**U.S. ARMY CORPS OF ENGINEERS**
**WALLA WALLA DISTRICT**
**FISH FACILITIES WEEKLY REPORT**
**#14-2018**

**Project: McNary**
Biologist: Bobby Johnson and Denise Griffith
Dates: June 1 to 7, 2018

## Turbine Operation

| Yes | No | Turbine Unit Status | | |
|---|---|---|---|---|
| | X | All 14 turbine units available for service. (See table & comments below for details). | **Hard** | **Soft** |
| X | | Available turbines operated within 1% peak efficiency? Constraint in effect. | X | |

Table 1. McNary Unit Outages (OOS) and Return to Service (RTS)

| | OOS | | RTS | | |
|---|---|---|---|---|---|
| **Unit** | **Date** | **Time** | **Date** | **Time** | **Outage Description** |
| 5 | 6/4 | 0634 | 6/14 | NA | Annual maintenance and lubricant replacement. |
| 6 | 6/6 | 0702 | 6/7 | 1138 | Hub tapped and electrical issue (33 switch). |

Comments: The reduction in spill requested by TMT concluded on June 1. This reduction aided in decreasing the dissolved gas levels at McNary. This request allowed units to operate throughout the entire 1% range, and hold reserves above 1%. No significant excursions outside the 1% criteria occurred.

## Adult Fish Passage Facilities

McNary fisheries biologists performed adult fishways measured inspections on June 1, 3 and 6. Temperature probe data was downloaded on June 1. Adult fish counting continued. Video review of night time lamprey passage will begin on June 15.

Fish Ladder Exits:

| Yes | No | Location | Criteria | Comments |
|---|---|---|---|---|
| | X | Oregon Exit | Head over weir 1.0’ to 1.3’ | 0.9’ on June 1st |
| X | | Oregon Count Station Differential | 0.0’ to 0.5’ | |
| X | | Washington Exit | Head over weir 1.0’ to 1.3’ | |
| X | | Washington Count Station Differential | 0.0’ to 0.5’ | |

Comments: Debris loads were very light near the Oregon exit and light to moderate near the Washington exits. Picketed leads were cleaned at the Washington exit by the general maintenance staff as needed, including the weekend. New incoming debris loads along the Washington shore line was light and steady with much of the debris collecting on the spillway.

At the Oregon exit, the traveling screens debris trough was cleaned as required. On June 1, the low head over weir measurement recorded occurred after a high picketed leads differential alarm and the leads had been cleaned. The exit set points were adjusted.

At the Washington exit, one loss of power alarm came in and was reset on June 3. Also, that day, general maintenance was called back in to remove a three foot diameter root wad from the upstream count station window slot. Approximately 3/4 of the opening was blocked and one adult Chinook was noted turning back when the problem was found. A railroad tie was noted at a stationary weir downstream of the count station at a location that

cannot be reached. The tie appears to be only partially obstructing an orifice. On June 4, a large log was removed from the exit trash rack.

Fishway Entrances and Collection Channel:

| Yes | No | Sill | Location | Criteria | Comments |
|---|---|---|---|---|---|
| | X | | North Oregon Entrance Head Differential | 1.0' – 2.0' | 2.1' on June 1 |
| | X | | NFEW2 Weir Depth | ≥ 8.0' | 6.6' on June 1 |
| | X | | NFEW3 Weir Depth | ≥ 8.0' | 6.7' on June 1 |
| X | | | South Oregon Entrance Head Differential | 1.0' – 2.0' | |
| X | | | SFEW1 Weir Depth | ≥ 8.0' | |
| X | | | SFEW2 Weir Depth | ≥ 8.0' | |
| X | | | Oregon Collection Channel Velocities | 1.5 to 4.0 fps | Averaged 1.5 fps. |
| X | | | Washington Entrance Head Differential | 1.0' – 2.0' | |
| X | | | WFE2 Weir Depth | ≥ 8.0' | |
| X | | | WFE3 Weir Depth | ≥ 8.0' | |

Comments: The readings on June 1 were a result of the entrances NFEW2 and NEFW3 both being jammed at an elevation, which resulted in slack in the cables. This situation occurs, at times, during high tailwater elevations. On June 3, NFEW3 was found with slack in the cables again but the weir appeared to be in criteria. Both times, the weirs were freed by reducing the fish pumps blade angles. NFEW3 was switched to manual operation, where it remains.

Auxiliary Water Supply System:

| Operating Satisfactory | Standby | Out of Service | Auxiliary Water Supply System (AWS) |
|---|---|---|---|
| X | | | WA shore Wasco County PUD Turbine Unit |
| | X | | WA shore Wasco PUD Bypass |
| X | | X | Oregon Ladder Fish Pump 1, Blade angle: 20 to 21. |
| X | | | Oregon Ladder Fish Pump 2, Blade angle: 20. |
| X | | | Oregon Ladder Fish Pump 3, Blade angle: 21 to 22. |
| X | | | OR North Powerhouse Pool supply from juvenile fishway |

Comments: On June 1, from 1616 to 1634 hours and on June 3, from 1400 to 1405 hours, the blade angle on all three fish pumps was reduced in order to free up NFEW2 and NFEW3 as described above. On June 7, from 0524 to 0835 hours, fish pump 1 was out of service due to a governor oil pump issue. The blade angles on the other two fish pumps were increased and the Oregon ladder remained in criteria.

**Juvenile Fish Passage Facility**

The sampling season continued. Daily sampling was scheduled through June 5, in order to monitor fish condition better, during the high flow conditions. However, on June 2, at 1535 hours, the system was switched to primary bypass due to side screen brush failure, which will be described below. From that time to June 6, at 0700 hours, daily sampling was missed. After the side brush was repaired, every other day sampling resumed on schedule on June 7, at 0700 hours.

Forebay Debris/Gatewell Debris/Oil:

| Yes | No | NA | Item | Comments |
|---|---|---|---|---|
| X | | | Forebay debris load acceptable? (amount) | Minimal to light near powerhouse. |
| X | | | Trash rack differentials measured this week? | Daily. |
| X | | | Trash rack differentials acceptable? | |
| | X | | Any debris seen in gatewells? (% coverage) | |
| | X | | Any oil seen in gatewells? | |

Comments: The forebay debris load near the powerhouse slightly increased from minimal to light. Some of the debris was noted going over the TSWs. New incoming debris loads were light and arrived scattered from the Washington shore line to the powerhouse. Debris accumulation along the spillway went from minimal to moderate.

