



Weekly Temperature Report

McNary Dam

August 9, 2021

Prepared by: Paul Wagner, Wes Stonecypher, and Eric Harries, Environmental Assessment Services, LLC

Report Period: July 30 through August 5, 2021

Report No. 2021 MCN Temperature Weekly Report 0730–0805 for EAS

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

Temperature monitoring at the McNary juvenile collection system began at 1200 hours on June 14 and is scheduled to continue through 0700 hours August 31. Wind speed data used in this report is from the National Weather Service station at the Hermiston Municipal Airport in Oregon. The air temperature data was obtained via an Onset temperature logger located onsite at the McNary Juvenile Fish Facility (JFF). Units operated in a “sawtooth pattern” (operate every other unit) to reduce thermal stress to juvenile salmonids passing through the collection system. Units 1, 2, and 5 were not in operation this week.

Fish Collection

An estimated 4,162 juvenile salmonids were collected and 4,156 bypassed at the McNary JFF (Table 1). Weekly fish mortalities were 2 in the sample and 4 in the facility.

River Conditions

Average river flow for this reporting period was 137.1 kilo cubic feet per second (kcfs) with an average spill of 77.5 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14. Onset temperature logger in gateway Unit 4 did not operate from July 29 at 0800 hours to July 30 at 1130 hours.

Weather Conditions

The weekly average air temperature from July 30 to August 5 was 83.8°F. Air temperatures ranged from a maximum of 105.2°F on July 30 to a minimum of 70.8°F on August 2 (Figure 1). Wind speeds averaged 5.7 mph with gusts to 18.4 mph (Table 1). Wind direction was predominantly Northern.

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: 73.2°F, forebay (weekly average of eight positions); 72.0°F, gateway (weekly average of 13 positions); 72.1°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 71.9°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 8 had the

highest weekly average temperature, 73.5°F (Figure 3). The maximum temperature, 81.4°F, was recorded in Forebay Unit 10 at 1700 hours on July 29.

The average weekly temperature differentials within dam locations were: 2.0°F, forebay; 2.9°F, gatewells; 0.5°F, collection channel; and 0.2°F, JFF (Figure 4). The largest temperature differential, 10.6°F, was recorded in the forebay at 1700 hours on July 29 (Unit 10 high, Unit 5 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 1.3°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 11.0°F at 1700 hours on July 29 at Unit 10 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 1.0°F. On average, the collection channel was warmer than the gatewells. The largest temperature differential between the gatewell and corresponding collection channel location was 3.6°F at 1730 hours on July 29 at Unit 8 (collection channel was warmer than the gatewell).

Table 1
Bypass, Mortality, and River and Weather Conditions from July 30 to August 5

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow (kcfs)	Avg. Turbine Flow (kcfs)	Avg. Spill (kcfs)	Air Temperature (°F)		Wind Speed (mph)	
			Sample	Facility				Avg.	Max	Avg.	Max
30-Jul	1,196	1,193	2	1	144.9	57.3	82.8	83.3	95.1	5.2	13.8
31-Jul					138.4	54.8	78.9	88.1	105.2	6.1	11.5
1-Aug	430	430	0	0	121.0	51.0	65.3	84.9	94.6	8.3	18.4
2-Aug					123.3	50.6	68.0	81.7	90.2	5.8	13.8
3-Aug	2,190	2,190	0	0	143.1	56.4	82.1	82.4	93.1	4.2	9.2
4-Aug					144.2	56.9	82.6	85.2	101.7	6.3	16.1
5-Aug	346	343	0	3	144.7	57.1	82.9	80.7	92.0	3.9	9.2
Weekly Total	4,162	4,156	2	4	137.1	54.9	77.5	83.8	96.0	5.7	13.2

