U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#40-2019

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: November 29 to December 5, 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	01/09/20	NA	Turbine blade packing.
14	08/19	1221	01/02/20	NA	Thrust bearing.
6 & 8	12/3	1001	12/3	1043	ESBS camera inspections, rotated through units.

Comments: All return to service dates are subject to change. The soft one percent peak efficiency constraint continued. At times, units ran outside the constraint at BPA's request. Unit priority concluded on December 1.

Adult Fish Passage Facilities

McNary fisheries biologists performed measured inspections of the adult fishways on November 29, December 1 and 3.

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 to light near the Oregon exit and minimal near the Washington exit. At the Oregon shore exit, the traveling screens debris trough was cleaned as required.

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	≥ 8.0'	7.9' on Nov 29.
X			NFEW3 Weir Depth	≥ 8.0'	
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 1.8 fps.
	X		Washington Entrance Head Differential	1.0' – 2.0'	0.9' on Dec 1 and 3.
X			WFE2 Weir Depth	≥ 8.0'	
	X		WFE3 Weir Depth	≥ 8.0'	6.4' to 6.9' all week.

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.

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 criteria points listed above for the Washington ladder entrance weir W3 and the entrance pool differential were due to weir W2 being jammed and in manual mode. In order to maintain the pool differential, the control system or operators have raised W3 out of criterion. Also, W3 has been in and out of automatic mode.

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 December 31.
Yes			Oregon shore Fish Pump 2, Blade angle: 22 to 23°
Yes			Oregon shore Fish Pump 3, Blade angle: 26°
Yes			OR North Powerhouse Pool supply from juvenile fishway

Comments: The Wasco County PUD remains out of service until the winter maintenance season. PUD personnel have asked for an early extension to the winter outage (19MCN17MOC). The bypass system has been functioning satisfactorily.

Fish pump 2 was out of service for a bus switch on December 4, from 1705 to 1707 hours.

Juvenile Fish Passage Facility

The juvenile system remains in primary bypass for the fall season. Light maintenance and preparations for the winter outage continued at the facility. The full flow flume adult flush line valve remained partially closed.

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.

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 remained in timer mode. Camera inspections in units 6 and 8 revealed no problems. After noting the brush cycle was not being fully completed for the ESBS in 2A slot, the biologist requested the cycle be switched to timer mode on December 2.

Daily VBS differential monitoring continued. No high differentials were recorded. Five screens were cleaned on November 30. No fish were observed.

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: Orifices were operated as required for VBS cleaning. There are no problems to report.

The access door for the first PIT tag detector in the full flow flume came off its hinges during a winter storm on November 29. The mechanical staff with reinstall the door in the near future.

Bypass Facility:

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

Comments: During the fall primary bypass season, all systems remain out of service with light maintenance ongoing.

The separator remains dewatered. On December 2, the first test results back on the paint showed three heavy metals. Two were at fairly high levels. The painter will clean separator area and remove the paint appropriately in the near future. After which, the engineers will check the structural integrity of the separator. A path forward for rehabilitation will be determined after this.

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
137.9	125.1	0.0	0.0	47.0	45.0	6.0	6.0

Comments: The above data is from the control room.

Other

Inline Cooling Water Strainers: The cooling water strainer inspections only revealed juvenile shad mortalities on December 3.

Avian Activity: Casual avian observations continued. Bird numbers appear to be fluctuating with their migration and the juvenile shad out migration. Overall, gull numbers appear to be slowly declining. Cormorant numbers were lower but stable. There appears to be more roosting activity than feeding. Adult and juvenile birds were observed.

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

In the spill zone, gull and cormorant numbers again fluctuated. Occasionally, pelicans were observed. All birds were roosting except possibly the pelicans. 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.

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, bird 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, grebe, pelican or cormorant was observed. No birds were noted roosting outside the zone along the Washington shore line. A few large gull flocks were still observed around the project.

Invasive Species: The next mussel station examinations will occur in late December.

Fish Rescue/Salvage**:** No fish rescue occurred this week.

Research: The fall phase of the adult steelhead top spillway weir (TSW) passage efficiency study concluded on the night of November 15. A dive to repair/replace the cable on the trash rack in 1B slot is scheduled to occur on December 10. The equipment on the ESBSs will be removed on December 16.

Project: Ice Harbor
Biologist: Ken Fone
Dates: November 29 – December 5, 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.
4	12/2/19	1240	---	---	Hydraulically lock the blades to stop oil leak from the hub

Comments: None.

