



Weekly Temperature Report McNary Dam

September 6, 2022

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Report Period: August 26 through August 31
Report No. 2022 MCN Temperature Report 0826–0831 by EAS

Re: USACE Walla Walla District Biological Services: Temperature Monitoring Program at McNary Dam

Temperature monitoring at the McNary juvenile collection system began at 0700 hours on June 14 and will continue through 0700 hours August 31. Wind speed data used in this report are from the National Weather Service station at the Hermiston Municipal Airport in Oregon. The air temperature data was obtained via Hobo probe at the Juvenile Fish Facility (JFF). Due to elevated river temperatures, the “sawtooth pattern” (operate every other unit) unit operation mode begun on July 24 continued through this report period to reduce thermal stress to juvenile salmonids passing through the collection system.

Fish Collection

An estimated 3,891 juvenile salmonids were collected and 3,883 were bypassed at the McNary JFF (Table 1). There were 8 fish mortalities in the sample for the reporting period.

River Conditions

Average river flow for this reporting period was 144.5 kilo cubic feet per second (kcfs) with an average spill of 20.2 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14 and pulled on August 31. All temperature loggers performed normally for the season.

Weather Conditions

The weekly average air temperature from August 26 to August 31 was 81.0°F. Air temperatures ranged from a maximum of 96.4°F on August 25 to a minimum of 59.4°F on August 28 (Figure 1). Wind speeds averaged 9.0 mph with gusts of 27.6 mph (Table 1). Wind direction was predominantly from the west-southwest.

Water Temperatures

Average water temperatures within dam locations varied with air temperatures and wind velocities (Figure 2). The weekly average temperatures within dam locations were: 72.0°F, forebay (weekly average of eight positions); 71.6°F, gatewell (weekly average of 14 positions); 71.6°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 71.6°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 3 had the highest weekly average temperature, 72.2°F (Figure 3). The maximum temperature, 77.9°F, was recorded in forebay Unit 1 at 15:00 hours on August 25.

The average weekly temperature differentials within dam locations were: 1.2°F, forebay; 1.3°F, gatewells; 0.2°F, collection channel; and 0.08°F, JFF (Figure 4). The largest temperature differential, 5.9°F, was recorded in the forebay at 18:00 hours on August 25 (Unit 5 high, Unit 1 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.6°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 6.8°F at 15:00 hours on August 25 at Unit 1 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.14°F. On average, the gatewells were warmer than the collection channels at Unit 1 and 12, and cooler at Unit 8. The largest temperature differential between the gatewell and corresponding collection channel location was 2.29 at 15:00 hours on August 28 at Unit 1 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from August 26-31

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
26-Aug	0	0	0	0	165.6	140.7	20.2	80.8	96.4	5.3	8.1
27-Aug	1,640	1,638	2	0	164.6	139.8	20.1	79.2	92.6	15.9	21.9
28-Aug	0	0	0	0	140.6	115.8	20.1	70	80.2	15.9	27.6
29-Aug	1,600	1,600	0	0	133.8	109.0	20.2	70.6	86.3	4.9	8.1
30-Aug	0	0	0	0	132.7	107.8	20.2	75.1	87.4	6.0	10.3
31-Aug	651	646	2	4	129.5	104.4	20.4	77.2	87.2	5.7	10.4
Weekly Avg	1297.0	1294.7	0.7	0.7	144.5	119.6	20.2	75.5	88.4	9.0	14.4