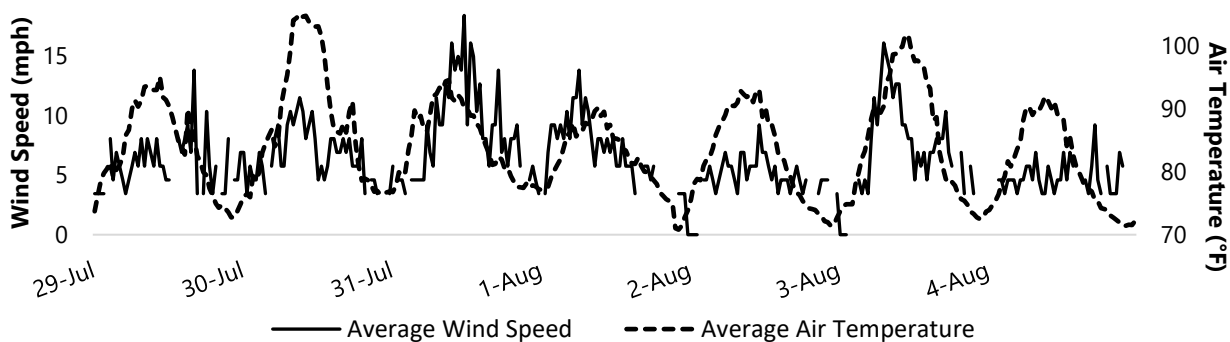


Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from July 30 to August 5

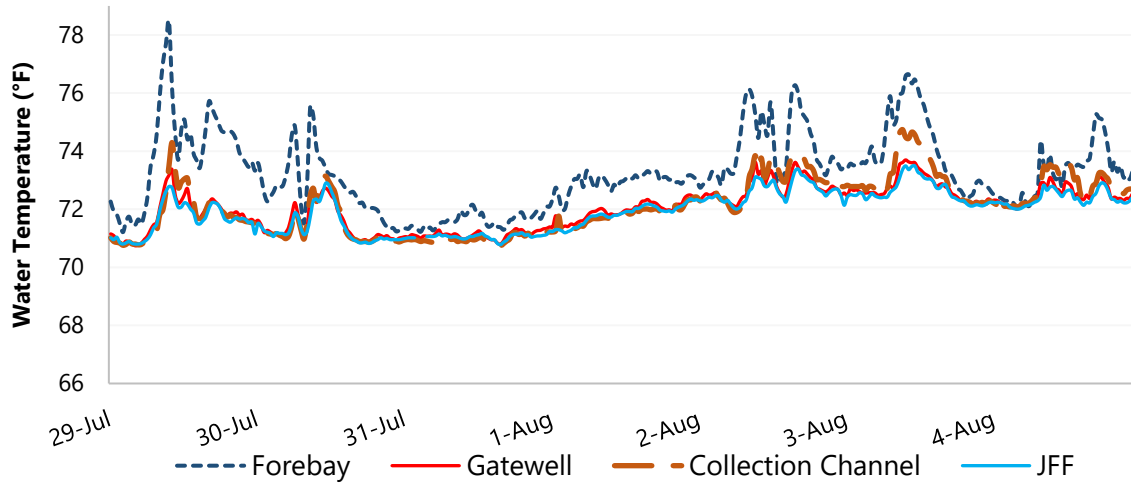


Figure 2
 Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from July 30 to August 5

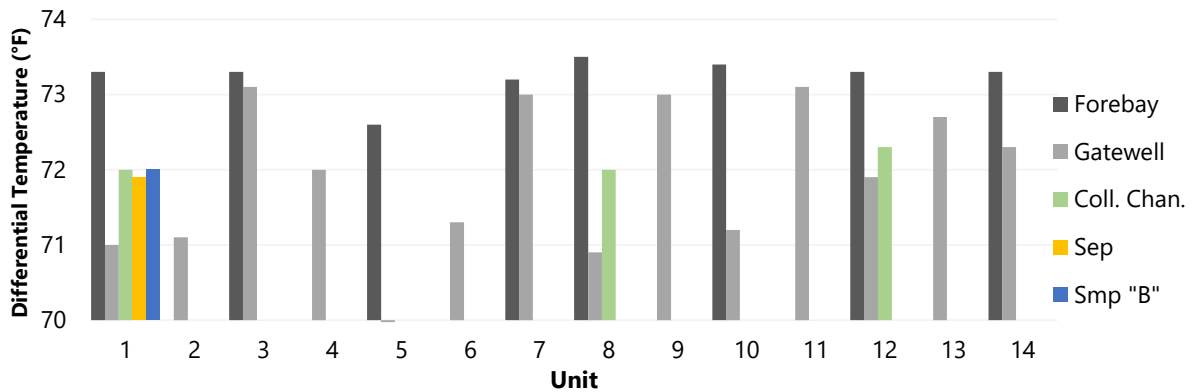


Figure 3
 Average Weekly Water Temperatures by Position for Five Dam Locations from July 30 to August 5

