulls	Cormorants	Caspian Terns	Pelicans	Grebes
May 30	2	34	3	74	1
May 31	0	12	0	41	0
June 1	2	7	0	50	0
June 2	0	3	1	18	0
June 3	0	3	2	16	0
June 4	1	3	9	15	0
June 5	0	4	2	10	0

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

Project: Lower Monumental
Biologists: Bill Spurgeon and K.C. Deife
Dates: May 30 – June 5, 2014

Turbine Operation

The units are being operated in hard constraint of the 1% operation criteria. Units were rotated out of service for STS inspections on June 3, 4, and 5. Unit 3 was taken out of service at 1139 hours on June 3 due to a damaged STS screen in gatewell slot 3C. The unit was returned to service at 1340 hours on June 3.

Adult Fish Passage Facility

The adult fishways were inspected by Corps and PSMFC/State biologists on May 30, 31, and June 1, and 4.

Fish Ladders: 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 (≤ 0.4' 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 with the exception of a 7.8' and 7.9 feet reading on May 31. North shore channel/tailwater head was in criteria (1'-2') on all inspections with the exception of a 0.9 feet reading on June 4.

SPE1 and SPE2 weir gates were in depth criteria (criteria: ≥ 8' or on sill) on all inspections with the exception of a 7.6' and 7.7 feet reading on May 31. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections with the exception of a 0.9 feet reading on June 4.

SSE1 weir gate was in depth criteria (criteria: ≥ 8' or on sill) on all inspections. 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 readings of 0.8' and 0.8 feet on May 30 and June 4, respectively.

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 being currently being programmed. The automated system is estimated to return to service in June. 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 throughout this period.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 2.5 square yards of forebay debris observed during this period. Gatewell debris ranged from 0-16% surface coverage. No oil was observed in gatewells.

STSs/VBSs: STS operation remains in continuous run mode due to the average length of sampled sockeye being less than 120 mm. STSs 1, 2, 3, 4, 5 and 6 were inspected on June 3, 4, and 5. The STS from slot 3C required repair on June 3 due to failure of mesh retainer clips. STS 3C was returned to service on June 3.

Orifices, Collection Channel, Dewatering Structure, Flume: The collection channel is operating with 19 to 20 orifices open.

Collection Facility: The facility is in collection for transport mode.

Transport Summary: Every-other-day barging began on May 31. During barge loading on May 30 an electrical issue caused the barge boom to malfunction. Fish were safely loaded into the barge and the barge boom was repaired prior to next barge loading.

River Conditions

The BPA called for the use of the Bulk spill pattern at 0900 hours on June 5.

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
127.8	112.1	38.0	29.3	56	54.5	2.1	1.0

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on May 19. Two live lampreys and 1 live Siberian prawn were recovered. Mortalities included 9 juvenile lamprey, 35 juvenile salmon, and 1 Siberian prawn.

Invasive Species: No zebra mussels were observed at the monitoring stations on June 1.

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 for the season ended on June 2.

Table 2. Tailrace Counts of Foraging Piscivorous Birds at Lower Monumental Dam.

Date	Time (hours)	Gulls	Cormorants	Terns
May 30	1200	0	0	0
May 31	1200	0	0	0
June 1	1115	0	2	0
June 2	1100	0	0	0
June 3	1100	2	0	0
June 4	1100	9	0	0
June 5	1100	0	0	0

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

Project: Little Goose
Biologist: Richard Weis
Dates: May 30 – June 5, 2014

Turbine Operation

Turbine units 1 through 6 were available for all of this reporting period. All turbine units were operated within 1% peak efficiency range.

Adult Fish Passage Facility

Adult fishway inspections were performed on May 31, June 3 and 5.

