Weekly Temperature Report
McNary Dam

July 6, 2021

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Report Period: June 25 through July 1

Report No. 2021 MCN Dam Temperature Weekly Report 0625–0701 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 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). In response to elevated river temperatures, on June 30 unit operations were switched to a “sawtooth pattern” (operate every other unit) to reduce thermal stress to juvenile salmonids passing through the collection system.

Fish Collection

An estimated 73,903 juvenile salmonids were collected and 73,893 bypassed at the McNary JFF (Table 1). Weekly fish mortalities were 5 in the sample and 5 in the facility.

River Conditions

Average river flow for this reporting period was 215.0 kilo cubic feet per second (kcfs) with an average spill of 123.0 kcfs.

Temperature Logger Operations

Temperature loggers were deployed on June 14.

Weather Conditions

The weekly average air temperature from June 25 to July 1 was 85.7°F. Air temperatures ranged from a maximum of 113.1°F on June 29 to a minimum of 68.5°F on June 27 (Figure 1). Wind speeds averaged 7.3 miles per hour (mph) with gusts to 28.8 mph (Table 1).

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 68.3°F, forebay (weekly average of eight positions); 67.7°F, gatewells (weekly average of 14 positions); 68.1°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 67.6°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 10 had the highest weekly average temperature, 69.2°F (Figure 3). The maximum temperature, 75.0°F, was recorded in Forebay Unit 7 at 2300 hours on June 25.

The average weekly temperature differentials within dam locations were 3.4°F, forebay; 3.7°F, gatewells; 1.0°F, collection channel; and 0.2°F, JFF (Figure 4). The largest temperature differential, 10.4°F, was recorded in the forebays at 2300 hours on June 25 (Unit 7 high, Units 3 and 5 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.7°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 8.6°F at 1700 hours on June 24 at Unit 3 (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 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 4.6°F at 0900 hours on June 25 at Unit 8 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from June 25 to July 1

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
25-Jun					198	79.9	113.4	79.3	95.7	6.4	18.4
26-Jun	36,900	36,897	2	1	219.5	89.2	125.6	80.9	96.0	5.3	10.4
27-Jun					212.5	86.2	121.6	85.1	99.7	4.6	9.2
28-Jun	11,200	11,200	0	0	212.4	86.3	121.4	87.4	105.0	8.9	17.3
29-Jun					222	90.4	126.9	90.6	108.5	2.8	5.8
30-Jun	25,803	25,796	3	4	235.2	96	134.5	92.2	113.1	9.2	20.7
1-Jul					205.2	83.1	117.3	84.6	102.6	14.0	28.8
Weekly Total	**73,903**	**73,893**	**5**	**5**	**215.0**	**87.3**	**123.0**	**85.7**	**102.9**	**7.3**	**15.8**