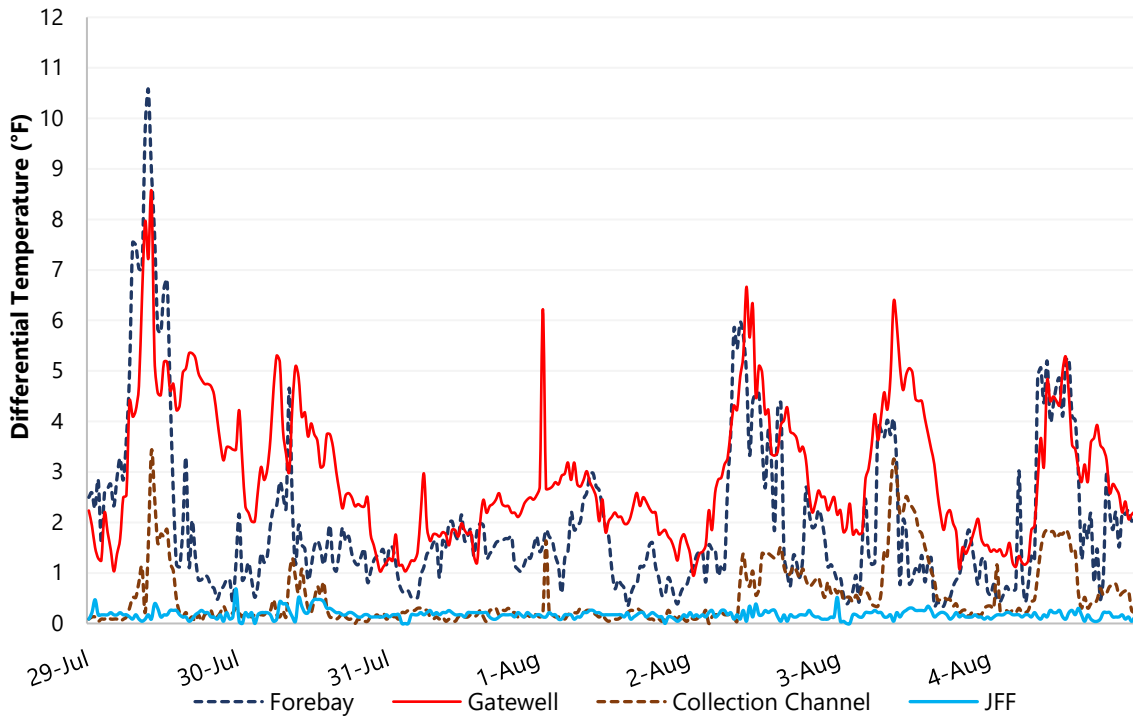


Figure 4
Average Differential Temperatures within Four Dam Locations from July 30 to August 5

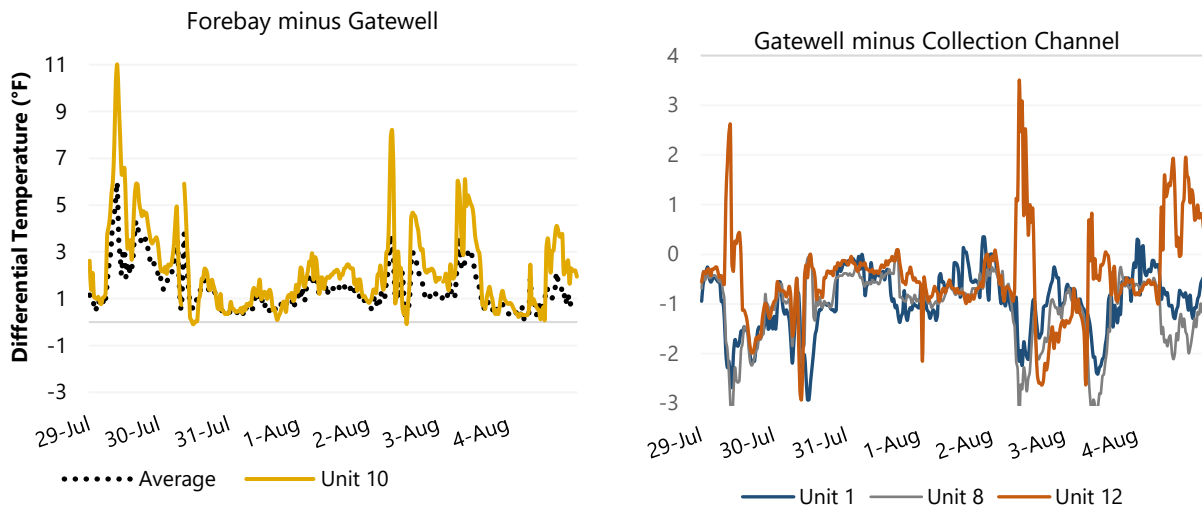


Figure 5
Average Differential Temperatures across Three Dam Locations from July 30 to August 5