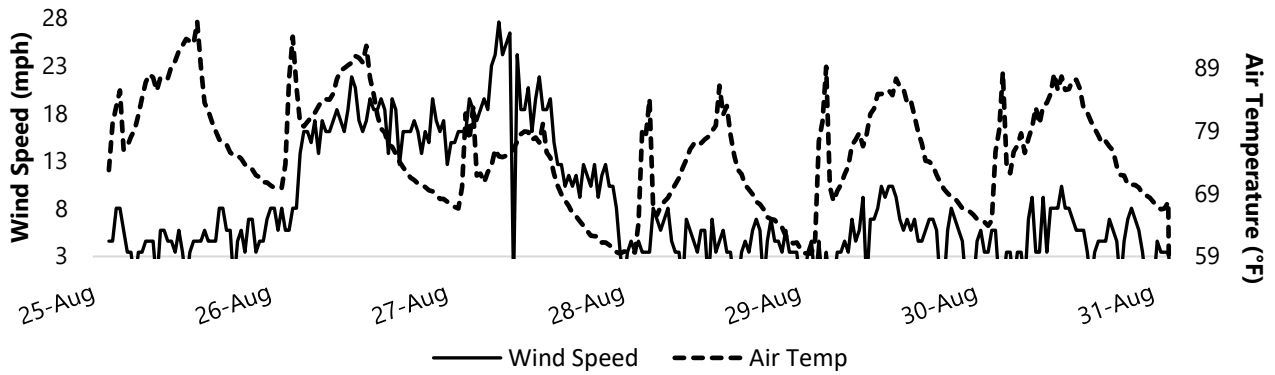


Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from August 26-31

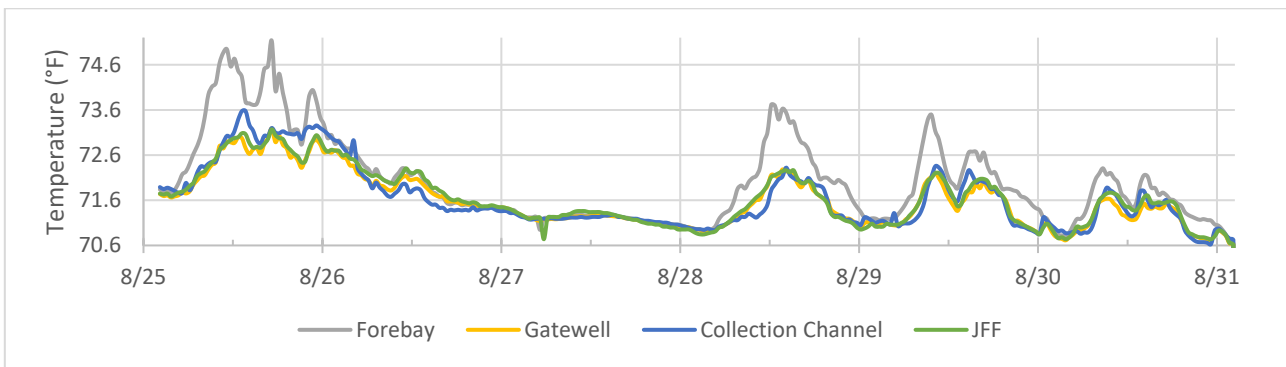


Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from August 26-31

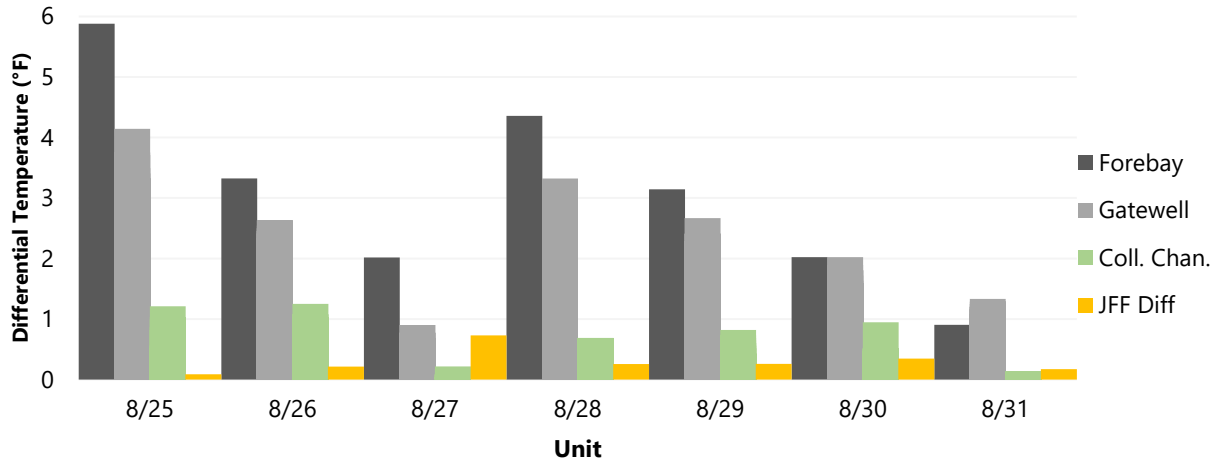


Figure 3
 Average Weekly Water Temperatures by Position for Five Dam Locations from August 26-31