No trash rack cleaning occurred this week. The next cleaning is scheduled for June 20.

Extended-length submersible bar screen (ESBSs)/Vertical barrier screen (VBSs):

| Yes | No | NA | Item |
|---|---|---|---|
| X | | | ESBSs deployed in all slots and in service? |
| | X | | ESBSs inspected this week? |
| | | X | ESBSs inspection results acceptable? |
| X | | | VBSs differentials checked this week? |
| X | | | VBSs differentials acceptable? |

Comments: The brush cycle for the ESBS in 1C slot remained in timer mode. On June 4, the brush cycle for the screen in 2A slot was switch from timer to automatic mode. No ESBS camera inspections occurred this week.

VBS differential monitoring occurred daily. No high differentials were measured. On June 5, the VBSs in units 4 and 6 long with 10A slot were inspected, which includes cleaning. During inspections, three smolt mortalities were observed. The VBS in 10A slot will be replaced in the near future. On June 6, at unit 4, we examined the idea of exchanging the prototype VBS in 4C slot with the standard VBS in 4A slot. The slot cover at 4A slot is larger than standard as a rotating VBS was once tested there. Installing the prototype VBS there would reduce the work load required to clean the VBS in that slot as the prototype rarely needs cleaning.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe:

| Yes | No | NA | Item | Number of orifices in service |
|---|---|---|---|---|
| X | | | Orifices operating satisfactory? | 42 |
| X | | | Dewatering and cleaning systems operating satisfactory? See note below. | |

Comments: During daily sampling, the channel was only examined on day shift. During primary bypass, the channel was monitored 24/7. Orifices were adjusted for VBS inspections. Orifice attraction lights were repaired as required.

On June 2, at about 1130 hours, the side screen cleaner tripped an alarm. First, the assistant biologist tried to return it to service. The project biologist came in at 1230 hours and tried to return the brush to service. The issue appeared to be electrical. From 1400 to 1505 hours, the electrician worked on the brush but was not able to resolve the issue. It was determined the side brush would have to be operated in hand mode, which means each step requires a person to operate a corresponding switch. Also, we noted that the brush cycle sequence was no longer operating properly. For the rectangular screen brush to be used, the start button had to be pushed, which requires a person to be in the channel. Yet, at other times, the rectangular brush ran in automatic mode but out of sequence. The biologist determined daily secondary bypass for sampling would have to be terminated in order to allow the fisheries staff to be in the channel and operate the brushes, which was done every three hours. On June 4, the project biologist was informed the juvenile channel upgrades contractor was notified of the warranty issue and they would arrive at McNary on June 5, at 1500 hours. The contractor arrived at about 1546 hours. At 1630 hours, after consultation and examination with the COE electrician, who had examined the brush on June 2, it was agreed that the side screen brush upstream limit switch had to be replaced. The magnetic limit switch was replaced on June 6 at 0648 hours. There was a brief power outage that had no adverse effects on channel operation when the limit switch was replaced. Next, the contractor purchased supplies, which would allow them to move the limit switch to a more accessible location. The switch was moved and tested by 1030 hours. The side screen brush was returned to automatic mode at 1045 hours.

The contractor also looked at the transition screen cleaner and moved the A zone limit switch so the brush would no longer park “hard”. This transition brush was returned to service at 1115 hours. At 1121 hours, the timer sequence

was reset, which returned the brushes cycle sequence to automatic mode, which allowed all three brushes to function properly. We were not able to determine why we lost the timing sequence.

On June 1, while doing an avian count, the assistant biologist noted handrail missing from the outfall pipe walkway. Due to high flows cresting over the outfall pipe, we have been very concerned about the condition of the outfall pipe, access walkway and avian hazing sprinkler system. On June 3, the project biologist turned in a trouble report and requested the control room not allow anyone on the walkway until it could be inspected. On June 4, when using a scoping scope, we estimated about 100 feet of handrail missing. Later, that day, the Chief of Operations, the Project Manager and a project engineer accessed the outfall walkway. They estimated the last fifth of the walkway was not safe to use. The walkway and avian sprinkler system had both been damaged with sections of each missing. Finally, that day, the project biologist told the avian deterrent team that he had strong reservations about the life span of the new proposed sprinkler system. On June 6, project and district engineers used a boat to examine the outfall walkway and sprinkler system further. They found walkway had structural support damage and the sprinkler system was missing two of five sprinklers. Repairing the damage will require a contract, which will take time to fund and put in place.

Bypass Facility:

| Yes | No | NA | Item |
|---|---|---|---|
| X | | | Sample gates on? |
| | | X | PIT-tag sampling system on? (Remain off unless a study is occurring.) |

Comments: The sample gates were on during secondary bypass for sample collection, which occurred as described above. This week, 13,600 juvenile lamprey and 87,908 smolts were bypassed.

During a facility roof inspection, one tear in the roof was repaired.

TSW Operations: The TSWs remain installed in spillbays 19 and 20. TSW removal was rescheduled to begin June 18 due to forebay debris distribution.

## River Conditions

Table 2. River Conditions at McNary 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 |
| 417.6 | 339.6 | 243.6 | 188.4 | 58.6 | 56.9 | 3.2 | 2.1 |

Comments: The above data is supplied by Anchor, QEA except water clarity, which is provided by the control room. As mentioned above, the TMT requested spill reduction remained in effect until June 1 as the spring spill program continued. The summer spill program will begin on June 16, at 0001 hours, at which time 50 percent of river flow will be spilled.

Daily temperature monitoring by Anchor, QEA throughout the juvenile system is scheduled to begin June 15. The probes will be deployed on June 8. Due to the damage to the outfall walkway, the temperature probe normally installed at the outfall will not be used this year.

## Other

Inline Cooling Water Strainers: The cooling water strainer examinations on June 5 revealed six juvenile lamprey and four subyearling Chinook mortalities. Two of the Chinook were unclipped.