Adult Fish Passage Facility

Ice Harbor fish facility staff inspected the adult fishways on December 3, 4, and 5.

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	
	X		South Shore Channel/Tailwater Differential	1.0’ – 2.0’	2.2’, 2.1’
X			South Shore Channel Velocity	1.5 – 4.0 fps	
		X	North Powerhouse Entrance (NFE-1) Weir Depth	≥ 8.0’ or on sill	
X			North Powerhouse Entrance Channel/Tailwater Differential	1.0’ – 2.0’	
		X	North Shore Entrance (NEW-2) Weir Depth	≥ 8.0’ or on sill	
	X		North Shore Channel/Tailwater Differential	1.0’ – 2.0’	2.3’, 2.2’

Comments: On November 27, the south ladder exit trash rack was cleaned in place by using an air hose to blow the debris loose. This reduced the differential at the exit from 0.4’ on November 26 to 0.1’ or less on subsequent inspections.

As a result of the tailwater elevation being low, the north shore entrance channel/tailwater head differential was above criteria on the December 3 and 4 fishway inspections, and the south shore entrance channel/tailwater differential was above criteria on all three inspections. From previous inspections conducted in November it was observed that the entrance head differentials were within criteria when the tailwater was higher. The north and south

shore fish ladders normally have two and at least six AWS pumps running, respectively, to meet entrance criteria. Shutting off an additional pump at each location may result in the head differentials being too low, especially when the tailwater increases.

Auxiliary Water Supply System:

Operating Satisfactory	Standby	Out of Service	Auxiliary Water Supply System (AWS)
6 pumps	1-2 pumps	0-1	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 serve at 1554 hours on December 5 to replace a leaky seal on the lower gearbox.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil:

Yes	No	NA	Item	Comments
X			Forebay debris load acceptable? (amount)	Average of 29 square yards
X			Gatewell drawdown measured this week?	
X			Gatewell drawdown acceptable	
X			Any debris seen in gatewells (% coverage)	0-5%
	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: None,

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: None.

Juvenile Fish Facility: The fish facility is being operated in primary bypass.

Fish Sampling: Sampling has ended for the year.

Removable Spillway Weir (RSW): Voluntary spill for fish passage has 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
22.6	12.3	0	0	48	44	9.6	9.6

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Monthly strainer inspections for lamprey ended in June and started again in December. Unit 1, 2, and 4 strainers were cleaned on December 2, because of higher water pressure differentials across the strainers. A total of approximately 677 juvenile shad mortalities were found.

Avian Activity: There were moderate numbers of gulls and pelicans 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: None.

Research: None.

Project: Lower Monumental
Biologists: Chuck Barnes and Raymond Addis
Dates: November 29 – December 05, 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 2	7/15/2019	07:20	2/28/2020	ERTS	Annual Maintenance/Draft Tube Liner Repair
Unit 3	12/02/2019	07:30	12/12/2019	ERTS	Annual Maintenance
Unit 4	10/09/2019	16:05	12/12/2019	ERTS	Governor Control
Unit 5	10/03/2019	15:50	1/23/2020	ERTS	Governor Control

Comments: Units went into Hard Restraint at 0001 on April 1st and changed to a soft constraint November 1st .

Adult Fish Passage Facility

The adult fishways were inspected by USACE biologists on December 2, 3 and 4.

Fish Ladder:

Yes	No	Location	Criteria	Measurements
X		North Ladder Exit Differential	Head ≤ 0.5’	
X		North Ladder Picketed Lead Differential	Head ≤ 0.4’	
X		North Ladder Depth over Weirs	Head over weir 1.0’ to 1.3’	
X		South Ladder Exit Differential	Head ≤ 0.5’	
X		South Ladder Picketed Lead Differential	Head ≤ 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	≥ 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		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: South Powerhouse Entrance weir (SPE-1) was on sill during all inspections with readings of 7.2, 7.5 and 7.0 feet respectively.
South Powerhouse Entrance weir (SPE-2) was on sill during all inspections with readings of 7.2, 7.5 and 7.0 respectively.
South Shore Entrance weir (SSE-1) was on sill during the December 4 inspection with readings of 7.9 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)	83 yd^2
X			Gatewell drawdown measured this week?	
X			Gatewell drawdown acceptable	
X			Any debris seen in gatewells (% coverage)	0 – 10 %
	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: STS's were operating in Cycle mode due to average sub-yearling Chinook and sockeye lengths being greater 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: None.

