Weekly Temperature Report
McNary Dam

August 23, 2021

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

Report Period: August 13 to August 19

Report No. 2021 MCN Temperature Report 0813–0819 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 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 on site at the McNary Juvenile Fish Facility (JFF). Units continued to be operated in a “sawtooth pattern” (operate every other unit) to reduce thermal stress to juvenile salmonids passing through the collection system.

Fish Collection

An estimated 440 juvenile salmonids were collected and 439 were bypassed at the McNary JFF (Table 1). There was 1 fish mortality in the sample on August 17. Fish sampling was limited to 15 hours per sample day (August 13, 15, 17, and 19) during this report period due to a shortage of McNary JFF staff.

River Conditions

Average river flow for this reporting period was 138.5 kilo cubic feet per second (kcfs), with an average spill of 49.2 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14. Onset temperature logger in gatewell Unit 8 did not operate from August 16 at 0900 hours to August 17 at 1200 hours, at which time it was replaced.

Weather Conditions

The weekly average air temperature from August 13 to August 19 was 78.1°F. Air temperatures ranged from a maximum of 100.0°F on August 12 to a minimum of 63.2°F on August 19 (Figure 1). Wind speeds averaged 7.2 mph with gusts of 24.2 mph (Table 1). Wind direction was predominantly 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: 72.8°F, forebay (weekly average of eight positions); 72.1°F, gatewell (weekly average of 14 positions); 72.3°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 72.0°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 10 had the

highest weekly average temperature, 73.1°F (Figure 3). The maximum temperature, 79.6°F, was recorded in forebay Unit 10 at 1930 hours on August 15.

The average weekly temperature differentials within dam locations were: 2.0°F, forebay; 2.3°F, gatewell; 0.7°F, collection channel; and 0.1°F, JFF (Figure 4). The largest temperature differential, 6.6°F, was recorded in the forebay at 2000 hours on August 15 (Unit 10 high, Unit 14 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 7.4°F at 1900 hours on August 15 at Unit 1 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.6°F. On average, the collection channel was warmer than the gatewell at Units 1 and 8. The largest temperature differential between the gatewell and corresponding collection channel location was 3.8°F at 1600 hours on August 12 at Unit 8 (collection channel was warmer than the gatewell).

Table 1
Bypass, Mortality, and River and Weather Conditions from August 13 to August 19

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
13-Aug	56	56	0	0	147.7	58.7	84.3	82.4	100.0	4.9	9.2
14-Aug					177.3	71.1	101.5	78.1	88.4	3.5	6.9
15-Aug	40	40	0	0	157.1	73.4	78.9	82.8	96.7	5.0	9.2
16-Aug					115.2	90.4	20.1	82.4	97.1	4.9	13.8
17-Aug	224	223	1	0	132.8	108.1	19.9	79.6	94.8	13.4	24.2
18-Aug					113.2	88.6	19.9	69.8	78.4	13.7	24.2
19-Aug	120	120	0	0	126.0	101.3	19.9	71.3	81.1	5.4	9.2
Weekly Total	**440**	**439**	**1**	**0**	**138.5**	**84.5**	**49.2**	**78.1**	**90.9**	**7.2**	**13.8**

