U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#42-2019

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: December 13 to 19, 2019

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(s)	**Date**	**Time**	**Date**	**Time**	**Outage Description**
5	05/23	0943	02/13/20	NA	Turbine blade packing.
14	08/19	1221	12/18	0932	Thrust bearing.
2	12/09	0829	12/19	1627	Annual maintenance.
1	12/16	0823	12/16	1617	ESBS's raised, study equipment removed.
10	12/16	0831	12/16	1610	ESBS's raised, study equipment removed.
12	12/17	0700	12/17	1536	ESBS's raised.
13	12/17	0701	12/17	1112	ESBS's raised.
11	12/17	1115	12/17	1614	ESBS's raised.
9	12/18	0650	12/18	1049	ESBS's raised.
8	12/18	0652	12/18	1319	ESBS's raised.
7	12/18	1051	12/18	1616	ESBS's raised.
6	12/19	0721	12/19	1108	ESBS's raised.
4	12/19	1227	12/19	1639	ESBS's raised.

Comments: All return to service dates are subject to change. The soft 1% peak efficiency constraint continued. At times, units ran outside the constraint at BPA's request.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on December 13, 15 and 18.

The Washington shore ladder was switched to orifice flow, which aids in fish evacuation, on December 15 at 0800 hours. The Wasco County PUD was removed from service the morning of December 16. The auxiliary water conduit stop logs were installed by 0923 hours. The exit stop logs were installed by 1300 hours, which fully removed the ladder from service for an early start to winter maintenance. The entrance stop logs were installed on December 17 by 1655 hours.

Several dozen sticks, five partial orifice blockages and one small log from the count station were removed on December 16, right after the ladder was removed from service. One 30 galloon can of debris and a dozen sticks were removed from the count station to the exit on December 17. All of the lamprey ports at the base of the exit weirs were found partially blocked with woody debris.

Dewatering the entrance pool has not yet occurred. A very small amount of oil from a dewatering pump and possibly the PUD system was removed from the entrance area on December 19.

The duplex PIT tag antennas have been abandoned by the researcher and will be removed this winter. Both antennas were damaged. Also, other winter maintenance will begin. The Washington shore ladder is scheduled to return to service on January 16.

Fish Ladder Exits:

Yes	No	Location	Criteria	Comments
X		Oregon Exit	Head over weir 1.0' to 1.3'	
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 and Washington exits.

At the Oregon shore exit, due to station service upgrades, a power outage occurred on December 13, from 1237 to 1645 hours. Owing to very little forebay elevation change, the exit values remained in criteria. After alarming, the exit and weir 338 were reset on December 18.

At the Washington shore exit, the ladder values remained in criteria until going to orifice flow on December 15.

Fishway Entrances and Collection Channel:

Yes	No	Sill	Location	Criteria	Comments
X			North Oregon Entrance Head Differential	1.0' – 2.0'	
	X		NFEW2 Weir Depth	$\geq$ 8.0'	7.9' on Dec 13.
X			NFEW3 Weir Depth	$\geq$ 8.0'	
X			South Oregon Entrance Head Differential	1.0' – 2.0'	
X			SFEW1 Weir Depth	$\geq$ 8.0'	
X			SFEW2 Weir Depth	$\geq$ 8.0'	
X			Oregon Collection Channel Velocities	1.5 to 4.0 fps	Averaged 1.9 fps.
X			Washington Entrance Head Differential	1.0' – 2.0'	
X			WFE2 Weir Depth	$\geq$ 8.0'	
	X		WFE3 Weir Depth	$\geq$ 8.0'	2.3' on Dec 13.

Comments: The out of criterion point listed above for the Oregon ladder entrance weir NFEW2 was possibly due to calibration or set point drifts and/or control issues. Also, NFEW2 was again found in manual mode on December 15. Finally, the control system panel view at the north powerhouse entrance has been working intermittently.

Oregon ladder entrance weir SFEW2 remained in manual mode. SFEW1 has been able to maintain the pool differential and no out of criteria points were recorded.

The out of criterion point listed above for the Washington ladder entrance weir W3 was due to weir W2 being jammed and in manual mode. In order to maintain the pool differential, the operators have raised W3 out of criterion and left it in manual mode. The entrance remained in this condition until being removed from service on December 16.