Fish Ladder: The ladder exit head differential held steady at 0.0 feet (criteria ≤ 0.5 ft.). Water depths over the weirs held steady at 1.2 feet (criteria 1.0-1.3 ft.). No differential was observed at the picketed leads (criteria ≤ 0.3 ft.). No debris was observed at the picketed leads or the ladder exit area. 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 1.2 and 1.6 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.2 and 8.4 feet (criteria ≥ 8.0 ft). NPE weirs rested on sill and ranged between 6.3 and 6.8 feet (criteria ≥7.0 ft). NSE weirs are in manual and depths ranged between 6.5 and 6.6 feet (criteria ≥ 6.0 ft.). Collection channel surface water velocity near the junction pool area measured 2.1 fps. Surface water velocity ranged between 2.2 to 2.5 fps near the north shore entrance (criteria 1.5 to 4.0 fps). Monthly water velocity readings were averaged using Stream velocity equipment. Measurements were taken 1 foot from bottom, mid elevation and 1 foot below surface. The average was 2.61 fps at North powerhouse pool.

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 between 3,200 and 5,000 sq ft.

Spillway Weir: The spillway weir was in service in the low crest position during this reporting period.

ESBS/VBS: All ESBS operated without problems. VBS inspections were performed on June 3 and 4. Units 1, 2 and 3 were checked. All units met criteria.

Orifices, Collection Channel, Dewatering Structure, and Flume: The Juvenile system operated with 22 open orifices.

Transportation Facility: The collection and transportation facility operated within criteria for the report period. A total of 245,361 fish were collected for transport. Eleven sub-yearling Chinook were bypassed. The descaling and mortality rates were 0.6% and 0.3% respectfully.

Transport Summary: Every day barging resumed during this reporting period. All fish collected but the 11 subyearling Chinook fry (mentioned above) were transported.

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
126.5	110.2	34.5	28.9	57.4	53.5	3.0	1.6

*Ladder temperature.

Other

Invasive Species: No zebra mussels were observed on the substrate monitor on June 5. The next inspection is scheduled for July 10.

Inline Cooling Water Strainers: Cooling water strainers were checked on June 4. Twenty-nine juvenile lamprey mortalities and 4 juvenile salmonid mortalities were removed.

Avian Activity: USDA-APHIS bird hazing was utilized all week.

Table 2. Maximum Daily Bird Counts at Little Goose Dam.

Date	Gulls	Cormorants	Caspian Terns	Pelicans
May 30	15	9	0	0
May 31	1	9	0	11
June 1	4	16	0	6
June 2	2	1	0	0
June 3	0	5	0	0
June 4	0	2	0	0
June 5	3	7	0	1

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

Gas Bubble Disease: One salmonid was found this week with minor signs of trauma.

Project: Lower Granite
Biologists: Mike Halter, Elizabeth Holdren and Ches Brooks
Dates: May 30 – June 5, 2014

Turbine Operation

Lower Granite had five turbine units available for power generation at the beginning of the report period. Turbine unit 6 is out of service for turbine blade seal insection, the expected return to service date is now July 8. Turbine unit 3 was out of service from 0914 until 0934 hours on May 30 to allow for an attempt to conduct VBS inspections. This attempt was unsuccessful because of low water clarity. Turbine unit 5 was out of service from 1032 until 1512 hours on May 30 to allow for slip ring cleaning. The turbine units are being operated in hard constraint of the 1% operation criteria.

Adult Fish Passage Facility

On May 30, 31, and June 1 COE fish biologists conducted inspections of the adult fishway system. The May 30 inspection was conducted with the ODFW biologist from Little Goose Dam.

Fish Ladder: All criteria were met.

Fishway Entrances and Collection Channel: Head differential readings remained within criteria at the south shore fishway entrances during the weekly inspections. The head differential reading at the north powerhouse fishway entrances was below criteria on the May 30 inspection with a reading of 0.6 feet (criterion 1.0 -2.0 feet) but met criteria on the May 31 and June 1 inspections with readings of 1.1 and 1.0 feet respectively. Head differential readings at the north shore fishway entrances were out of criteria on the June 1 inspection with a reading of 0.9 feet (criterion 1.0' – 2.0') but met criteria on the May 30 and 31 inspections with readings of 1.1 and 1.0 feet respectively. These out of criteria events at the north shore and north powerhouse are associated with the fact that fish pump one is now being run in 'slow' speed mode. Fish pump one's motor management relay system has a tendency to trip the pump offline when the pump is running in 'fast' speed mode during low tailwater conditions (the pump requires up to an hour to restart).

