U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#08-2013

Project: McNary
Biologists: Carl Dugger and Bobby Johnson
Dates: April 19 - 25, 2013

Turbine Operation

McNary had 11 to 12 units available for power generation this week. On April 1, the hard constraint one percent criteria began. No units ran outside the criteria. Unit outages are recorded in Table 1.

Table 1. Unit Outages at McNary Dam.

Units	Outage Dates	Outage Length	Reason
3	Jun 4, 2012 – Unknown	About one year.	After rewind, thrust bearing.
14	Sep 18 – May 2	Seven months.	Turbine bearing issues continue.
10	Mar 31 - Apr 19	20 days.	Turbine bearing issue resolved.
11, 12 & 13	Apr 19	2.5, 2.3 & 1.1 hours each.	Trash rack cleaning.
1 & 2	Apr 22	3.0 & 1.3 hours each.	Trash rack cleaning.
4, 5 & 6	Apr 24	2.6, 3.1 & 2.5 hours each.	Trash rack cleaning.
6 & 7	Apr 25	1.3 & 4.5 hours each.	Trash rack cleaning.

Adult Fish Passage Facilities

As mentioned in last week's report, on April 19 at 1111 hours, the project resolved an issue with Washington exit weir 337, and returned the ladder to automatic operation.

On April 19, 21 and 24, the McNary fisheries biologists performed measured inspections of the adult fishways. During primary bypass operations, the fisheries staff helped to monitor the picketed leads. Visual fish counts continued.

Fish Ladders' Exits: During the inspections, both ladder exits met all Fish Passage Plan criteria. The project cleaned both exits' picketed leads regularly. On April 19, the operators adjusted the Washington exit's set points. Debris quantity along the Washington shore has been fluctuating. At the Oregon exit, there were three false traveling screen alarms which the operator reset. Our differential monitoring of the screens revealed no problems.

Fishway Entrances and Collection Channel: At the Washington ladder entrance, all inspection points were in criteria. Spill turbulence is causing calibration drifts which are very difficult to

correct. At the Oregon ladder entrances, all points were in criteria. However, by week's end, we noted SFEW1 was again beginning to drift out of criteria. We have requested the electricians to check the weir.

The Oregon ladder collection channel velocity averaged 2.9 feet per second. This week, after a rain storm, we noticed moisture in the meter's readout container near the electrical components and are looking into sealing the canister better.

Auxiliary Water Supply System: For the report week, the Wasco county PUD in the Washington ladder and no interruptions in service. For the Oregon ladder, fish pumps 1 and 3 operated all week with 30 degree blade angles with no interruptions in service. Pump 2 remains out of service for major overhaul which will require a contract. The juvenile facility continued to supply the usual 450 cfs to the north powerhouse pool.

Juvenile Fish Passage Facility

The spring season with alternating days of primary and secondary bypass with the switch occurring every morning at 0700 hours continued. No deviations from this schedule occurred. We bypassed 94,894 smolts and 2,750 juvenile lampreys this week.

Forebay Debris/Gatewell Debris/Oil: For the week, forebay debris was light to moderate with most of it being at the powerhouse. Trash rack cleaning, weather, debris infusion and project operations affected debris dispersal.

The highest trash rack different the fisheries staff measured this week was 1.9 feet. The project cleaned racks at units 1 to 7 and at units 11 to 13. We removed approximately 31 ten-yard truck loads of debris (310 cu yds) which consisted mostly of tumble weeds. The project plans to continue cleaning trash racks next week. We cleaned unit 3 while it was out of service. We observed one lost yearling Chinook smolt and retrieved one live juvenile lamprey from the debris.

We noted no problems in the gatewell slots. However, the fisheries staff did remove spillage (from trash rake racking) from the slots and the general maintenance crew removed one 10 foot long by two foot diameter log.

ESBSs/VBSs: All ESBSs are installed except those in units 3 and 14 (these units are out of service). This week, the technical staff reprogrammed all the ESBS PLC controls. We will begin camera inspections in mid May. VBS differential monitoring revealed no screens out of criteria and none were cleaned.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: For the week, we had 42 orifices open with no problems observed. When cleaning trash racks, we closed the orifices at the affected unit and opened spare orifices in adjacent units. All systems operated well in automatic mode. The transition screen cleaning device remains out of service until it can be examined during a channel dewatering. The fisheries staff continues to monitor the collection channel during primary bypass operatins.

Transportation Facility: During the spring fish passage season, both primary and secondary 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 continues to occur only on secondary bypass days.