Auxiliary Water Supply System:

Operating Satisfactory	Standby	Out of Service	Auxiliary Water Supply System (AWS)
		Yes	WA shore Wasco County PUD Turbine Unit
Yes			WA shore Wasco PUD Bypass
		Yes	Oregon shore Fish Pump 1, OOS to September 12, 2020.
Yes			Oregon shore Fish Pump 2, Blade angle: 23 to 24°
Yes			Oregon shore Fish Pump 3, Blade angle: 26°
Yes			OR North Powerhouse Pool supply from juvenile fishway

Comments: The Wasco County PUD unit will remain out of service until the end of the winter maintenance season, which began on December 16. The bypass system functioned satisfactorily until it was removed from service on that date.

The juvenile system was switched to emergency bypass and no longer supplied flow to the Oregon north powerhouse pool on December 17. This entrance will be more subject to weir depths being out of criteria now.

Juvenile Fish Passage Facility

The juvenile system was switched to emergency bypass in preparation for the winter maintenance season on December 17. The juvenile facility was fully winterized that day. In the juvenile channel, orifices will be closed and fish will be evacuated from the channel on December 20. Light maintenance continued throughout the system. At the facility, the full flow flume adult flush line valve and the separator will be repaired this winter.

Forebay Debris/Gatewell Debris/Oil:

Yes	No	NA	Item	Comments
X			Powerhouse forebay debris load acceptable?	Minimal to light.
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: Debris was a mixture of aquatic vegetation and woody material. New incoming debris was minimal. The spillway debris load would be described as minimal. Much of the debris moved between the powerhouse and the Oregon shoreline, which is causing the debris to dissipate.

There are no problems to report. Gatewell slots will be examined and trash rack differentials will be measured during the winter.

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 cycles for the screens in units 6, 8, 10 and 13 along with the screen in 2A slot remained in timer mode until the ESBSs were raised. After the unit returned to service and before the ESBS was raised, the brush cycle for the screen in 2A slot appeared to be occasionally missing a cycle. This could have been caused by a motor amperage issue.

The ESBSs were raised in units 1, 4 and 6 through 13 on December 16 to 19. The screens in units 2 and 3 will be raised on December 20, which will completed ESBS removal for the season. No camera inspections occurred as the screens were examined as they are raised. No juvenile lamprey have been observed on the screens to this point.

Daily VBS differential monitoring will continue until all ESBSs are raised. No high differentials were recorded and no screens were cleaned.

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

Yes	No	NA	Item	Number of orifices in service
X			Orifices operating satisfactory?	42
X			Dewaterer and cleaning systems operating satisfactory?	

Comments: There were 42 orifices in use when in primary and emergency bypass. Orifice will be closed for the winter maintenance season on December 20. Orifice operators will be examined next March.

The system was switched from primary to emergency bypass on December 17, from 0900 to 1130 hours. The channel systems were winterized. Before this, the rectangular screen brush appeared to need lubrication, which will occur during the winter maintenance outage. There are no other problems to report.

Bypass Facility:

Yes	No	NA	Item
		X	Sample gates on?
		X	PIT-tag sampling system on?

Comments: All systems remained out of service with light maintenance ongoing. Final winterization occurred on December 17.

TSW Operations:

The TSWs in spillbays 19 and 20 remained closed for the season.

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
132.6	105.9	0.0	0.0	45.0	44.0	6.0	6.0

Comments: The above data is from the control room.

Other

Inline Cooling Water Strainers: The next cooling water strainer inspections will occur on January 7.

Avian Activity: Casual avian observations continued. Gull numbers appear to be declining. Cormorant numbers were lower but stable. There appears to be more roosting activity than feeding.

Gull activity declined in the powerhouse zone with fewer birds feeding and roosting.

In the spill zone, gull and cormorant numbers were lower. All birds were roosting. Much fewer gulls and cormorants roosted on the top of the navigation lock and Washington ladder walls.

In the bypass outfall zone, a fair number of cormorants along with a few gulls were noted mostly roosting on the full flow pipe. However, at times, these birds were observed feeding until primary bypass concluded on December 17. A few birds did examine the emergency bypass outfall after this date.

The laser for bypass outfall hazing remained in place. The laser did appear to be fairly effective on the wing wall. The outfall programming has not yet been verified. Thus, cormorant counts remained fairly high near the outfall. Though, bird numbers were down overall. At this point, further evaluation of laser technology will resume next spring.

In the forebay zone, an occasional gull, gull flock, bald eagle, pelican or cormorant was observed. At times, gulls were noted roosting outside the zone along the Washington shore line. There appears to be one large gull flock still being observed around the project.

Invasive Species: The mussel station examinations reveal no problems on December 15.

Fish Rescue/Salvage: Fish rescue reports for the Washington shore ladder and the juvenile collection channel will be described next week.