Avian Activity: Avian tailwater counts continued and are recorded in Table 3 below. As flow volumes decrease, pelicans were noted moving into the zones. Gulls and cormorants remained low in numbers.

An occasional osprey, cormorant, blue heron or tern was observed in the forebay. As many as 20 grebes have been observed. Pelicans, cormorants and gulls were roosting on the rocks by the Washington shore boat dock. Hazing appears to be working well on the grebes. On May 31, one grebe entered a gatewell slot and passed to the juvenile collection channel, where it remains.

The outfall hazing water sprinklers remained off due to high flows and were later determined to be out of service due to system damage, which will require a contract to repair/replace. The bird distress calls deployed along the navigation lock wing wall have been functioning well. The calls have been adjusted weekly. USDA Wildlife Services continued with two shifts. Also, boating hazing occurred on Friday and Monday through Thursday. Due to the flow volume, the boat has remained below the outfall pipe.

Table 3. McNary Project's Daily Avian Count.

| Date | Zone | Gull | Cormorant | Tern | Pelican |
|---|---|---|---|---|---|
| June 1 | Spill | 1 | 0 | 0 | 0 |
| | Powerhouse | 0 | 0 | 0 | 1 |
| | Outfall | 0 | 0 | 0 | 0 |
| June 2 | Spill | 2 | 0 | 0 | 0 |
| | Powerhouse | 0 | 0 | 0 | 0 |
| | Outfall | 0 | 0 | 0 | 0 |
| June 3 | Spill | 2 | 0 | 0 | 0 |
| | Powerhouse | 0 | 2 | 0 | 0 |
| | Outfall | 2 | 1 | 0 | 0 |
| June 4 | Spill | 3 | 0 | 0 | 0 |
| | Powerhouse | 0 | 0 | 0 | 0 |
| | Outfall | 0 | 0 | 0 | 0 |
| June 5 | Spill | 0 | 0 | 0 | 3 |
| | Powerhouse | 0 | 0 | 0 | 0 |
| | Outfall | 0 | 0 | 0 | 0 |
| June 6 | Spill | 0 | 0 | 0 | 0 |
| | Powerhouse | 0 | 0 | 0 | 0 |
| | Outfall | 0 | 0 | 0 | 1 |
| June 7 | Spill | 0 | 0 | 0 | 5 |
| | Powerhouse | 0 | 0 | 0 | 0 |
| | Outfall | 0 | 0 | 0 | 0 |

Invasive Species: The next the mussel station examinations will occur in late June. No Siberian prawns were observed in the sample this week.

Fish Rescue/Salvage**:** None occurred.

Research: GBT monitoring occurred once this week due to the system being in primary bypass for most of the week. One smolt exhibited signs of GBT. On June 10, PNNL will do their last dead fish releases as part of the spill to gas cap evaluation. This week, the University of Idaho set up telemetry equipment at all ladder entrances and exits for an adult lamprey passage study.

**Project: Ice Harbor**
Biologist: Ken Fone
Dates: June 1 – June 7, 2018

## Turbine Operation

| Yes | No | Turbine Unit Status | | |
|---|---|---|---|---|
| | X | All 6 turbine units available for service (see table & comments below for details). | **Hard** | **Soft** |
| | X | Available turbines operated within 1% peak efficiency? Constraint in effect. | X | |

Ice Harbor Unit Outages (OOS) and Return to Service (RTS).

| | OOS | | RTS | | |
|---|---|---|---|---|---|
| **Unit** | **Date** | **Time** | **Date** | **Time** | **Outage Description** |
| 2 | 4/25/16 | 0606 | --- | --- | Runner replacement |
| 4 | 12/17/17 | 1342 | --- | --- | Investigate oil leak. |
| 1 | 6/1/18 | 0708 | 6/1/18 | 1120 | Rake trash racks |
| 3 | 6/1/18 | 1127 | 6/1/18 | 1406 | Rake trash racks |

Comments: Unit 3 was noted to be operating a few megawatts above the 1% peak operating efficiency range on each of the fishway inspections. This was due to the GDACS program needing to be updated with the narrower operating efficiency range of unit 3 since it became a fixed-blade unit.

## Adult Fish Passage Facility

Ice Harbor fish facility staff inspected the adult fishways on June 5, 6, and 7.

Fish Ladders:

| Yes | No | Location | Criteria | Measurements |
|---|---|---|---|---|
| X | | North Ladder Exit Differential | Head ≤ 0.3’ | |
| X | | North Ladder Picketed Lead Differential | Head ≤ 0.3’ | |
| X | | North Ladder Depth over Weirs | Head over weir 1.0’ to 1.3’ | |
| X | | South Ladder Exit Differential | Head ≤ 0.3’ | |
| X | | South Ladder Picketed Lead Differential | Head ≤ 0.3’ | |
| X | | South Ladder Depth over Weirs | Head over weir 1.0’ to 1.3’ | |

Fishway Entrances and Collection Channel:

| Yes | No | Sill | Location | Criteria | Measurements |
|---|---|---|---|---|---|
| | X | | South Shore Entrance (SFE-1) Weir Depth | ≥ 8.0’ or on sill | 7.0’ |
| X | | | South Shore Channel/Tailwater Differential | 1.0’ – 2.0’ | |
| X | | | South Shore Channel Velocity | 1.5 – 4.0 fps | |
| X | | | North Powerhouse Entrance (NFE-2) Weir Depth | ≥ 8.0’ or on sill | |
| X | | | North Powerhouse Entrance Channel/Tailwater Differential | 1.0’ – 2.0’ | |
| X | | | North Shore Entrance (NEW-1) Weir Depth | ≥ 8.0’ or on sill | |
| X | | | North Shore Channel/Tailwater Differential | 1.0’ – 2.0’ | |

Comments: The SFE-1 weir depth was below criteria on the June 5 inspection. This may have been due to the weir gate motor tripping out on an overload. This is an intermittent problem that electricians have been working on.