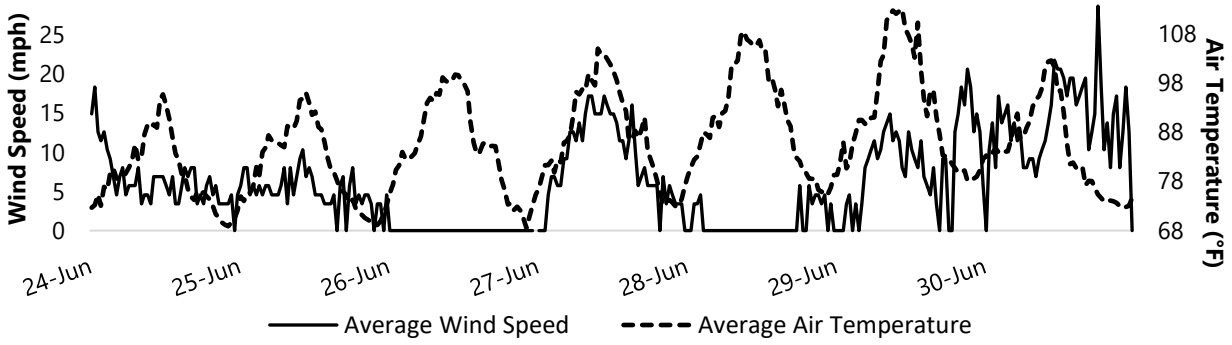

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from June 25 to July 1

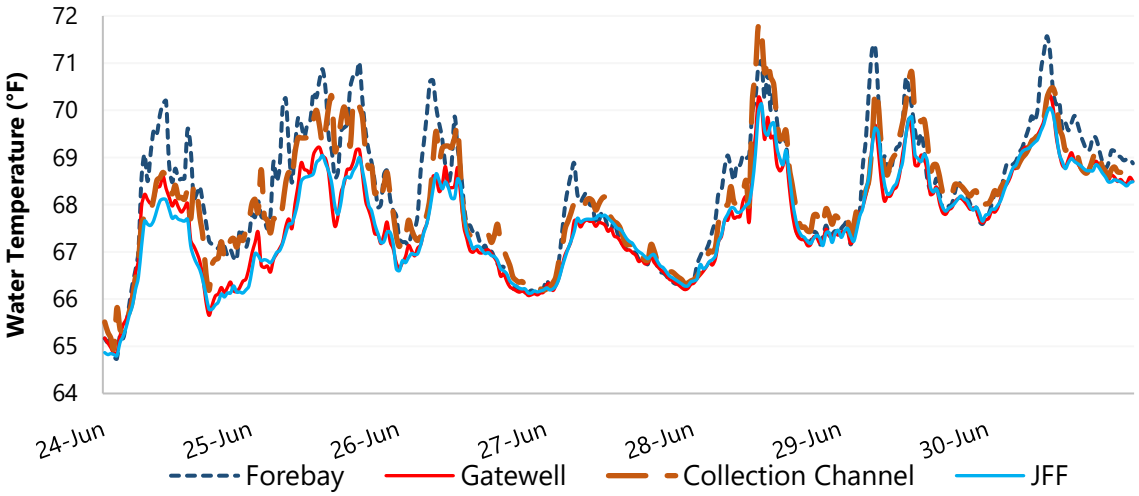

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from June 25 to July 1

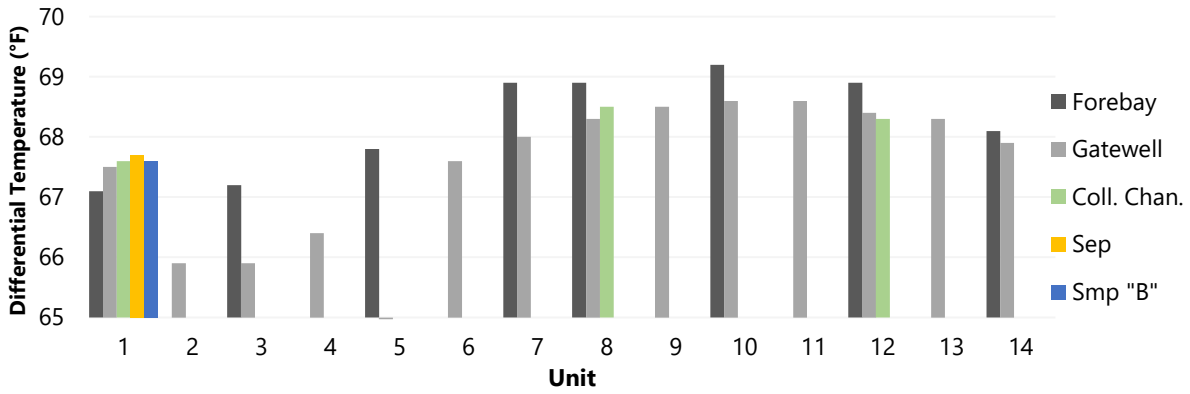

