Weekly Temperature Report
McNary Dam

September 7, 2021

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

Report Period: August 27 through August 31

Report No. 2021 MCN Temperature Report 0827–0831 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 1200 hours on June 14 and continued 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 an Onset temperature logger located on site at the McNary Juvenile Fish Facility (JFF). Operation of Units in a “sawtooth pattern” (operate every other unit) to reduce thermal stress to juvenile salmonids passing through the collection system ended on August 31.

Fish Collection

An estimated 168 juvenile salmonids were collected and 167 were bypassed at the McNary JFF (Table 1). There was one fish mortality in the sample on August 31.

River Conditions

Average river flow for this reporting period was 127.1 kilo cubic feet per second (kcfs) with an average spill of 20.7 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14. The Onset temperature logger in forebay Unit 7 ceased operation on August 30 at 0830 hours. Temperature monitoring was concluded for the 2021 season on August 31 at which time all temperature loggers were removed.

Weather Conditions

The weekly average air temperature from August 27 to August 31 was 70.0°F. Air temperatures ranged from a maximum of 84.3°F on August 29 to a minimum of 55.6°F on August 28 (Figure 1). Wind speeds averaged 9.5 mph with gusts of 28.8 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: 69.9°F, forebay (weekly average of eight positions); 69.7°F, gatewell (weekly average of 14 positions); 69.7°F, collection channel (weekly average of positions at

Units 1, 8, and 12); and 69.7°F, JFF (weekly average of the separator and sample tank "B"). Forebay Unit 7 had the highest weekly average temperature, 70.1°F (Figure 3). The maximum temperature, 73.2°F, was recorded in forebay Unit 1 at 1700 hours on August 29.

The average weekly temperature differentials within dam locations were: 0.8°F, forebay; 1.0°F, gatewells; 0.3°F, collection channel; and 0.1°F, JFF (Figure 4). The largest temperature differential, 3.5°F, was recorded in the gatewell at 1700 hours on August 29 (Unit 1 high, Unit 4 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.3°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 3.4°F at 1730 hours on August 29 at Unit 10 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.3°F. On average, the gatewells were warmer than the collection channels at Units 1 and 8. The largest temperature differential between the gatewell and corresponding collection channel location was 2.3°F at 1700 hours on August 29 at Unit 1 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from August 27 to August 31

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
27-Aug	40	40	0	0	131.3	106.7	19.9	71.9	80.8	14.9	21.9
28-Aug					130.2	105.6	19.9	68.5	79.2	6.2	13.8
29-Aug	40	40	0	0	135.1	106.6	23.8	69.5	81.8	3.9	8.1
30-Aug					127.7	103.1	19.9	71.6	84.3	4.2	11.5
31-Aug	88	87	1	0	111.1	86.5	19.9	68.3	79.7	18.3	28.8
Weekly Total	**168**	**167**	**1**	**0**	**127.1**	**101.7**	**20.7**	**70.0**	**81.2**	**9.5**	**16.8**