Auxiliary Water Supply (AWS) System:

| Operating Satisfactory | Standby | Out of Service | Auxiliary Water Supply System (AWS) |
|---|---|---|---|
| 7 pumps | 1 pump | | Status of the 8 South Shore AWS Pumps |
| 2 pumps | 1 pump | | Status of the 3 North Shore AWS Pumps |

Comments: None.

**Juvenile Fish Passage Facility**

Forebay Debris/Gatewell Debris/Oil:

| Yes | No | NA | Item | Comments |
|---|---|---|---|---|
| X | | | Forebay debris load acceptable? (amount) | 523 square yards |
| X | | | Gatewell drawdown measured this week? | |
| X | | | Gatewell drawdown acceptable | |
| X | | | Any debris seen in gatewells (% coverage) | 0 to 8% |
| | X | | Any oil seen in gatewells? | |

Comments: Unit 1 and 3 trash racks were raked on June 1. Approximately 2 cubic yards of debris was removed, most of which came off of 1B trash rack. There was practically no debris found on unit 3 trash racks.

STSs/VBSs:

| Yes | No | NA | Item |
|---|---|---|---|
| | X | | STSs deployed in all slots and in service? |
| X | | | STSs in continuous-run mode (Note: if not, then STSs are in cycle-run mode)? |
| | X | | STSs inspected this week? |
| | | X | STSs inspection results acceptable? |
| | | X | VBSs differentials checked this week? |
| | | X | VBSs differentials acceptable? |

Comments: The STSs remained in continuous-run mode due to the presence of subyearling chinook with average fork lengths of less than 120 mm in the Ice Harbor juvenile fish sample.

Orifices, Collection Channel, Dewatering Structure, and Flume:

| Yes | No | NA | Item | Number open and in service |
|---|---|---|---|---|
| X | | | Orifices operating satisfactory? | 20 |
| X | | | Dewaterer and cleaning systems operating satisfactory? | |

Comments: The travel cable for the mechanical screen cleaner was replaced with new cable on June 7, due to observed fraying.

Juvenile Fish Facility: The fish facility is being operated in primary bypass, except when collecting fish for sampling.
Fish Sampling: Sampling is occurring on Mondays and Thursdays of each week. See the tables below for a summary of the sampling results. The one mortality in the June 7 sample had bloating consistent with bacterial kidney disease.

Fish condition sampling results at Ice Harbor Dam:

Date: June 4

| Species, Run, Rear type | Sampled | #Descaled | Morts | Avian Marks |
|---|---|---|---|---|
| Chinook yearling clipped | 0 | --- | --- | --- |
| Chinook yearling unclipped | 0 | --- | --- | --- |
| Chinook subyearling clipped | 43 | 2 | 0 | 0 |
| Chinook subyearling unclipped | 54 | 1 | 0 | 0 |
| Steelhead clipped | 1 | 1 | 0 | 0 |
| Steelhead unclipped | 3 | 0 | 0 | 1 |
| Sockeye clipped | 1 | --- | 1 | --- |
| Sockeye unclipped | 0 | --- | --- | --- |
| Coho clipped | 0 | --- | --- | --- |
| Coho unclipped | 0 | --- | --- | --- |
| Total | 102 | 4 | 1 | 1 |

Date: June 7

| Species, Run, Rear type | Sampled | #Descaled | Morts | Avian Marks |
|---|---|---|---|---|
| Chinook yearling clipped | 2 | 0 | 0 | 0 |
| Chinook yearling unclipped | 0 | --- | --- | --- |
| Chinook subyearling clipped | 30 | 1 | 1 | 0 |
| Chinook subyearling unclipped | 26 | 0 | 0 | 0 |
| Steelhead clipped | 0 | --- | --- | --- |
| Steelhead unclipped | 2 | 0 | 0 | 0 |
| Sockeye clipped | 0 | --- | --- | --- |
| Sockeye unclipped | 0 | --- | --- | --- |
| Coho clipped | 0 | --- | --- | --- |
| Coho unclipped | 0 | --- | --- | --- |
| Total | 60 | 1 | 1 | 0 |

Removable Spillway Weir (RSW): Voluntary spill for fish passage, including spill through the RSW, is occurring.

## River Conditions

River conditions at Ice Harbor 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 |
| 148.3 | 103.2 | 96.9 | 80.0 | 59 | 56 | 3.6 | 1.8 |

*Unit 1 scroll case temperature.

## Other

Inline Cooling Water Strainers: The turbine cooling water strainers will be inspected later this month.

Avian Activity: Gull numbers were low, while cormorant and pelican numbers fluctuated this week (see the table below). Most of the cormorants were observed foraging downstream of the spillway and powerhouse, while most of the pelicans were observed foraging downstream of the spillway or resting on Eagle Island. Contracted land-based hazing of piscivorous birds for 16 hours per day is occurring. Boat-based hazing for 8 hours per day, 3 days per week, is occurring. The land-based hazing has been effective at moving birds out of zones adjacent to the dam.

Boat-based hazing has been effective at dispersing birds out of downstream spillway and powerhouse zones and away from the outfall of the juvenile fish bypass pipe.

Daily maximum piscivorous bird counts at Ice Harbor Dam.

| Date | Gulls | Cormorants | Caspian Terns | Grebes | Pelicans |
|---|---|---|---|---|---|
| June 1 | 2 | 17 | 0 | 0 | 42 |
| June 2 | 0 | 7 | 0 | 0 | 9 |
| June 3 | 0 | 52 | 0 | 0 | 83 |
| June 4 | 0 | 12 | 0 | 0 | 21 |
| June 5 | 1 | 0 | 0 | 0 | 11 |
| June 6 | 0 | 0 | 0 | 0 | 0 |
| June 7 | 0 | 2 | 0 | 0 | 2 |

Invasive Species: No exotic species that are new to the area have been found.

Siberian Prawn: Siberian prawns collected in the sample at the Juvenile Fish Facility are humanely euthanized by Anchor, frozen and properly disposed of in a landfill. Daily and total Siberian prawn counts at Ice Harbor Dam Fish Facility for this reporting period are reported below.

| Date | Sample (euthanized) | Collection* |
|---|---|---|
| June 4 | 1 | 1 |
| June 7 | 1 | 1 |
| Totals | 2 | 2 |

*Collection and sample numbers are the same as the facility when sampling at 100%

Fish Rescue/Salvage: Unwatering activities that could involve fish rescue did not occur.