Weir depths at the south shore fishway entrances met criteria on all inspections this week. Weir depths at the north powerhouse fishway entrances were on sill all week due to tailrace elevations below 636.0 feet (at which depths the gates bottom out). Weir depths at the north powerhouse entrances ranged from 7.5 to 7.6 feet. Weir depths at north shore entrance 1 ranged from 5.1 to 5.4 feet (criterion $\geq$ 7.0 feet). Weir depths at north shore entrance 2 ranged from 4.5 to 5.6 feet (criterion $\geq$ 7.0 feet). North shore entrance 2 remains damaged, and cannot adjust for weir depths automatically; this gate has been manually set at a compromise depth of 630.0 feet. Due to a lack of water at the north shore entrances, weir depth readings are being sacrificed in attempt to maintain the requisite 1.0 foot of head differential.

Velocity readings in the adult fishway collection channel transition pool area ranged from 0.96 to 1.20 feet per second and averaged 1.07 feet per second.

Auxiliary Water Supply System: Fish pumps one and three were run during the week with fish pump two held in standby mode.

Juvenile Fish Passage Facility

The sample rate was increased from 0.5% to 1.0% at 0700 hours on June 1 and remained at that level for the duration of the report week. The cumulative smolt collection of 6,230,882 thru June 5 is the highest since 2005. The cumulative descaling rate of 0.95% thru June 5 is the lowest since at least 1985.

Forebay Debris/Gatewell Debris/Oil: The amount of forebay debris varied during the week due to wind strength and direction. No debris spills took place during the week. JFF staff have been monitoring gatewells daily and removing floating debris with a hand basket in attempt to circumvent orifice blockages.

ESBSs/VBSs: ESBSs are deployed in all units and have been operating without issue. The brush cleaning cycle is set for once every two hours. On May 30 an attempt was made to conduct VBS inspections. This attempt was unsuccessful because of low water clarity. The next inspection is scheduled for June 27 – 28.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: Orifices are being backflushed every three hours around the clock. Debris levels increased considerably during the week with the higher river flows.

Transportation Facility: Every day barge transport operations at Lower Granite began on May 2. Fish are being picked up at Little Goose and Lower Monumental on all trips. The last everyday barge left Lower Granite on May 30. Every-other-day barging will take place until mid-August. Lamprey friendly tail screens (with larger mesh openings) have been installed in all raceways.

Transport Summary: The last everyday barge left Lower Granite on May 30. Every-other-day barging will take place until mid-August. There were no serious operational problems on the barges and all fish were released at the designated sites in a timely manner. Fish collection numbers decreased during the week from a high of 39,000 on May 31 to a low of 20,500 on June 4.

Removable Spillway Weir: The RSW resumed operation with normal spring spill activities on April 3.

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
132.5	116.2	48.7	29.6	55.3	53.0	2.3	1.9

*Cooling water intake temperature.

Other

The adult fish counters began visual counts at the counting window on April 1. The counting hours are from 0400 to 2000 hours PST and are scheduled to continue through October 31.

Inline Cooling Water Strainers: Cooling water strainers were last inspected for lamprey on May 27. A total of 181 lamprey mortalities were found in the strainers over a combined run time of 2,929.2 unit hours. The next cooling water strainer inspections are scheduled for late June.

Invasive Species: The zebra mussel substrate near the adult fishway exit was examined for zebra mussels on the May 3 inspection. No evidence of zebra mussels was found.

Avian Activity: Formal bird counts and hazing activities began on April 1. Sixteen hours per day hazing began on April 21 and continued until June 1 (This was in order to provide the maximum amount of hazing effort when the highest numbers of juvenile fish are passing the dam). Hazing will now occur eight hours per day, split between the morning and afternoon.

Table 2. Daily Average Predacious Bird Counts at Lower Granite Dam.