Research: For the adult steelhead top spillway weir (TSW) passage efficiency study, the equipment on the ESBSs in units 1 and 10 was removed on December 16.

Project: Ice Harbor
Biologist: Ken Fone
Dates: December 13 – December 19, 2019

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**
3	5/3/19	0641	---	---	Turbine runner replacement and stator rewind
5	10/15/19	0741	---	---	Install new head gate cylinder in 5A. Also annual maintenance.
1	12/9/19	1550	12/19/19	2256	Annual maintenance
4	12/16/19	0713	12/16/19	1343	STS removal and No. 2 115 kV line maintenance.
2	12/17/19	0820	12/17/19	1522	STS removal and fish release pipe removal from STSs
6	12/18/19	0724	12/18/19	1049	STS removal

Comments: None.

Adult Fish Passage Facility

Ice Harbor fish facility staff inspected the adult fishways on December 16, 17, and 18.

Fish Ladders:

Yes	No	Location	Criteria	Measurements
X		North Ladder Exit Differential	Head $\leq$ 0.3’	
X		North Ladder Picketed Lead Differential	Head $\leq$ 0.3’	
X		North Ladder Depth over Weirs	Head over weir 1.0’ to 1.3’	
X		South Ladder Exit Differential	Head $\leq$ 0.3’	
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			South Shore Entrance (SFE-1) Weir Depth	$\geq$ 8.0’ or on sill	
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-1) Weir Depth	$\geq$ 8.0’ or on sill	
X			North Powerhouse Entrance Channel/Tailwater Differential	1.0’ – 2.0’	
X			North Shore Entrance (NEW-2) Weir Depth	$\geq$ 8.0’ or on sill	
X			North Shore Channel/Tailwater Differential	1.0’ – 2.0’	

Comments: None.

Auxiliary Water Supply System:

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

Comments: South shore AWS pump #1 was taken out of service at 0840 hours on December 11 due to excessive noise coming from the pump.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil:

Yes	No	NA	Item	Comments
X			Forebay debris load acceptable? (amount)	Average of 51 square yards
X			Gatewell drawdown measured this week?	
X			Gatewell drawdown acceptable	
X			Any debris seen in gatewells (% coverage)	0-7%
	X		Any oil seen in gatewells?	

Comments: None.

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 for units 1, 3, and 5 were raised out of the water on December 14 for winter maintenance. The STSs for units 4, 2, and 6 were raised on December 16, 17, and 18, respectively.

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: On December 19, orifices were closed and the juvenile fish bypass was unwatered for winter maintenance.

Juvenile Fish Facility: The fish facility was operating in primary bypass until the bypass was unwatered.

Fish Sampling: Sampling has ended for the year.

Removable Spillway Weir (RSW): Voluntary spill for fish passage is ended for the year.

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
35.8	11.8	0	0	44	42	10.0	10.0

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: The next strainer inspections for lamprey will occur in January.

Avian Activity: There were moderate numbers of gulls observed around the project. The birds were observed to be foraging downstream of the powerhouse.

Invasive Species: No new exotic species 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. Sampling is done for the year.

Fish Rescue/Salvage: The number and species of fish recovered from the juvenile fish channel on December 19 were 15 clipped adult steelhead, 9 unclipped adult steelhead, 2 clipped adult chinook, 1 clipped adult coho, 2 clipped juvenile steelhead, 1 unclipped juvenile steelhead, and 15 channel catfish. Fish were released in good condition at the north shore forebay boat ramp.

Research: PNNL researchers removed the fish release pipes from unit 2 STSs on December 17.

Project: Lower Monumental
Biologists: Chuck Barnes and Raymond Addis
Dates: December 13-19, 2019

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	12/18/19	08:30	1/9/2020	ERTS	Annual Maintenance
Unit 2	7/15/2019	07:20	2/28/2020	ERTS	Annual Maintenance/Draft Tube Liner Repair
Unit 4	10/09/2019	16:05	1/01/2020	ERTS	Governor Control
Unit 5	10/03/2019	15:50	1/23/2020	ERTS	Governor Control

Comments: Units went into Soft Restraint at 0001 on November 1.

Adult Fish Passage Facility

The adult fishways were inspected by USACE biologists on December 17, 18 and 19.

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’	

Comments: None.

Fishway Entrances and Collection Channel:

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

Comments: South Powerhouse Entrance weir (SPE-1) was on sill during all inspections with readings of 6.7, 6.2 and 5.4 feet respectively.
South Powerhouse Entrance weir (SPE-2) was on sill during all inspections with readings of 6.7, 6.2 and 5.4 respectively.
South Shore Entrance weir (SSE-1) was on sill during all inspections with readings of 7.6, 7.1 and 6.4 feet respectively.