Research: PNNL personnel continue trapping and tagging adult chinook ascending the south fish ladder by using the adult fish trap. The fish are being released back to the river at Levey Park and their movements tracked further upstream for a Little Goose Dam fish passage study.

**Project: Lower Monumental**
Biologists: Chuck Barnes and Raymond Addis
Dates: June 1 - 7, 2018

## Turbine Operation

| Yes | No | Turbine Unit Status | | |
|---|---|---|---|---|
| | X | All 6 turbine units available for service (see table & comments below for details). | **Hard** | **Soft** |
| X | | Available turbines operated within 1% peak efficiency? Constraint in effect. | X | |

Lower Monumental Unit Outages (OOS) and Return to Service (RTS)

| | OOS | | RTS | | |
|---|---|---|---|---|---|
| **Unit** | **Date** | **Time** | **Date** | **Time** | **Outage Description** |
| Unit 1 | 12/10/2014 | | 08/2018 | | Rehabilitation Overhaul |
| Unit 2 | 6/2/2018 | 1029 | 6/2/2018 | 1515 | Trash rack Raking |
| | 6/5/2018 | 0700 | 6/5/2018 | 1251 | STS Inspections / Hub Tapping |
| Unit 3 | 6/2/20148 | 0856 | 6/2/2018 | 1514 | Trash rack Raking |
| | 6/5/2018 | 1317 | 6/5/2018 | 1635 | STS Inspections |
| Unit 4 | 6/2/2018 | 0634 | 6/2/2018 | 1023 | Trash rack Raking |
| | 6/6/2018 | 0700 | 6/6/2018 | 1050 | STS Inspections / Hub Tapping |
| Unit 5 | 6/6/2018 | 1125 | 6/6/2018 | 1415 | STS Inspections |
| Unit 6 | 6/7/2018 | 0700 | 6/7/2018 | 1500 | STS Inspections |

Comments: Units went into Hard Constraint at 0001 on April 1.

## Adult Fish Passage Facility

The adult fishways were inspected by Corps and Anchor QEA biologists on June 1, 2, 3, 4 and 6.

Fish Ladder:

| Yes | No | Location | Criteria | Measurements |
|---|---|---|---|---|
| X | | North Ladder Exit Differential | Head $\leq$ 0.5’ | |
| X | | North Ladder Picketed Lead Differential | Head $\leq$ 0.4’ | |
| X | | North Ladder Depth over Weirs | Head over weir 1.0’ to 1.3’ | |
| X | | South Ladder Exit Differential | Head $\leq$ 0.5’ | |
| X | | South Ladder Picketed Lead Differential | Head $\leq$ 0.3’ | |
| X | | South Ladder Depth over Weirs | Head over weir 1.0’ to 1.3’ | |

Fishway Entrances and Collection Channel:

| Yes | No | Sill | Location | Criteria | Measurements |
|---|---|---|---|---|---|
| X | | | North Shore Entrance (NSE-1) Weir Depth | ≥ 8.0' or on sill | |
| X | | | North Shore Entrance (NSE-2) Weir Depth | ≥ 8.0' or on sill | |
| X | | | North Shore Channel/Tailwater Differential | 1.0'–2.0' | |
| X | | | South Powerhouse Entrance (SPE-1) Weir Depth | ≥ 8.0' or on sill | |
| X | | | South Powerhouse Entrance (SPE-2) Weir Depth | ≥ 8.0' or on sill | |
| X | | | South Powerhouse Entrance Channel/Tailwater Differential | 1.0'–2.0' | |
| X | | | South Shore Entrance (SSE-1) Weir Depth | ≥ 8.0' | |
| X | | | South Shore Entrance (SSE-2) Weir Depth | ≥ 6.0' | |
| X | | | South Shore Channel/Tailwater Differential | 1.0' – 2.0' | |

Comments:

Auxiliary Water Supply System:

| Operating Satisfactory | Standby | Out of Service | Auxiliary Water Supply System (AWS) |
|---|---|---|---|
| No | | X | AWS Fish Pump 1 |
| Yes | | | AWS Fish Pump 2 |
| Yes | | | AWS Fish Pump 3 |

Comments: AWS Fish pump 1 is out of service for seized Wicket Gate Bushings. There is no current return to service estimate date.

**Juvenile Fish Passage Facility**

Forebay Debris/Gatewell Debris/Oil:

| Yes | No | NA | Item | Comments |
|---|---|---|---|---|
| X | | | Forebay debris load acceptable? (amount) | 122 sq yd average |
| X | | | Gatewell drawdown measured this week? | |
| X | | | Gatewell drawdown acceptable | |
| X | | | Any debris seen in gatewells (% coverage) | 0 – 30% |
| | X | | Any oil seen in gatewells? | |

Comments: Due to concern over potential future forebay debris, Trash Rack Raking for Units 2, 3 and 4 took place on June 2.

STSs/VBSs:

| Yes | No | NA | Item |
|---|---|---|---|
| X | | | STSs deployed in all slots and in service? |
| X | | | STSs in continuous-run mode (Note: if not, then STSs are in cycle-run mode)? |
| X | | | STSs inspected this week? |
| X | | | STSs inspection results acceptable? |
| | | X | VBSs differentials checked this week? |
| | | X | VBSs differentials acceptable? |

Comments: STS's were operating in continuous mode during this reporting period due to average sub-yearling Chinook and sockeye lengths being less than 120 mm.

Orifices, Collection Channel, Dewatering Structure, and Flume:

| Yes | No | NA | Item | Number open and in service |
|---|---|---|---|---|
| | X | | Orifices operating satisfactory? | 18 |
| X | | | Dewaterer and cleaning systems operating satisfactory? | |

Comments: Orifice 17 was observed with a log protruding from it on May 31 and orifice 18 was put into service until the obstruction was cleared. Orifice 18 was observed with an obstruction on June 4; orifice 17 was opened until orifice 18 could be cleared. The log in orifice 17 was removed on June 4, however, it was out of service the remainder of this reporting period because of a suspicious flow pattern.