Date	Gulls	Cormorants	Caspian Terns	Pelicans
May 30	0	0	0	0
May 31	0	0	0	0
June 1	0	0	0	0
June 2	0	0	0	0
June 3	0	0	0	0
June 4	1	0	0	0
June 5	0	0	0	0

* Numbers are an average of the morning and evening counts off the JFF separator platform.

Adult Fish Trap Operations: The adult fish trap was watered up and sampling began on March 10. The initial sample rate was 28%. On April 14 at 1400 hours the sample rate was lowered to 15%. Since, as in 2013, adult trapping will only be conducted Monday thru Friday the 15% sample rate represents an overall weekly sample rate of 11%. Genetic/scale samples will be taken from one out of every 10 hatchery steelhead. All wild steelhead captured will be PIT-tagged and scale and genetic samples taken. Any previously PIT-tagged steelhead (either

hatchery or wild) will have both scale and genetic samples taken for verification purposes. Up to twenty sort by code Lemhi origin Chinook will be radio-tagged and scale and genetic samples taken.

Research

Idaho Fish and Game (IDFG) Genetic Stock Identification: The goal of this study is to develop fine-scale genetic profiles for natural origin salmon and steelhead; develop genetic stock identification (GSI) techniques to estimate stock-specific escapement over LGR, monitor abundance, productivity and distribution of naturally produced adult and juvenile steelhead and salmon; research and monitor stock-specific life history characteristics. At LGR the goal of the study will be to enumerate and characterize the natural production of spring/summer Chinook salmon and steelhead above LGR with regards to age composition and genetic stock profiles. IDFG will sample Monday through Friday until the first part of July with the goal to collect between 2,000-5,000 genetic samples each from yearling spring/summer Chinook and steelhead and 500-3,000 genetic samples from subyearling fall Chinook.

Nez Perce Tribe (NPT)/U. of Idaho (UI)/Columbia River Intertribal Fisheries Commission (CRITFC) – Kelt Study: The goal of this research project is to study the physiology and endocrinology of steelhead kelts to evaluate the feasibility and success of several strategies for rehabilitating and handling steelhead collected at LGR. Also, to understand and identify the suite of physiological changes that occurs in Snake River steelhead during the process of sexual maturity, and to determine changes that occur post spawning that are associated with successful downstream migration and recovery to spawn again. As part of this collaborative study to investigate approaches to increase adult steelhead returns the NPT will select up to 150 fish for transport to the Dworshak National Fish Hatchery holding facility.

National Marine Fisheries Service (NMFS) In-River Survival: This week, NMFS staff began 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.

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 2013 in natal streams and are diverted to the Sort-By-Code tanks at LGR.

Biological Evaluation of Prototype Overflow Weir and 14 inch Orifice: A prototype broad crested overflow weir and 14 inch diameter orifice were installed into intake gatewell 5A during the winter of 2012. These structures are being evaluated by UC Davis, Biomark and Blue Leaf Environmental in order to test whether these structural modifications will reduce passage times and increase survival of fish through the upper portion of the LGR Juvenile Bypass System. Last

winter a sharp crested weir was installed in place of the broad crested weir and a prototype LED light ring was installed on the 14 inch orifice. The goal of the study is to assess the biological and debris passage characteristics associated with each style of passage structure (14 inch orifice - with light ring) and 'sharp crested' overflow weir) during the day, and this year also at night. Results of this study will be used to determine whether any redesign of the weir or orifice structures is necessary and to determine which of these structures warrant installation in the remaining gatewells. This study will also help inform future management decisions for structural modifications at other Columbia and Snake River dams. Up to 375 fish of each species (clipped yearling Chinook, clipped subyearling Chinook and clipped steelhead) will be collected from the JFF east raceways during the NMFS survival and transport study sampling. These fish are PIT-tagged, photographed, evaluated for condition, held overnight and released the next morning for the day release or the next evening for the night release. The fish are released into gatewell 5A or the gallery channel. To further evaluate these structures up to 100 adult steelhead kelts and up to 2500 juvenile lamprey will be PIT-tagged and released. A subsample of each release group will be collected in the Sort-By-Code tanks and examined for injury.