The sample gates are on every other day during secondary bypass days. The gates functioned well. The primary PIT tag system remains off as the bypass lines provide a better route for the fish than the PIT tag system lines. PSMFC employees performed the weekly test of the PIT system. The secondary PIT/bypass gates remain off and open for bypass season.

We continued to do ice block checks of the return to river lines, even though the bypass outfall is too far away to see the blocks exit the pipe even with binoculars.

Transport Summary: No fish transport is taking place at this time.

River Conditions

River conditions during the week are outlined in Table 2 as provided by the PSMFC smolt monitoring staff. The data day runs from 0700 hours to 0700 hours.

The spring spill season which calls for 40 percent of river flow being spilled with both TSWs in operation continued. On April 19, due to spill in excess of powerhouse capacity 43 percent of total river flow was spilled.

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
239.5	201.0	99.5	80.9	49.2	47.5	6.0	6.0

*****Control room data.

Other

Inline Cooling Water Strainers: The project will examine the main unit cooling water strainers again in early May.

Invasive Species: On April 24, the zebra mussel station examination revealed no problems.

Avian Activity: We continue bird counts with each zone being observed once a day usually in the morning. In the forebay, we observed a high count of 70 grebes with an occasional pelican, cormorant, gull or osprey seen. We also noted one raft of gulls during a different inspection. Finally, we noted pelicans, gulls and cormorants on the rocks by the Washington boat dock.

We noted 3 grebes in the gatewell slots. We removed 2 with 1 passing to the collection channel and out of the system.

In the tailwater area, we had high counts of 59 gulls and 45 terns with an occasional cormorant or pelican noted. Most of the birds were in the spill basin. We observed high counts of nine terns and five gulls by the bypass outfall.

High bird counts maybe due to birds migrating through.

Hazing personnel continued to work seven days a week. On April 21, a second hazing shift began so all daylight hours are covered each day. Also, lethal take of gulls has been allowed for this year. On April 23, the fisheries staff deployed the propane hazing cannons. Finally, the hazing water cannon continued to function well.

Research: The FGE study continues at units 6, 7, 12 and 13. GBT examinations continue. The Oregon exit traveling screen study will begin soon.

Project: Ice Harbor
Biologist: Mark Plummer
Dates: April 19 - 25, 2013

Turbine Operation

Turbine units 1- 4 and 6 are in service. Turbine unit 5 remained out of service due to blade cracks. Turbine units were out of service for short periods April 23 and 24 in support of STS/VBS inspections.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fish ways April 22, 23, and 24.

Fish Ladders: The north and south shore adult fish ladder inspection areas (picketed leads, head differentials, fish way exits, and depth over weirs) were within criteria.

Fishway Entrances and Collection Channel (inspection date order): The south shore entrance (SFE) was off sill with a depth of 8.5 feet, off sill with a depth of 8.9 feet, and on sill with a depth of 8.8 feet. The north powerhouse entrance (NFE) was off sill with a depth of 8.6 feet, off sill with a depth of 8.8 feet, and on sill with a depth of 9.4 feet. The north shore entrance (NSE) was on sill with a depth of 7.7 feet, on sill with a depth of 7.8 feet, and on sill with a depth of 7.7 feet. Fishway entrance criterion is 8 feet depth, greater than 8 feet depth, or on sill. All channel/tailwater differentials were in criteria. Channel/tailwater differential criteria are 1 – 2 feet.

Auxiliary Water Supply System: Two of the 3 north shore fish pumps were operated without problems. Six of 8 south fish pumps are in service. All south fish pumps are available for operation.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: No problems to report. Fish ladder exits are clear of debris and the bubblers are operating satisfactorily.

STSs/VBSs: STSs are in operation. No problems were found on the April inspections. May STS/VBS inspections are scheduled for May 21 and 22. Turbine strainer inspections will be done at the same time.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile bypass is "watered up" with 20 open orifices.

Juvenile Bypass Facility: No problems to report.

Fish Sampling: The first sample took place April 8. Sampling days alternate from Monday and Wednesday to Tuesday and Thursday each week.

Removable Spillway Weir: The RSW is in operation. Spill in support of fish passage began April 3, 2013.