Collection Facility: Collection into raceways for transport began at 0700 on April 23.

GBT monitoring: GBT monitoring sampling began on April 10.

Transport Summary: Every-day barging changed to alternate day barging on May 22. A total of 80,200 fish were collected and 106,139 were transported during this reporting period.

Spillway Weir: RSW went into service when Spring Spill began at 0001 on April 3.

**River Conditions**

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 |
| 143.6 | 86.3 | 58.7 | 26.7 | 59.0 | 58.0 | 3.0 | 1.8 |

*Scroll case temperatures.

**Other**

Inline Cooling Water Strainers: Cooling water strainers were inspected on May 10. No live fish were recovered. Mortalities included 44 juvenile salmon, 3 juvenile steelhead, 28 juvenile lamprey and 1 smallmouth bass.

Avian Activity: Gulls and pelicans were the primary piscivorous bird species observed in the tailrace during fish ladder inspections at Lower Monumental Dam this week.

| Date | Time | Gulls | Cormorants | Terns | Grebes | Pelicans |
|---|---|---|---|---|---|---|
| 6/1/2018 | 1210 | 1 | 0 | 0 | 0 | 0 |
| 6/2/2018 | 1130 | 0 | 0 | 0 | 0 | 0 |
| 6/3/2018 | 1200 | 0 | 0 | 0 | 0 | 3 |
| 6/4/2018 | 1130 | 0 | 0 | 0 | 0 | 0 |
| 6/5/2018 | 1200 | 0 | 0 | 0 | 0 | 0 |
| 6/6/2018 | 1130 | 0 | 0 | 0 | 0 | 1 |
| 6/7/2018 | 1135 | 0 | 0 | 0 | 0 | 0 |

Comments: Bird hazing efforts by USDA personnel ended at 2000 on June 2.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on June 2.

Siberian Prawn: Siberian prawns collected in the sample at the Juvenile Fish Facility are humanely euthanized by PSMFC and Anchor, frozen and properly disposed of in a landfill. No Siberian prawn were collected in the sample at Lower Monumental Dam for this reporting period.

Fish Rescue/Salvage: No fish rescue during this reporting period.

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

**Project: Little Goose**
Biologists: Scott St. John and Richard Weis
Dates: June 01-07, 2018

## Turbine Operation

| Yes | No | Turbine Unit Status | | |
|---|---|---|---|---|
| | X | All 6 turbine units available for service (see table & comments below for details). | **Hard** | **Soft** |
| X | | Available turbines operated within 1% peak efficiency? Constraint in effect. | X | |

Little Goose Unit Outages (OOS) and Return to Service (RTS)

| | OOS | | RTS | | |
|---|---|---|---|---|---|
| **Unit** | **Date** | **Time** | **Date** | **Time** | **Outage Description** |
| 5 | 04/14/17 | 14:11 | 07/31/18 | 17:00 | Spider and upper guide bearing repair. |
| 3 | 06/05/18 | 07:00 | 06/05/18 | 09:20 | Forced OOS camera inspection orifice 3A1 & 3A2 |
| 6 | 06/05/18 | 09:10 | 06/05/18 | 09:20 | Forced OOS unit 86 lockouts during PH switching. |
| 6 | 06/05/18 | 13:26 | 06/05/18 | 13:16 | Forced OOS unit 86 lockouts during PH switching. |
| 6 | 06/06/18 | 07:25 | 06/06/18 | 07:32 | Forced OOS unit 86 lockouts during PH switching. |

Comments: None.

## Adult Fish Passage Facility

Little Goose fish facility and Anchor QEA staff inspected the adult Fishway on June 03, 05, and 07.

Fish Ladder: None.

| Yes | No | NA | Location | Criteria | Measurements |
|---|---|---|---|---|---|
| X | | | Fish Ladder Exit Differential | Head $\leq$ 0.5’ | |
| X | | | Fish Ladder Picketed Lead Differential | Head $\leq$ 0.3’ | |
| X | | | Fish Ladder Depth over Weirs | Head over weir 1.0’ to 1.3’ | |
| X | | | Fish Ladder Cooling Water Pumps in Service | | |
| X | | | Fish Ladder Exit Cooling Water Pumps Operating Satisfactorily | | |

Fishway Entrances and Collection Channel: None.

| Yes | No | Sill | Location | Criteria | Measurements |
|---|---|---|---|---|---|
| X | | | South Shore Entrance (SSE-1) Weir Depth | $\geq$ 8.0’ | |
| X | | | South Shore Entrance (SSE-2) Weir Depth | $\geq$ 8.0’ | |
| X | | | South Shore Channel/Tailwater Differential | 1.0’ – 2.0’ | |
| | | X | North Powerhouse Entrance (NPE-1) Weir Depth | $\geq$ 7.0’ or on sill | |
| | | X | North Powerhouse Entrance (NPE-2) Weir Depth | $\geq$ 7.0’ or on sill | |
| X | | | North Powerhouse Entrance Channel/Tailwater Differential | 1.0’–2.0’ | |
| X | | | North Shore Entrance (NSE-1) Weir Depth | $\geq$ 6.0’ or on sill | |
| X | | | North Shore Entrance (NSE-2) Weir Depth | $\geq$ 6.0’ or on sill | |
| X | | | North Shore Channel/Tailwater Differential | 1.0’–2.0’ | |
| X | | | Collection Channel Surface Velocity | 1.5 – 4.0 fps | |

Comments: Adult fishway cooling pump is currently operating in accordance to MOC 18 LGS 04. Adult fishway control system is currently operating in manual mode.

Auxiliary Water Supply System:

| Operating Satisfactory | Standby | Out of Service | Auxiliary Water Supply System (AWS) |
|---|---|---|---|
| X | | | AWS Fish Pump 1 |
| X | | | AWS Fish Pump 2 |
| X | | | AWS Fish Pump 3 |

Comments: None.

