Weekly Temperature Report
McNary Dam

June 26, 2022

Prepared by: Glen Manley and Jeff Christopherson, Environmental Assessment Services

Report Period: June 15 through June 22

Report No. 2023 MCN Temperature Report 0615–0622 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). 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 30,301 juvenile salmonids were collected and 30,294 were bypassed at the McNary JFF (Table 1). There were 7 fish mortalities in the sample on for the reporting period.

River Conditions

Average river flow for this reporting period was 174.8 kilo cubic feet per second (kcfs) with an average spill of 108.0 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14. All temperature loggers performed normally. Due to gatewells 13 and 14 being covered over for at least 1 month, those temperature loggers were deployed in the Collection Channel in locations 13 and 14. In addition, Forebay 5 temperature logger was deployed in Forebay 6 location due to USDA monitoring equipment already in that location.

Weather Conditions

The weekly average air temperature from June 15 to 22 was 64.6°F. Air temperatures ranged from a maximum of 86.1°F on June 17 to a minimum of 49.4°F on June 19 (Figure 1). Wind speeds averaged 10.1 mph with gusts of 18.9 mph (Table 1). Wind direction was predominantly West by 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: 64.7°F, forebay (weekly average of eight positions); 64.3°F, gatewell (weekly average of 14 positions); 64.0°F, collection channel (weekly average of positions at

Units 1, 8, 12, 13, and 14); and 64.1°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 1 had the highest weekly average temperature, 65.3°F (Figure 3). The maximum temperature, 64.7°F, was recorded in gatewell Unit 2 at 1100 hours on June 14.

The average weekly temperature differentials within dam locations were: 1.7°F, forebay; 1.8°F, gatewells; 0.5°F, collection channel; and 0.2°F, JFF (Figure 4). The largest temperature differential, 15.0°F, was recorded in the gatewell at 1100 hours on June 14 (Unit 2 high, Unit 3 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 7.5°F at 1930 hours on June 21 at Unit 10 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.7°F. On average, the gatewells were warmer than the collection channels at Units 1, 8, and 12. The largest temperature differential between the gatewell and corresponding collection channel location was 14.1°F at 1100 hours on June 14 at Unit 1 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from June 17 to June 23

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
15-Jun					190.1	50.3	135.0	63.7	76.3	15.6	25.3
16-Jun	5,500	5,498	2		192.1	54.0	133.4	64.9	80.8	5.1	11.5
17-Jun					181.1	67.0	109.3	67.6	86.1	15.2	19.6
18-Jun	7,350	7,350	0		171.1	63.0	103.4	68.6	80.1	11.6	23.0
19-Jun					165.6	63.1	97.9	61.3	73.1	13.4	23.0
20-Jun	6,400	6,398	2		164.9	66.1	94.1	62.1	70.3	15.4	21.9
21-Jun					171.1	72.4	93.9	62.4	72.5	9.3	18.4
22-Jun	11,051	11,048	2	1	162.2	60.3	97.1	66.1	80.0	5.0	8.1
Weekly Total	**30,301**	**30,294**	**6**	**1**	**174.8**	**62.0**	**108.0**	**64.6**	**77.4**	**10.1**	**18.9**