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from June 25 to July 1

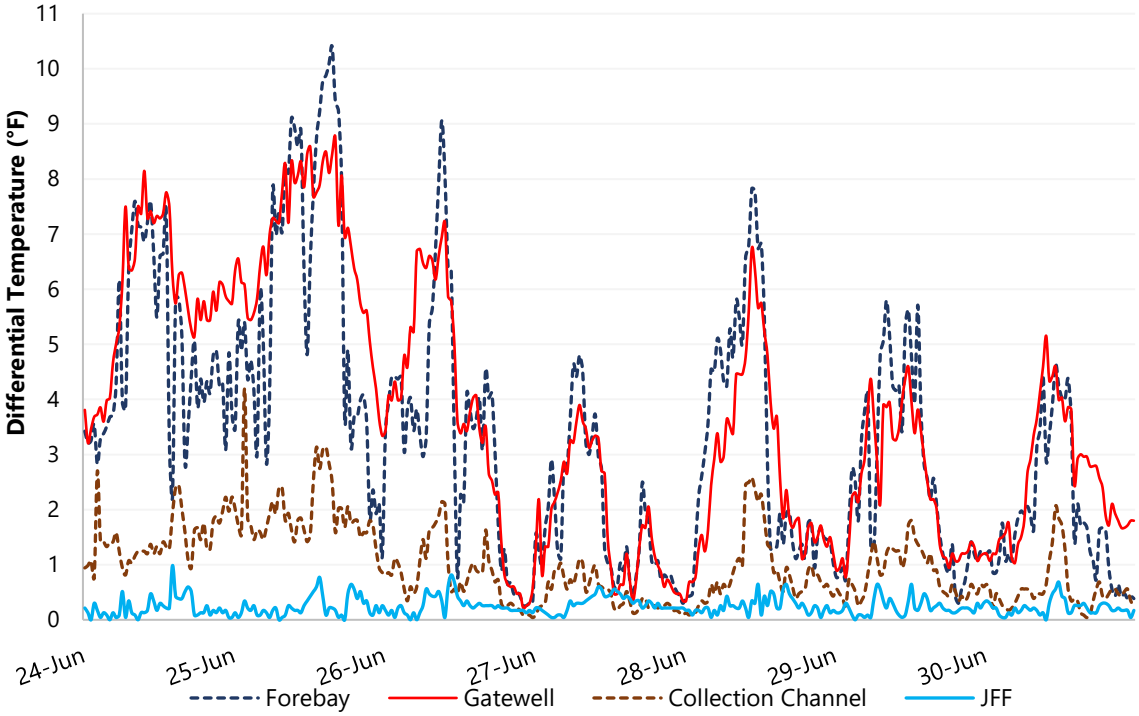

Figure 4
Average Differential Temperatures within Four Dam Locations from June 25 to July 1

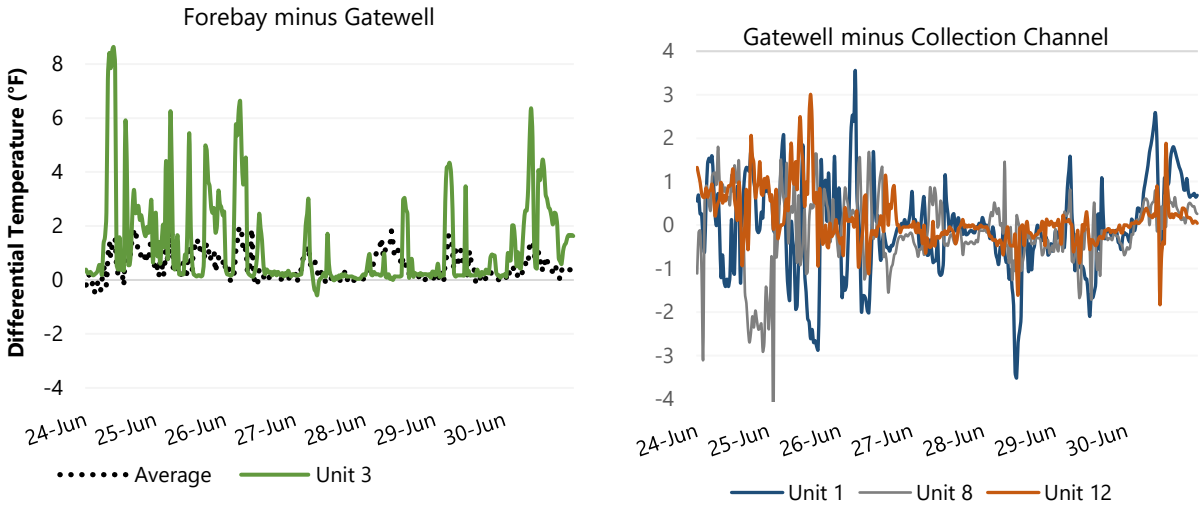

Figure 5
Average Differential Temperatures across Three Dam Locations from June 25 to July 1