**Juvenile Fish Passage Facility**

Forebay Debris/Gatewell Debris/Oil:

| Yes | No | NA | Item | Comment |
|---|---|---|---|---|
| X | | | Forebay debris load acceptable? (amount) | |
| X | | | Gatewell drawdown measured this week? | |
| X | | | Gatewell drawdown acceptable | |
| | X | | Any debris seen in gatewells (% coverage) | |
| | X | | Any oil seen in gatewells? | |

Comments: Gatewell drawdown differential measurements on units 1, 2, 3, 4 and 6 were taken on June 07 and were in criteria. There is approximately 6,000 square feet of floating woody debris currently inside the trash shear boom in the forebay.

ESBS/VBS:

| Yes | No | NA | Item |
|---|---|---|---|
| X | | | ESBSs deployed in all slots and in service? |
| | X | | ESBSs inspected this week? |
| | | X | ESBSs inspection results acceptable? |
| X | | | VBSs differentials checked this week? |
| X | | | VBSs differentials acceptable? |
| X | | | VBSs inspected this week? |

Comments: VBS differential measurements on units 1, 2, 3, 4 and 6 were taken on June 07 and were in criteria.

Orifices, Collection Channel, Dewatering Structure, and Flume:

| Yes | No | NA | Item | Number open and in service |
|---|---|---|---|---|
| X | | | Orifices operating satisfactory? | 20 |
| X | | | Dewaterer and cleaning systems operating satisfactory? | |

Comments: The limitorque motor that automatically adjusts weirs for water elevation in the primary dewatering structure is currently running in auto mode and appears to be working well.

Collection Facility: Juvenile fish facility is currently operating. The facility was changed to every other day barging on May 24. On June 6 at 12:00, Little Goose Juvenile Fish Facility switched to primary bypass in order to remove debris from the separator. The separator water was lowered, bars removed and all debris cleaned out to allow for safe fish passage. Separator was then reassembled and returned to collection mode at 14:15 (18 LGS 10 MFR Primary Bypass).

Transport Summary: Daily barging commenced on April 24 and every other day barging commenced on May 24. The collection and transportation facility operated within criteria this report period, except during a separator cleanout detailed in MFR 18 LGS 10. A total of 104,195 fish were collected, and 147,916 were transported via

barge. The descaling and mortality rates were 1.4% and 0.9% respectively. This weekly report period, 1 adult lamprey was removed from the raceways or sample and released one mile above the Dam at Little Goose Landing.

Spillway Weir: Spring spill operations began on April 03 in accordance to the Fish Passage Plan. Adjustable spillway weir crest height was set to the low crest elevation at 16:00 on April 08.

## River Conditions

River conditions at Little Goose 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 |
| 145.2 | 101.8 | 55.8 | 25.2 | 60.3 | 57.9 | 2.9 | 2.2 |

*Ladder temperature.

## Other

Inline Cooling Water Strainers: Inline cooling strainers are being inspected and results submitted every other week.

Avian Activity: Average daily piscivorous bird counts by zone for the report period at Little Goose Dam.

| Zone | Gull | Cormorant | Tern | Pelican | Grebe |
|---|---|---|---|---|---|
| Unmodified boat barrier | 0 | 0 | 0 | 0 | 0 |
| Modified boat barrier* | 0 | 0 | 0 | 0 | 0 |
| Forebay debris | 0 | 0 | 0 | 0 | 0 |
| Trash/shear boom | 0 | 0 | 0 | 0 | 0 |
| Forebay count | 0 | 0 | 0 | 0 | 0 |
| Tailrace count | 0 | 0 | 0 | 0 | 0 |

*modified boat barrier section has weights and bird spikes removed.

Invasive Species: No invasive species have been observed on the mussel station.

Siberian Prawn: Siberian prawns collected in the sample at the Juvenile Fish Facility are humanely euthanized by Oregon Department of Fish and Wildlife and Anchor, frozen and properly disposed of in a landfill. No Siberian prawns were collected in the sample at Little Goose Dam for this reporting period.

Gas Bubble Trauma (GBT): GBT monitoring was performed on June 04. Personnel examined 100 fish and 1 were found to have symptoms of GBT.

Fish Rescue/Salvage: None.

Research: PNNL is currently monitoring hydrophones and associated equipment for an acoustic telemetry study.

**Project: Lower Granite**
Biologists: Elizabeth Holdren and Stephen Hampton
Dates: June 1- June 7, 2018

## Turbine Operation

| Yes | No | Turbine Unit Status | | |
|---|---|---|---|---|
| | X | All 6 turbine units available for service (see table & comments below for details). | **Hard** | **Soft** |
| X | | Available turbines operated within 1% peak efficiency? Constraint in effect. | X | |

Lower Granite Unit Outages (OOS) and Return to Service (RTS)

| | OOS | | RTS | | |
|---|---|---|---|---|---|
| **Unit** | **Date** | **Time** | **Date** | **Time** | **Outage Description** |
| 1 | 6/7 | 0711 | 6/7 | 1143 | ESBS Exchange |

Comments: The ESBS in slot 1A was exchanged with the spare ESBS due to an SQO ground issue.

## Adult Fish Passage Facility

Lower Granite and Anchor QEA staff inspected the adult fishway on June 2, 3, 4, and 6.

Fish Ladder:

| Yes | No | NA | Location | Criteria | Measurements |
|---|---|---|---|---|---|
| X | | | Fish Ladder Exit Differential | Head ≤ 0.5’ | |
| X | | | Fish Ladder Picketed Lead Differential | Head ≤ 0.3’ | |
| X | | | Fish Ladder Depth over Weirs | Head over weir 1.0’ to 1.3’ | |
| | X | | Fish Ladder Cooling Water Pumps in Service | | |
| | | X | Fish Ladder Cooling Water Pumps Operating Satisfactorily | | |

Comments: None.