Fish Sampling:

April 22:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	18	0	0	0
UC-CH	12	1	0	0
C-CH-O	---	---	---	---
UC-CH-O	---	---	---	---
C-SH	65	1	0	7
UC-SH	10	3	0	0
C-COHO	---	---	---	---
UC-COHO	---	---	---	---
C-SOCK	---	---	---	---
UC-SOCK	---	---	---	---
TOTAL	105	5	0	7

April 24:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	20	1	0	0
UC-CH	13	0	0	0
C-CH-O	---	---	---	---
UC-CH-O	---	---	---	---
C-SH	54	3	0	4
UC-SH	7	0	0	0
C-COHO	---	---	---	0
UC-COHO	---	---	---	---
C-SOCK	---	---	---	---
UC-SOCK	---	---	---	---
TOTAL	94	4	0	4

River Conditions

River conditions during the week are outlined in Table 1.

Table 1. River conditions at Ice Harbor Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
61.5	47.0	47.7	37.0	51	50	4.6	4.6

*Unit 1 scrollcase temperature.

Other

Inline Cooling Water Strainers: Main turbine cooling water inspections took place on April 25. Motalities recovered included 4 juvenile lamprey from unit 4, 3 juvenile lamprey from unit 6 and 1 juvenile catfish from unit 1.

Invasive Species: No invasive species were detected this week.

Avian Activity: Formal bird counts began April 8 and are in progress. Hazing activities began April 1.

Research: There is no research is in progress at this time.

Project: Lower Monumental
Biologists: Bill Spurgeon and Elizabeth Lindsey
Dates: April 19 - 25, 2013

Turbine Operation

The units are being operated in hard constraint of the 1% operation criteria.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and PSMFC/State biologists on April 19, 20, 21, 24, and 25.

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 NSE 2 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.

SPE 1 and SPE 2 weir gates were in sill criteria (criteria: ≥ 8' or on sill) on all inspections. While on sill, the gate depth readings were 6.3', 6.0', 6.1', 5.5', and 5.9 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. While on sill, the gate depth readings were 6.7', 6.6', 6.3', 6.1', and 5.9 feet. SSE 2 was in criteria (6' above sill) on all inspections. South shore channel/tailwater head was in criteria (1'-2') this week.

Auxiliary Water Supply System: AWS pumps 1 and 3 were operated throughout this period. Two pump operation will continue until bearing repair and shaft alignment work is completed on pump 2, approximately July 15.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 0.0 square yards of forebay debris observed during this period. Gatewell debris ranged from 0-90% surface coverage. The 90% reading was taken on April 20 in gatewell 3A. Gatewell debris was removed on April 22. No oil was observed in gatewells.

STSs/VBSs: STS operation was changed to continuous run mode on April 9 due to the average length of sampled sockeye being less than 120 mm.

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

Collection Facility: Collection for condition sampling began on April 1. Subsequent collection for condition monitoring is occurring every third day. Collection for transport is scheduled to begin at 0700 hours on May 7.

Transport Summary: No transport. The first barge is scheduled to depart on May 8.

River Conditions

River conditions during the week are outlined in Table 1.

Table 1. River conditions at Lower Monumental Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature (^{o}F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
60.7	47.4	31.0	29.6	49.0	47.5	4.4	3.1

*Scrollcase temperatures.

Other

Spring spill operation is occurring.

Inline Cooling Water Strainers: Cooling water strainers were inspected on April 2. No live lamprey were recovered. Recovered mortalities included 13 juvenile lamprey, 1 juvenile salmon, 1 juvenile channel catfish, and 26 Siberian prawns.

Invasive Species: There were no zebra mussels observed at the monitoring stations on April 1.

Avian Activity: Formal bird counts have been in progress since April 1. Bird hazing activities also began April 1.

Research: There is no research is in progress at this time.

Project: Little Goose
Biologists: Richard Weis
Dates: April 19 - 25, 2013

Turbine Operation

Turbine units 1 through 6 were available for service throughout most of this report period. Unit 3 was forced out of service on April 24 due to exciter regulator problem. Unit 3 was returned to service on April 25. Turbine units were operated within the 1% criteria.

Adult Fish Passage Facility

USACE and ODFW fisheries biologists performed measured inspections of the adult fishway April 19, 21 and 24.

Fish Ladder: The ladder exit head differentials remained steady at 0.1 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs remained steady at 1.1 feet (criteria 1.0-1.3 ft.) and picketed lead head differentials ranged between 0.0 and 0.1feet (criteria $\leq$ 0.3 ft.). No debris was observed at the picketed leads or the ladder exit. The air bubbler used to prevent debris from collecting near the ladder exit operated satisfactorily.