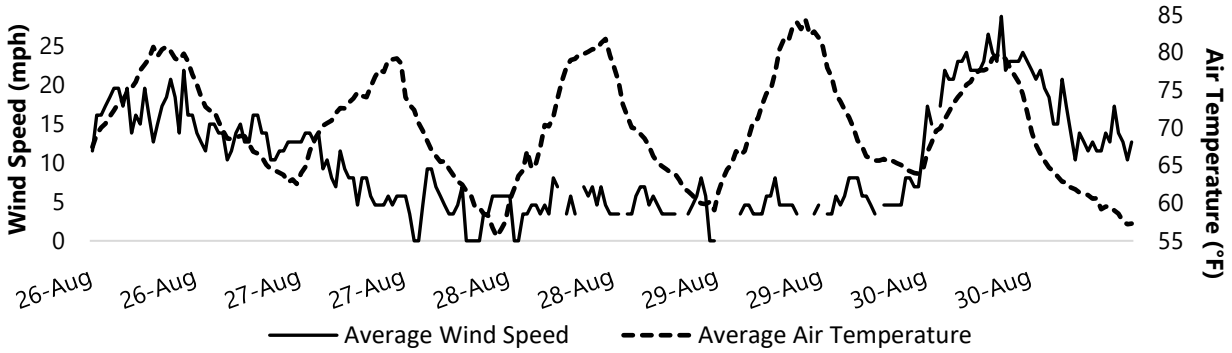

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from August 27 to August 31

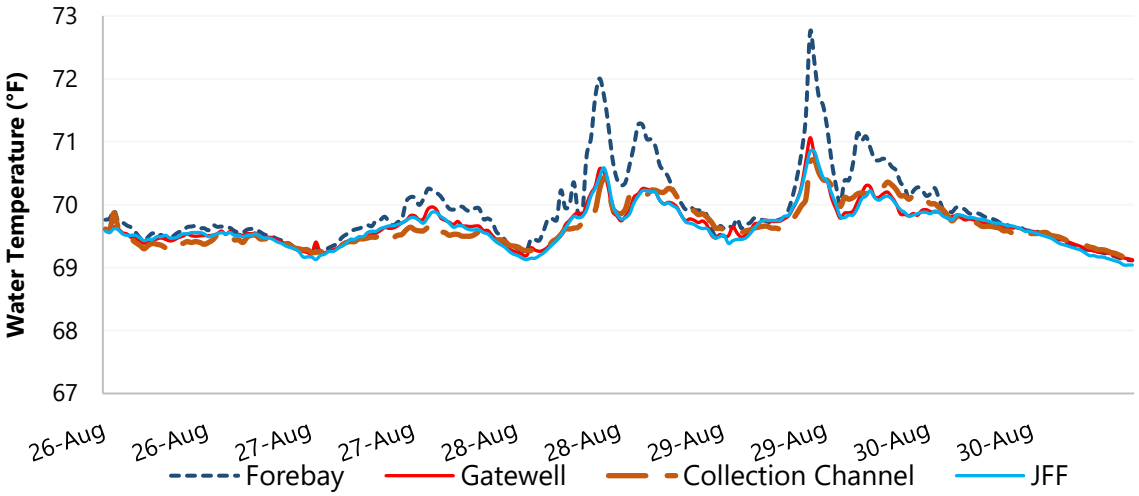

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from August 27 to August 31

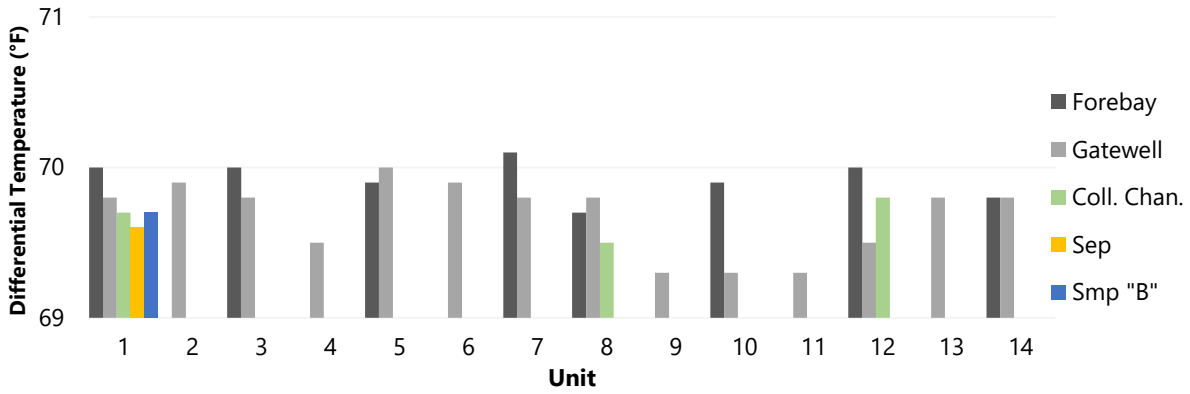