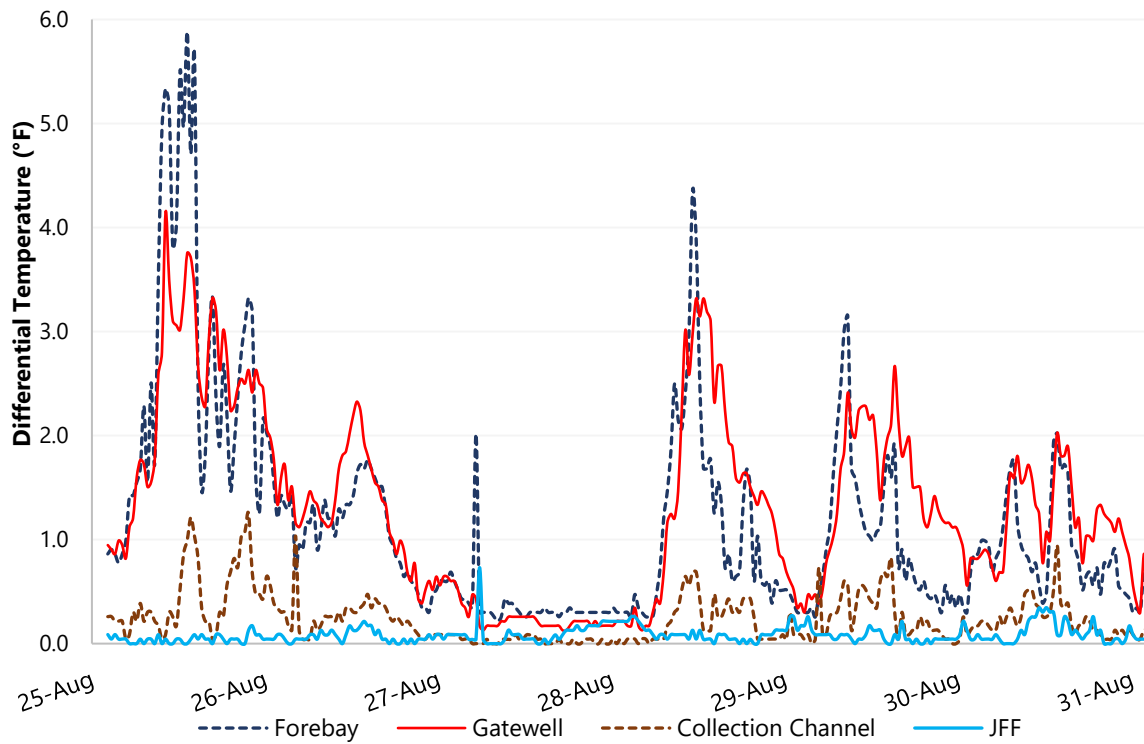


Figure 4
 Average Differential Temperatures within Four Dam Locations from August 26-31

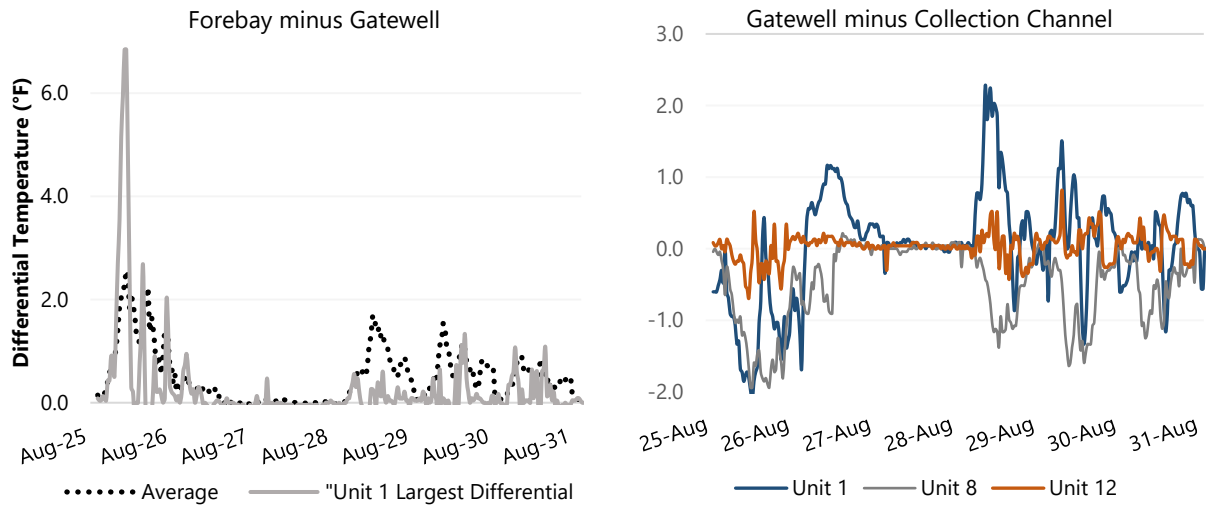


Figure 5
Average Differential Temperatures across Three Dam Locations from August 26-31