Fishway Entrances and Collection Channel: Channel to tailwater head differentials ranged between 1.0 and 2.2 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 8.3 and 9.0 feet (criteria $\geq$8.0 ft). As a result of two pump operations and decreased channel to head differentials, NPE2 remained closed. NPE1 weir rested on sill and depths ranged 5.4 and 5.5 feet (criteria $\geq$7.0 ft or on sill). NSE weirs are at fixed elevations of 532.0 feet and depths ranged between 5.3 and 5.5 feet (criteria $\geq$ 6.0 ft.). Collection channel surface water velocities (criteria 1.5 fps) measured 2.6 fps for the single reading near the NSE. Surface water velocities at the junction pool were not measureable due to up-welling from diffuser 2 that dominated over lateral laminar flows.

Auxiliary Water Supply System: Fish pumps 1 and 2 operated within criteria ranging between 77 and 78 rpm. Fish pump 3 remains out of service and is undergoing repairs.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: Woody debris observed this week ranged from 200 to 6,000 square feet inside the trash shear boom. Drawdowns measurements were performed on Turbine units 1 and 2 on April 24. All measurements were within proper operating range and indicated no significant buildup of debris on trash racks, ESBSs and VBSs.

Spillway Weir: The spillway weir operated in the high crest position.

ESBS/VBS: All ESBSs operated within criteria this report period.

Orifices, Collection Channel, Dewatering Structure, Flume: The juvenile collection system was operated throughout this period with 22 open orifices.

Transportation Facility: The facility switched from primary to secondary bypass operations from April 23 at 0700 hours to 0700 hours the following day to collect a 24 hour sample of fish for condition sampling. Collection totaled an estimated 32,271 fish. All fish were bypassed. The descaling and mortality rate was 0.7% and 0.0% respectfully.

Transport Summary: Transport operations are scheduled to begin on May 02 with the first barge leaving on May 03.

River Conditions

River conditions during the week are outlined in Table 1.

Table 1. River conditions at Little Goose Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
55.1	45.1	17.5	13.5	47.9	47.7	3.8	3.3

*Ladder temperature.

Other

Inline Cooling Water Strainers: On April 24 cooling water strainers were inspected; 2 salmonids and 2 juvenile lamprey mortalities were removed.

Invasive Species: The zebra mussel substrate monitor was inspected on April 7. No mussels were observed.

Avian Activity: Maximum bird count form single survey included 22 cormorants, 20 gulls and 3 pelicans. USDA-APHIS bird hazing started on April 1 and continued through this report period.

Research: Gas Bubble Trauma research was conducted on April 22. No signs of GBT were observed.

Project: Lower Granite
Biologists: Mike Halter and Ches Brooks
Dates: April 19 - 25, 2013

Turbine Operation

Lower Granite had all turbine units except for unit 6 available for power generation at the beginning of the report period. Turbine unit 6 is out of service because the project does not yet have an ESBS fish screen ready to be installed. At the present time, the project hopes to have a screen installed in slot 6C by May 10. Previously, unit 6 was operated with a screen burrowed from unit 5. This screen was returned when unit 5 became operational. Turbine units 6, 3, 1, 5 and 2 respectively, were rotated out of service from 0650 hours to 1600 hours on April 19 in support of VBS/ESBS video inspections. Turbine unit 4 was out of service from 0703 until 0924 hours on April 20 in support of the same operation.

Adult Fish Passage Facility

On April 19 - 21 & 24 the Lower Granite fisheries biologists performed measured inspections of the adult fishway system.

Fish Ladder: All criteria were met.

Fishway Entrances and Collection Channel: Head differential readings remained within criteria at all fishway entrances during the period inspections with the exception of the north shore entrances on the April 24 inspection when the differential was 0.8 feet (criterion 1.0 – 2.0 feet).

Weir depths at the south shore fishway entrances also met criteria during all weekly inspections. The north powerhouse fishway entrances were on sill during all inspections this week with depths of 5.3– 5.7 feet due to tailwater elevations below 636.0 feet (these gates bottom out at elevations below 636.0 feet). Weir depths at the north shore entrances were out of criteria all week with depths ranging from 3.1 to 5.3 feet (criterion $\geq$ 7.0 feet). At this time, only north shore entrance 1 can adjust its depth relative to the tailwater elevation. North shore entrance 2 is manually set at a compromise depth of 630.0 feet. Normally weir depth readings at the north shore entrances are sacrificed in order to maintain the requisite 1.0 foot of head differential.

Velocity readings in the adult fishway collection channel transition pool area ranged from 0.92 to 1.16 feet per second and averaged 1.06 feet per second.