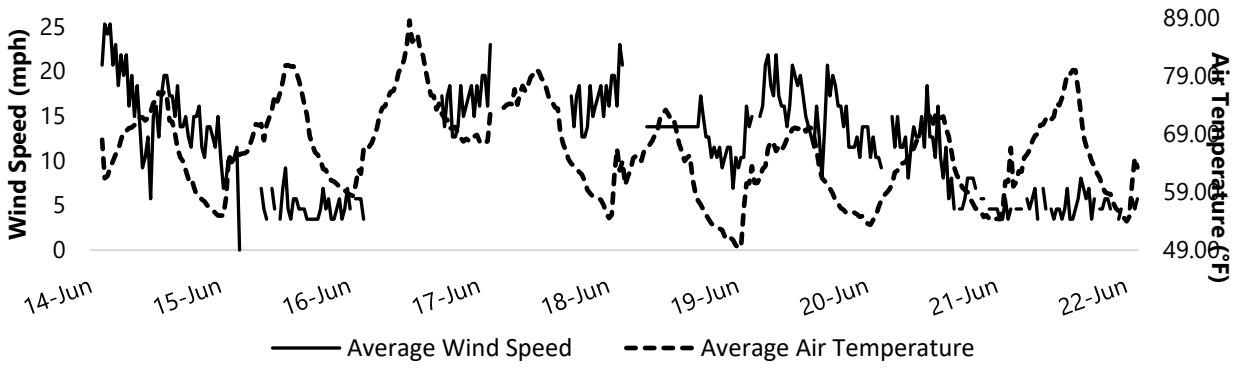

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from June 17 to June 23

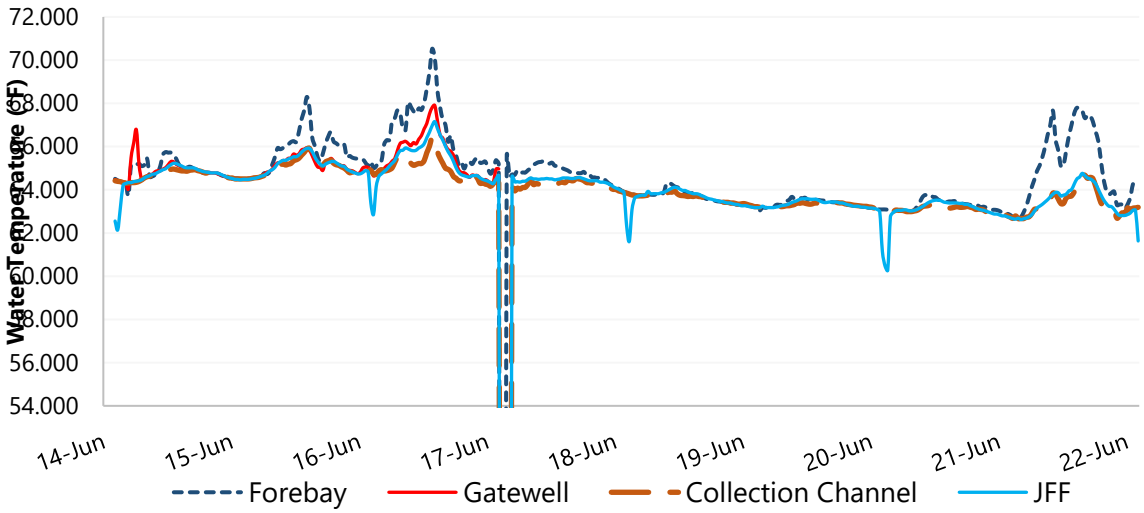

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from June 17 to June 23

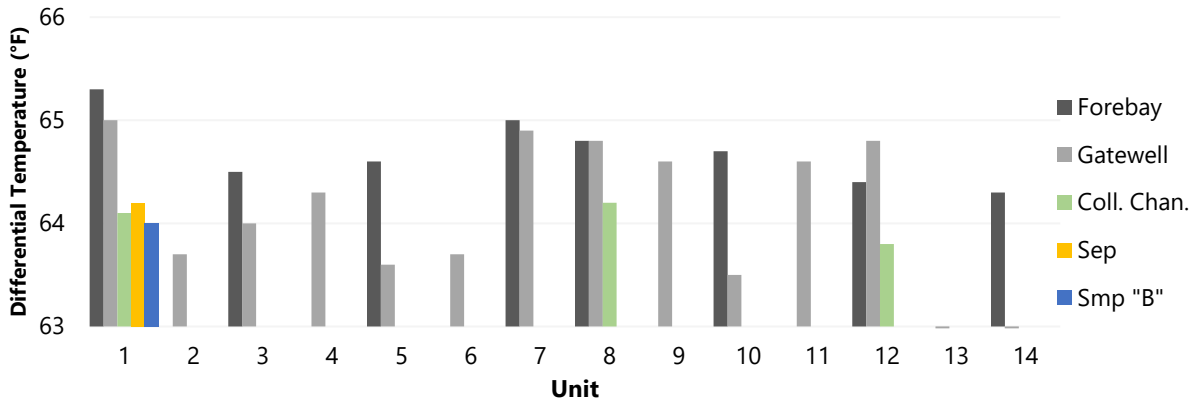