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
21.6	13.6	0.0	0.0	42.9	42.5	6.5	5.2

*Scrollcase temperatures.

Other

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

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
12/022019	13:30	10	18	0	0	0
12/03/2019	10:10	17	8	0	0	0
12/04/2019	10:10	0	0	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: No Fish Rescue/Salvage took place during this reporting period.

Research: No Research took place during this reporting period.

Project: Little Goose
Biologists: Scott St. John and Richard Weis
Dates: November 29 – December 05, 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	17:00	Unit Annual, VBS/ESBS Inspection
2-4	12/05/19	06:35	12/05/19	15:05	T1 Outage for XJ upgrade measurements

Comments: None.

Adult Fish Passage Facility

Little Goose fish facility staff inspected the adult fishway on December 02, 04 and 05.

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’	
	X		Collection Channel Surface Velocity	1.5 – 4.0 fps	1.4

Comments: The December 04 inspection found the surface velocity at the SSE out of criteria. Subsurface water velocity was measured near NPE on October 27 using a Rickly velocity meter and averaged 2.7 feet per second.

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: Due to total outflow, trash rack differentials have not been measured, however trash racks were recently raked. There is approximately 3,200 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 underwater camera inspections were conducted on Unit 1 on December 03 and were in good condition.

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
20.3	13.5	0.9	0.0	43.6	43.2	6.0	6.0

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers were last inspected on July 3 with no lamprey being observed. Inspections will resume in December per the Fish Passage Plan.

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: None.

Research: N/A

Project: Lower Granite
Biologists: Elizabeth Holdren and David Miller
Dates: November 29-December 5, 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			Forced OOS due to field ground (rotor)
Unit 6	12/04	1000	12/04	1205	Tighten wicket gate packing
Unit 6	12/05	1205			Suspected source of oil sheen in tailrace

Comments: Unit 3 remains in operation. Unit 6 was removed from service December 4 to tighten wicket gate packing. At 1109 hours December 5 an oil sheen in the spillway tailrace was reported to Operations. Unit 6 was removed from service at 1205 hours and declared forced out of service at 1300 hours December 5 when the unit was determined to be the source of the oil sheen observed in the spillway tailrace. Powerhouse mechanics will dewater the unit to investigate the source of oil following the fish rescue December 10.

Adult Fish Passage Facility

Lower Granite Corps biologist's inspected the adult fish ladder December 3 and 4.

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'	7.9', 7.9'
X			South Shore Entrance (SSE-2) Weir Depth	$\geq$ 8.0'	7.9', 7.9'
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	0.9, 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.

Ladder operations were modified with AWS pump 3 off and both NPEs closed to eliminate attraction flow from 1210-1323 hours December 5 while investigating unit 6 as the suspected source of the oil sheen in the tailrace.

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 pump 3 was off from 1210-1323 hours December 5 while an oil sheen in the spillway tailrace was investigated.

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: ESBS removal for unit 1 and unit 2 began November 25 due to these units not being returned to service until after December 15. Underwater camera inspections are being used to identify issues with retracting the ESBS in slot 1A. After several attempts the ROV was pulled through the juvenile collection channel orifice in gatewell slot 1A December 4. The ROV was retrieved and re-deployed that day. December 5 the ROV became entangled in the ESBS components requiring slot 1A orifices to be closes until the ROV can be removed. Opening one of the orifices in slot 1A would result in cables/cords and possibly the ROV obstructing the orifices. Gatewell slot 1A is continuously monitored during daylight hours. No fish have been seen in the gatewell. Dipping the gatewell is not possible at this time due to the risk of the basket becoming tangled in the ESBS gear and ROV camera cable.

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: The collection channel is operating with primarily 14" orifices with 10" orifices opened to maintain optimal flume flow in response to forebay elevation. The north makeup water valve remains in local control due to an automatic control motor hardware failure. Intermittent issues with local and remote operation of orifices for back flushing continue to be observed. Problems are reported to operations when they are identified. Orifices in 1A were intermittently closed to facilitate under water inspection of the ESBS in slot 1A December 2-4 and were required to remain closed December 5 due to the ROV camera being entangled in the ESBS components. The gatewell continues to be constantly monitored during daylight hours. No fish have been observed in the gatewell slot.

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
20.4	16.5	0	0	44.0	44.0	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: No fish salvage/rescues occurred during this reporting period.

Research: No research is currently occurring.