Auxiliary Water Supply System: Fish pumps 2 and 3 were operated until the morning of April 22. On the morning of April 22, the project switched out fish pump 2 with fish pump 1 in order to evaluate fish pump 1 following motor rewedge work. Fish pump 1 and fish pump 3 are being operated with fish pump 2 being held in reserve.

Juvenile Fish Passage Facility

Fish collection numbers were highly variable during the week. Sample rates during the week ranged from 1% up to 5% in order to help accommodate fish marking needs for testing the prototype overflow weir and 14-inch orifice in the collection gallery. All fish other than those sampled are being diverted back to mid-river through the bypass pipe (secondary bypass).

Forebay Debris/Gatewell Debris/Oil: The amount of forebay debris varied during the week due to wind strength and direction; none was removed.

ESBSs/VBSs: VBS/ESBS video inspections took place on April 19-20.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: Orifices are being backflushed every 3 hours around the clock in an attempt to keep them free of materials that might impact fish passage.

Transportation Facility: General barge transport operations from Lower Granite will begin on April 28.

Transport Summary: The research barge scheduled to depart on Thursday, April 25 was postponed until Friday, April 26 due to problems with the fish pump used to transfer fish to the NOAA marking complex. The routine general transport barge will depart Lower Granite on April 28. Every day barging from Lower Granite will begin on May 2. Every day barging from Little Goose and Lower Monumental is scheduled to begin on May 3 and May 8, respectively.

Removable Spillway Weir: Mandatory spill operations began at 0000 hours on April 3. The RSW was operated in support of general spill operations.

River Conditions

River conditions during the week are outlined in Table 1.

Table 1. River conditions at Lower Granite Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
54.7	45.0	20.4	20.2	48.9	48.4	4.7	4.0

*Scrollcase temperature.

Other

Video counts in the adult fish ladder counting room began on March 1 and concluded on March 31. Visual counting between the hours of 0400 and 2000 began on April 1.

Inline Cooling Water Strainers: Cooling water strainers were last inspected for lamprey entrainment on March 27. A total of 44 lamprey were found in the strainers over a combined run time of 1,389.3 unit hours. The next cooling water strainer inspections are scheduled for April 29-30.

Invasive Species: The zebra mussel substrate near the adult fishway exit was last examined for zebra mussels on April 1. No evidence of zebra mussels was found. The next inspection is scheduled for early May.

Avian Activity: Formal bird counts and hazing started on April 1. Hazing is presently being conducted daily from approximately 6:00 am till approximately 8:00 pm. This is very effective and kept the gull activity in the tailrace to a minimum.

Adult Fish Trap: The adult fish trap was "watered up" and sampling began on March 4. The initial sample rate was 21%. On Wednesday April 24 at 1500 hours the sample rate was increased to 25%. Since in 2013 adult trapping will only be conducted Monday thru Friday the 25% sample rate represents an overall weekly sample rate of 21%. Genetic 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.

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.

Biological Evaluation of Prototype Overflow Weir and 14 inch Orifice: A prototype overflow weir and enlarged 14 inch orifice were installed into intake gatewell 5A during the winter for biological testing from April 15-June 30 and will be evaluated by UC Davis, Biomark and Blue Leaf Environmental. Their goal is to release 350 hatchery steelhead and 350 hatchery yearling Chinook into the gatewells six days a week, beginning April 15. When yearling spring/summer fish numbers decline 350 hatchery subyearling Chinook will be collected and released.

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.

United States Fish and Wildlife Service (USFWS), United States Geological Service (USGS), Pacific Northwest National Laboratory (PNNL) and National Marine Fisheries Service (NMFS) –Holdover fall Chinook Study: This study is part of the regional discovery based research titled "Investigating passage of ESA-listed fall Chinook salmon at Lower Granite Dam during winter when the fish bypass system is not operated". This is a cooperative study of the survival and prevalence of the reservoir-type life history of juvenile fall Chinook salmon in the Snake River and the passage of subyearlings and reservoir-type fish through the lower Snake River. This part of the study collects PIT-tagged yearling fall Chinook holdovers in the Sort by Code tanks at LGR from the 2012 release of Dworshak hatchery fish.

National Marine Fisheries Service (NMFS)-Monitoring the Migrations of Wild Snake River Spring/Summer Chinook: This study is done to monitor the migration behavior and survival of wild spring/summer Chinook salmon in the Snake River basin. The specific goals are to characterize the migration timing and estimate parr-to-smolt survival to LGR of different 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 2012 in natal streams and are diverted to the Sort by Code tanks at LGR.