Auxiliary Water Supply System:

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

Comments: None.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil:

Yes	No	NA	Item	Comments
X			Forebay debris load acceptable? (amount)	350 yd^2
X			Gatewell drawdown measured this week?	
X			Gatewell drawdown acceptable	
		X	Any debris seen in gatewells (% coverage)	STS screens dogged off in gatewells
	X		Any oil seen in gatewells?	

Comments: None.

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: All STS's were removed from the gatewells for winter maintenance December 16-19.

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: All orifices were closed and the juvenile channel, primary dewatering structure and bypass pipe were dewatered at 1000 hours on December 16 for annual winter maintenance. Fish were crowded as the channel was dewatered and routed back to the tailrace through emergency bypass pipe per the dewatering fish salvage plan. No mortalities occurred and all fish were successfully removed from the system.

Collection Facility: The facility was dewatered at 1200 on October 3 for cleaning and winter maintenance.

Transport Summary: Transport season ended on September 30.

Spillway Weir: There was no spill during this reporting period.

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
39.6	16.4	0.0	0.0	41.5	40.2	7.0	5.5

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on December 17. A total of approximately 1200 juvenile American shad mortalities were spread across units 1, 3, 4, 5 and 6.

Avian Activity: Gulls and cormorants were the predominant piscivorous bird species observed during fish ladder inspections this week.

Date	Time	Gulls	Cormorants	Terns	Grebes	Pelicans
12/17/2019	12:00	160	16	0	0	0
12/18/2019	09:25	80	0	0	0	0
12/19/2019	09:25	34	12	0	0	0

Comments: Bird hazing efforts by USDA personnel ended at the end of the working day on June 2.
Daily bird hazing effectiveness tailrace observations ended with the June 30 observation.

Invasive Species: No zebra or quagga mussels were observed during monitoring station inspections on December 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. Juvenile fish collection ended at 0700 on September 30.

Fish Rescue/Salvage: Juvenile channel, primary dewatering structure and bypass flume dewatered at 1000 hours on 16 December. See “collection channel” section above for details.

Research: No Research took place during this reporting period.

Project: Little Goose
Biologists: Scott St. John and Richard Weis
Dates: December 13-19, 2019

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	04/21/17	00:54	03/31/21	17:00	Spider and Upper Guide Bearing Repair
1	11/25/19	15:30	12/20/19	11:25	Unit Annual, VBS/ESBS Inspection

Comments: Unit #1 returned to service on December 20 at 11:25 am.

Adult Fish Passage Facility

Little Goose fish facility staff inspected the adult fishway on December 16, 17 and 18.

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 Pump in Service		
		X	Fish Ladder Exit Cooling Water Pump Operating Satisfactorily		

Comments: Cooling water pumps was shut off for the season on September 23.

Fishway Entrances and Collection Channel:

Yes	No	Sill	Location	Criteria	Measurement
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	North Powerhouse Entrance (NPE-1) Weir Depth	≥ 7.0’ or on sill	
		X	North Powerhouse Entrance (NPE-2) Weir Depth	≥ 7.0’ or on sill	
X			North Powerhouse Entrance Channel/Tailwater Differential	1.0’–2.0’	
X			North Shore Entrance (NSE-1) Weir Depth	≥ 6.0’ or on sill	
X			North Shore Entrance (NSE-2) Weir Depth	≥ 6.0’ or on sill	
	X		North Shore Channel/Tailwater Differential	1.0’–2.0’	0.9
X			Collection Channel Surface Velocity	1.5 – 4.0 fps	

Comments: Subsurface water velocity was measured near NPE on December 10 using a Rickly velocity meter and averaged 2.3 feet per second. December 16 inspection found 0.9 feet on channel to tailwater reading on the north shore. Adjustments were made.

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		Trash rack differentials measured this week?	
		X	Trash rack differentials acceptable	
	X		Any debris seen in gatewells (% coverage)	
	X		Any oil seen in gatewells?	

Comments: There is approximately 2,350 square feet of floating woody debris inside the trash shear boom in the immediate 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?

Comments: ESBS/VBS screens were pulled out for the season the week of December 16.

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: None.

Collection Facility: The juvenile bypass system is currently operating in primary bypass, with the Juvenile Fish Facility dewatered for winter maintenance.

Transport Summary: Daily collection and transport ended on November 01 at 07:00.