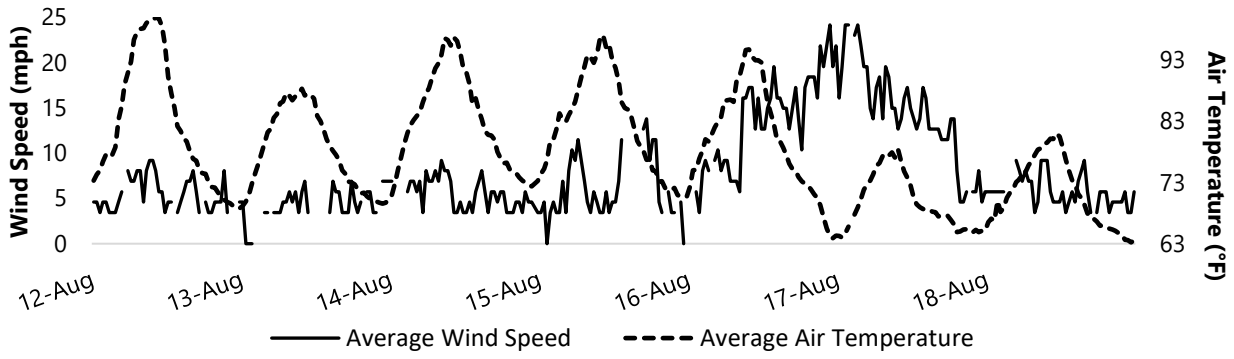

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from August 13 to August 19

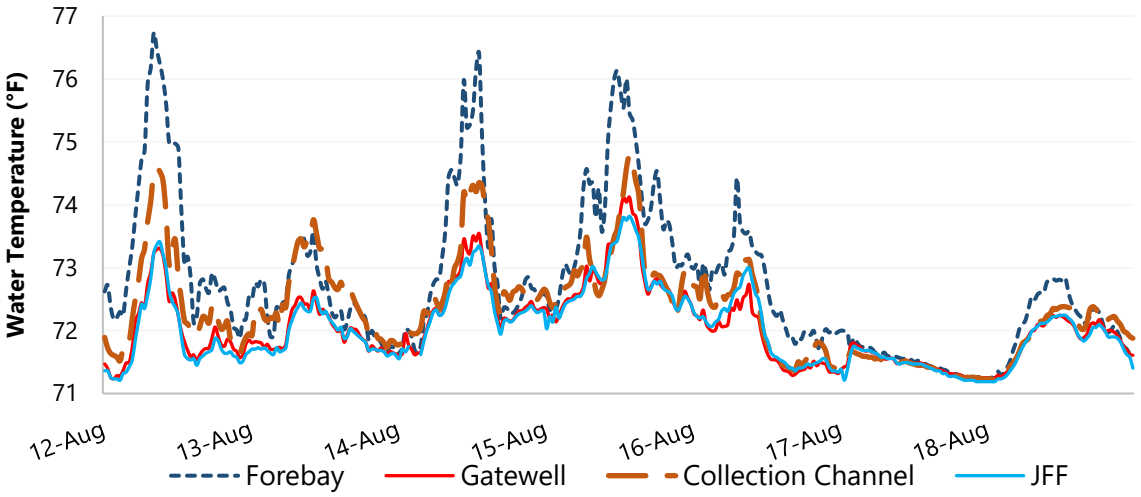

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from August 13 to August 19

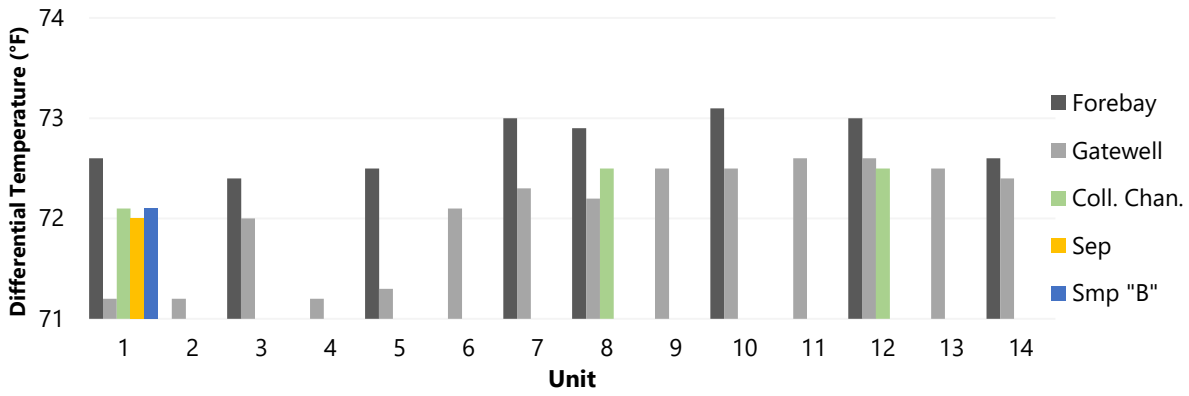