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from August 27 to August 31

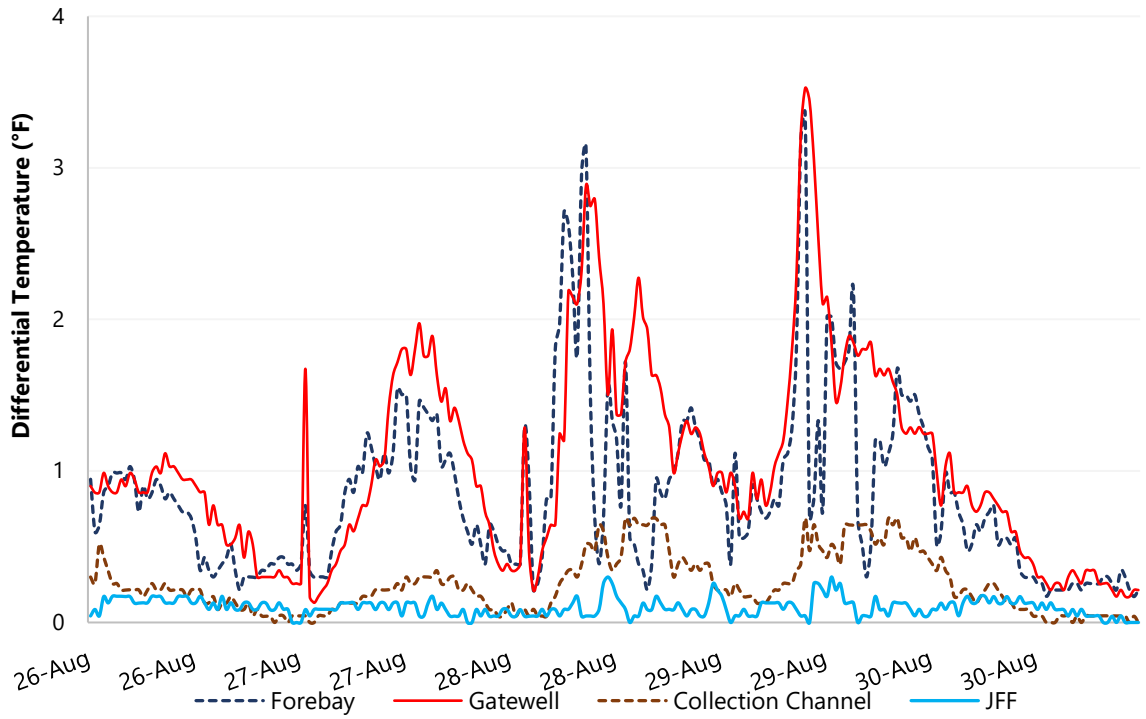

Figure 4
Average Differential Temperatures within Four Dam Locations from August 27 to August 31

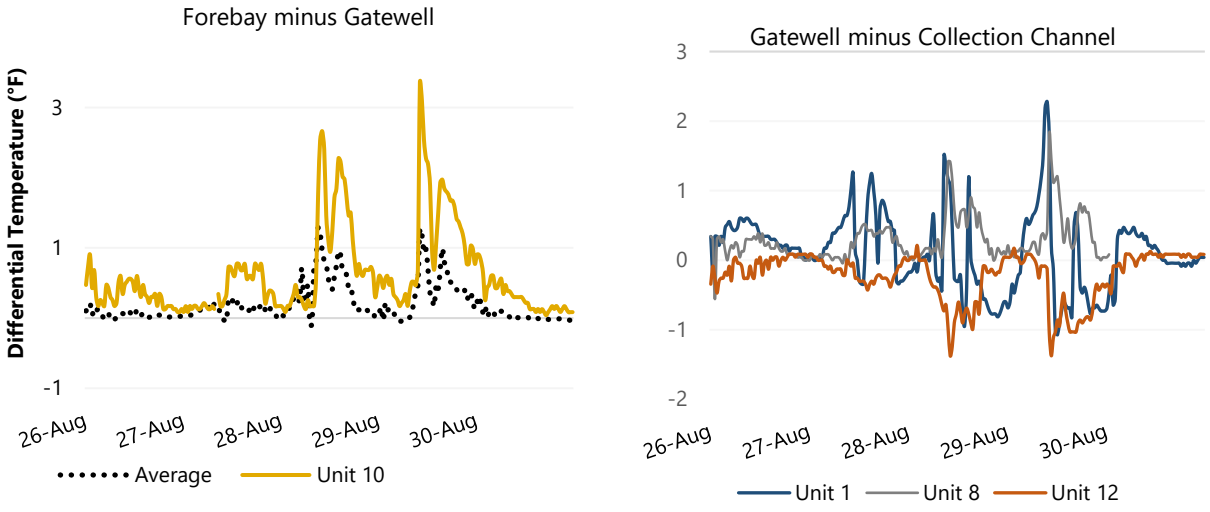

Figure 5
Average Differential Temperatures across Three Dam Locations from August 27 to August 31