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from June 17 to June 23

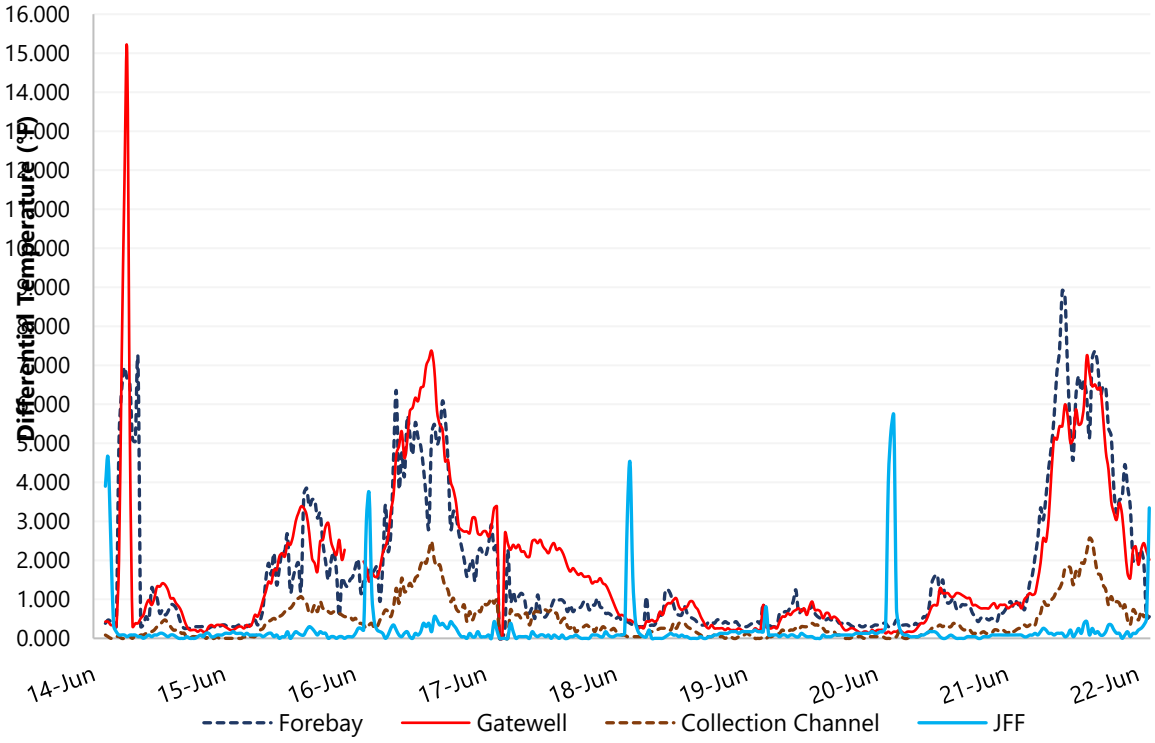

Figure 4
Average Differential Temperatures within Four Dam Locations from June 17 to June 23

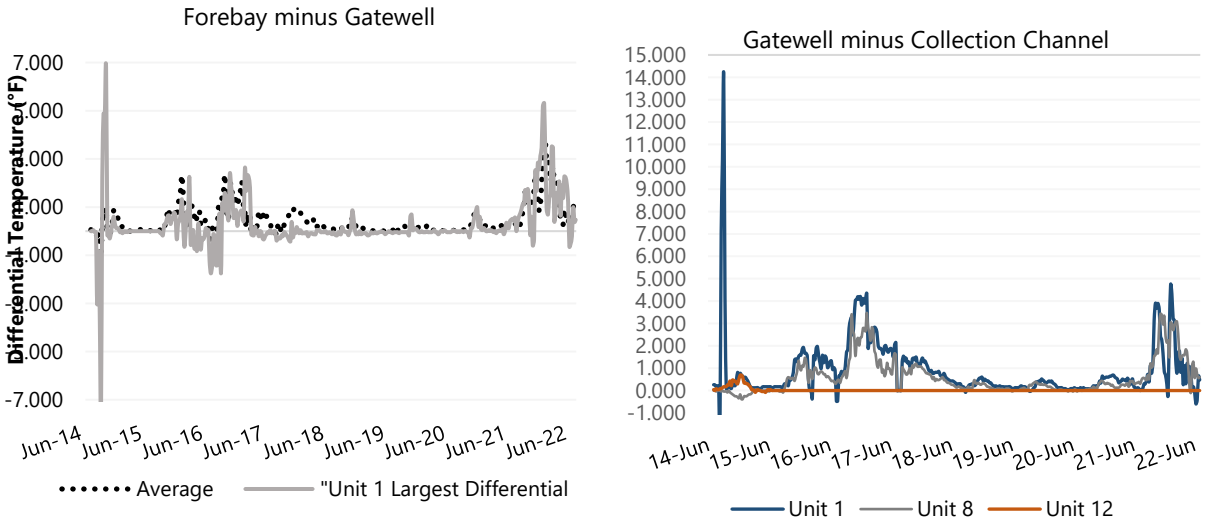

Figure 5
Average Differential Temperatures across Three Dam Locations from June 17 to June 23