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from August 13 to August 19

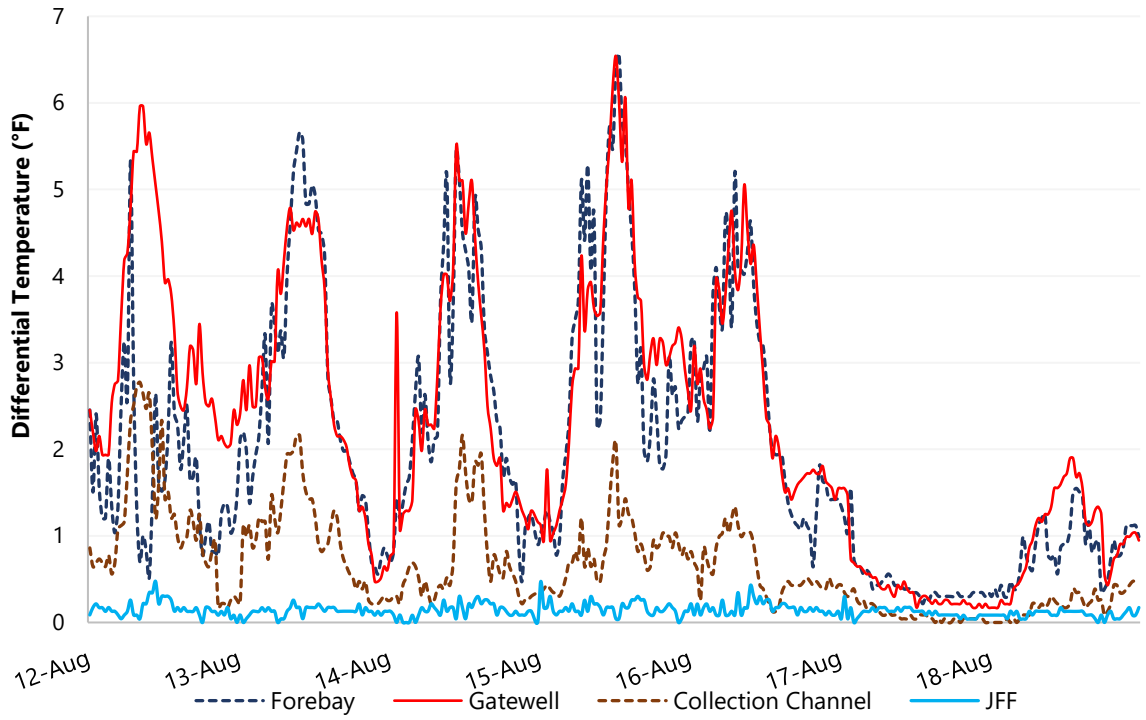

Figure 4
Average Differential Temperatures Within Four Dam Locations from August 13 to August 19

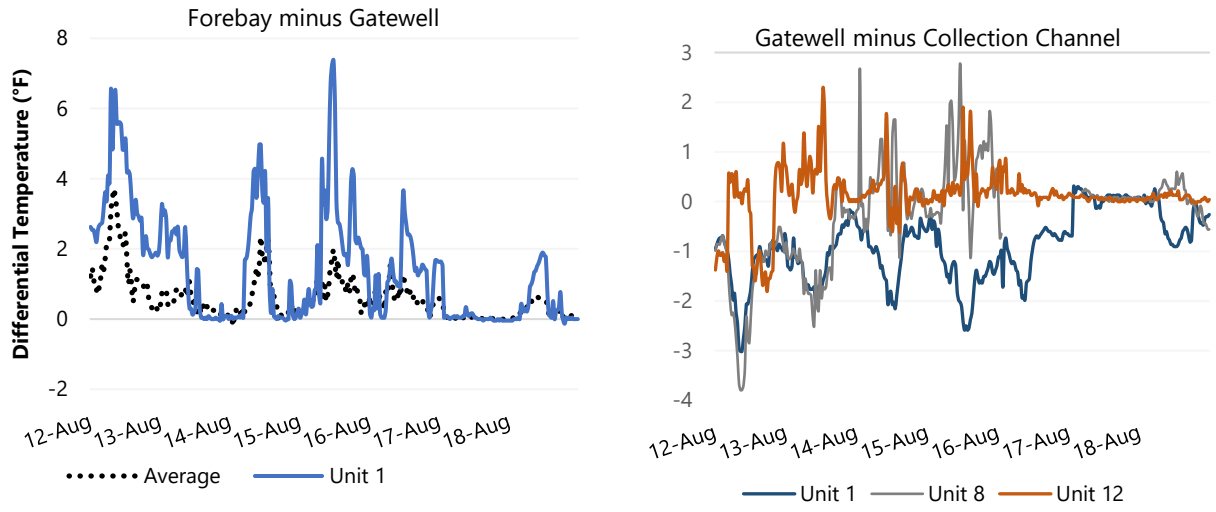

Figure 5
Average Differential Temperatures Across Three Dam Locations from August 13 to August 19