Spillway Weir: The adjustable spillway weir (ASW) was closed on July 23 at 15:17 per the guidance outlined in the Columbia Basin Teletype (CBT). The ASW will remain closed for the season.

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
39.8	15.4	0.0	0.0	42.7	41.6	6.0	6.0

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on December 18 with no lamprey or Salmonids being observed.

Avian Activity: Daily Piscivorous bird counts at Little Goose Dam ended on October 31 for the 2019 season.

Invasive Species: No zebra or Quagga mussels were observed.

Siberian Prawn: None.

Gas Bubble Trauma (GBT): The last gas bubble monitoring occurred on July 15.

Fish Rescue/Salvage: On December 19 the Juvenile Channel and Dewaterer were drained and 75 adult Salmonids were returned to the river. 2 Coho were also seen. 2 Steelhead were seen not gilling and presumed dead.

Research: N/A

Project: Lower Granite
Biologists: Elizabeth Holdren and David Miller
Dates: December 13-19, 2019

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
Unit 2	11/04	0800			Overhaul
Unit 1	11/23	0545	12/19	1240	Forced OOS due to field ground (rotor)
Unit 6	12/05	1205			Investigate source of oil sheen in tailrace

Comments: None.

Adult Fish Passage Facility

Lower Granite Corps biologist's inspected the adult fish ladder December 16 and 17.

Fish Ladder:

Yes	No	NA	Location	Criteria	Comments
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 Cooling Water Pumps Operating Satisfactorily		

Comments: None.

Fish Ladder Entrances and Collection Channel:

Yes	No	Sill	Location	Criteria	Comments
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	$\geq$ 8.0' or on sill	
		X	North Powerhouse Entrance (NPE-2) Weir Depth	$\geq$ 8.0' or on sill	
X			North Powerhouse Entrance Channel/Tailwater Differential	1.0'–2.0'	
X			North Shore Entrance (NSE-1) Weir Depth	$\geq$ 7.0' or on sill	
X			North Shore Entrance (NSE-2) Weir Depth	$\geq$ 7.0' or on sill	Closed
X			North Shore Channel/Tailwater Differential	1.0'–2.0'	
	X		Collection Channel Surface Velocity	1.5 – 4.0 fps	1.0, 0.9

Comments: Since May 4 the fish ladder control system screen and local reading for the south shore channel/tailwater and depth over the SSEs have been inconsistent. SSE gates remain in local operation until Operation and District engineering can resolve the control system issues. SSEs out of criteria readings were due to the gated inability to

adjust to changing tailwater. SSE gates were repositioned to a depth of greater than 8.0 feet in response to out of criteria readings. Operations returned the fish ladder control system to auto operation at 0905 hours December 4 to determine if the control system will maintain criteria with calm tailwater conditions.

NPE channel velocity sensor readings have consistently read below 1.5 fps. Surface velocity is being verified using tape measure and stopwatch and found to be in criteria. Velocities have been reading below 1.5 fps at both north powerhouse and north shore sensors. Biologists, operators, and District engineers are working to resolve fish ladder velocity issues and control system issues.

Auxiliary Water Supply System:

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

Comments: AWS pumps 1 and 3 were temporarily removed from service from 1715 hours December 17 to 1700 hours on December 19 to support emergency repair work for leaks encountered during spillbay 1 PIT tag installation.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil:

Yes	No	NA	Item	Comments
X			Forebay debris load acceptable? (amount)	
X			Trash rack differentials measured this week?	
X			Trash rack differentials 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: All ESBSs are removed and dogged off in the gatewell slots.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe:

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

Comments: The collection channel and PDW were dewatered for winter maintenance from 0730-1045 hours December 18.

Collection Facility: Dewatered for winter maintenance.

Transport Summary: N/A

Spillway Weir: No spill

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
28.7	20.6	0	0	40.6	40.5	5.0+	5.0+

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers were not inspected during this reporting period.

Invasive Species: No signs of Zebra/Quagga mussels were found on submerged substrates.

Avian Activity: N/A

Gas Bubble Trauma (GBT) Monitoring: N/A

Adult Fish Trap Operations: The adult trap is closed for the season.

Fish Rescue/Salvage: A fish rescue of the juvenile collection channel bypass system occurred from 0730-1045 hours December 18. There were 18 adult steelhead, 3 juvenile steelhead, and 3 suckers identified going through the emergency bypass. There were 2 suckers in the collection channel that were netted and released into the tailrace. The transport flume was walked following the PDW flume gate closure at 0745 hours December 18. No fish were present.

Research: No research is currently occurring.