Fish Ladder Entrances and Collection Channel:

| Yes | No | Sill | Location | Criteria | Measurements |
|---|---|---|---|---|---|
| X | | | South Shore Entrance (SSE-1) Weir Depth | ≥ 8.0’ | |
| X | | | South Shore Entrance (SSE-2) Weir Depth | ≥ 8.0’ | |
| X | | | South Shore Channel/Tailwater Differential | 1.0’ – 2.0’ | |
| | X | X | North Powerhouse Entrance (NPE-1) Weir Depth | ≥ 8.0’ or on sill | 7.8 |
| | X | X | North Powerhouse Entrance (NPE-2) Weir Depth | ≥ 8.0’ or on sill | 7.8 |
| X | | | North Powerhouse Entrance Channel/Tailwater Differential | 1.0’–2.0’ | |
| X | | | North Shore Entrance (NSE-1) Weir Depth | ≥ 7.0’ or on sill | |
| | | | North Shore Entrance (NSE-2) Weir Depth | ≥ 7.0’ or on sill | OOS |
| X | | | North Shore Channel/Tailwater Differential | 1.0’–2.0’ | |
| X | | | Collection Channel Surface Velocity | 1.5 – 4.0 fps | |

Comments: NPEs out of criteria readings of 7.8 feet were likely due to wave action affecting the ability to accurately read the staff gauge. The gates were in criteria on the digital reading.

Auxiliary Water Supply System:

| Operating Satisfactorily | Standby | Out of Service | Auxiliary Water Supply (AWS) |
|---|---|---|---|
| X | | | AWS Fish Pump 1 |
| | | X | AWS Fish Pump 2 |
| X | | | AWS Fish Pump 3 |

Comments: AWS pump 2 is out of service for drive shaft bearing repair.

**Juvenile Fish Passage Facility**

Forebay Debris/Gatewell Debris/Oil:

| Yes | No | NA | Item | Comments |
|---|---|---|---|---|
| X | | | Forebay debris load acceptable? (amount) | 129 $yd^2$ |
| X | | | Gatewell drawdown measured this week? | |
| X | | | Gatewell drawdown acceptable | |
| | X | | Any debris seen in gatewells (% coverage) | |
| | X | | Any oil seen in gatewells? | |

Comments: None.

ESBSs/VBSs:

| Yes | No | NA | Item |
|---|---|---|---|
| X | | | ESBSs deployed in all slots and in service? |
| | X | | ESBSs inspected this week? |
| | | X | ESBSs inspection results acceptable? |
| X | | | VBSs differentials checked this week? |
| X | | | VBSs differentials acceptable? |

Comments: None.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe:

| Yes | No | NA | Item | Number open and in service |
|---|---|---|---|---|
| X | | | Orifices operating satisfactory? | 18 |
| | X | | Dewaterer and cleaning systems operating satisfactory? | |

Comments: Primary dewaterer floor screen brushes, side screen brushes, and the pneumatic screen cleaners are being operated in manual mode by powerhouse operators due to mechanical and programing issues with the new system. Overflow weirs in groups A. B, and C remain in auto; weir group D continues to be in manual to achieve optimal flow from the PDW to the transport flume. Problems are being investigated and troubleshooting the system for needed repairs is ongoing.

Collection Facility: Operational modifications continue as needed. The facility is in collection for transport mode.

Transport Summary: Every other day barging continues.

Spill/Spillway Weir: Spring spill operation continues at court ordered gas cap levels.

**River Conditions**

River conditions at Lower Granite 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 |
| 153.6 | 103.9 | 45.4 | 30.7 | 60 | 56.2 | 3.4 | 2.1 |

*Cooling water intake temperature.

**Other**

Inline Cooling Water Strainers: Cooling water strainers were last inspected on May 31 and reported in the previous weekly report.

Invasive Species: No mussels were present during the June 3 inspection.

Siberian Prawn: No Siberian prawns were collected in the sample for this reporting period.

Avian Activity: Biologist daily piscivorous bird counts at Lower Granite Dam.

| Date | Time | Gulls | Cormorants | Caspian Terns | Pelicans |
|---|---|---|---|---|---|
| 6/1/2018 | 1530 | 0 | 0 | 0 | 11 |
| 6/2/2018 | 1300 | 0 | 0 | 0 | 0 |
| 6/3/2018 | 1551 | 0 | 0 | 0 | 14 |
| 6/4/2018 | 0745 | 1 | 0 | 0 | 0 |
| 6/5/2018 | 1520 | 4 | 0 | 0 | 17 |
| 6/6/2018 | 1322 | 1 | 2 | 0 | 17 |
| 6/7/2018 | 1230 | 0 | 1 | 0 | 8 |

Gas Bubble Trauma (GBT) Monitoring: Fish are collected from the separator and examined for GBT Thursdays. No symptoms of GBT were observed this week.

Adult Fish Trap Operations: Adult trap is operating Monday through Friday with a 28% sample rate.

Fish Rescue/Salvage: N/A

Research:

Idaho Fish and Game (IDFG) Genetic Stock Identification
Fish collected as part of the Lower Granite condition sample are used to enumerate and characterize age composition and genetic stock profiles of naturally producing yearling chinook and juvenile steelhead. IDFG will sample Monday through Friday through mid-June with a goal of collecting 2,000-5,000 yearling chinook and juvenile steelhead genetic samples.

Nez Perce Tribe (NPT)/U. of Idaho (UI)/Columbia River Intertribal Fisheries Commission (CRITFC) – Kelt Study
Collection of adult steelhead kelt from Lower Granite juvenile separator for NPT rehabilitation program began April 1 with the first collection being worked up April 2. This research investigates steelhead kelt physiology and endocrinology to evaluate the feasibility and success of rehabilitating strategies. Selected kelts collected at Granite are transported by NPT to Dworshak National Fish Hatchery for reconditioning and later release 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 goals are to characterize 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 2017 in natal streams and are diverted to the Sort-By-Code tanks at LGR.

National Marine Fisheries Service (NMFS) In-River Survival: NMFS PIT-tag Chinook and steelhead smolts for their Survival Study April through early June 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) Transportation Study: NMFS staff is collecting and PIT-tagging yearling Chinook salmon and steelhead smolts for the Transportation Evaluation Study to compare smolt-to-adult returns of transported smolts to the smolt-to-adult returns of in-river migrating smolts.

PNNL System Survival Study

This study will evaluate the effects of increased spill on the passage and in-river survival of yearling Chinook salmon and juvenile steelhead migrating through the Snake and Columbia River hydro-system. The study will also evaluate the effects of increased spill on the passage of adult Chinook salmon and steelhead at Little Goose Dam during 2018 spring gas cap spill. Collection of yearling chinook and juvenile steelhead at Lower Granite began April 15.