Weekly Temperature Report
McNary Dam

July 21, 2023

Prepared by: Eric Harries, Environmental Assessment Services

Report Period: July 14 through July 20

Report No. 2023 MCN Temperature Report 0714–0720 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). Due to elevated river temperatures, the “sawtooth pattern” (operate every other unit) unit operation mode began on July 2 and continued through this report period to reduce thermal stress to juvenile salmonids passing through the collection system.

Fish Collection

An estimated 12,310 juvenile salmonids were collected and 12,289 were bypassed at the McNary JFF (Table 1). There were five fish mortalities in the sample for the reporting period.

River Conditions

Average river flow for this reporting period was 155.4 kilo cubic feet per second (kcfs) with an average spill of 89.6 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14. All temperature loggers performed normally.

Weather Conditions

The weekly average air temperature from July 14 to July 20 was 79.8°F. Air temperatures ranged from a maximum of 100.7°F on July 20 to a minimum of 61.0°F on July 19 (Figure 1). Wind speeds averaged 7.3 mph with wind speed averages up to 27.6 mph (Table 1). The wind direction was predominantly from the 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: 72.7°F, forebay (weekly average of eight positions); 71.1°F, gatewell (weekly average of eleven positions); 70.5°F, collection channel (weekly average of positions at Units 1, 8, 12, 13 and 14); and 70.9°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 3 had the highest weekly average temperature, 73.5°F (Figure 3). The maximum temperature, 79.7°F, was recorded in forebay Unit 3 at 19:30 hours on July 15.

The average weekly temperature differentials within dam locations were: 3.1°F, forebay; 3.5°F, gatewells; 1.0°F, collection channel; and 0.2°F, JFF (Figure 4). The largest temperature differential, 9.3°F, was recorded in the gatewell at 19:30 hours on July 14 (Unit 4 high, Unit 10 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 1.8°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 7.7°F at 22:00 hours on July 15 at Unit 1 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.22°F. On average, the gatewells were warmer than the collection channels at Unit 1 and cooler at Unit 8. The largest temperature differential between the gatewell and corresponding collection channel location was 4.3 at 21:00 hours on July 14 at Unit 8 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from July 7–13

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
14-Jul	6,900	6,889	3	8	161.5	64.8	92.0	79.4	95.6	5.3	9.2
15-Jul	0	0	0	0	167.5	69.9	92.9	81.6	98.3	5.1	12.7
16-Jul	2,400	2,399	1	0	156.8	59.7	92.4	82.8	100.4	7.4	17.3
17-Jul	0	0	0	0	145.0	51.3	89.0	77.5	86.0	16.5	27.6
18-Jul	2,150	2,141	1	8	155.1	66.9	83.6	74.8	88.2	5.6	9.2
19-Jul	0	0	0	0	161.0	67.6	88.7	78.7	98.3	5.7	10.4
20-Jul	860	860	0	0	147.0	53.0	89.3	82.5	100.7	5.4	11.5
Weekly Total	**12,310**	**12,289**	**5**	**16**	**156.3**	**61.9**	**89.7**	**79.6**	**100.7**	**7.3**	**27.6**

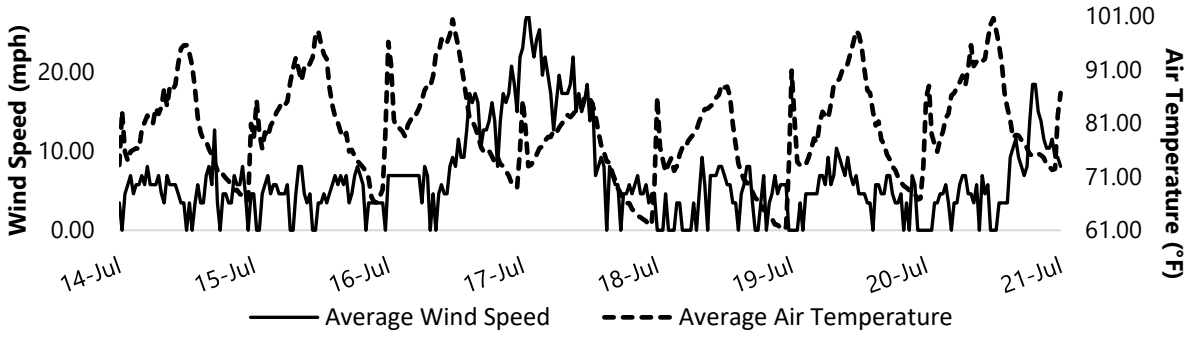

Figure 1
Average Wind Speed and Air Temperature for each half hour interval from July 14–20

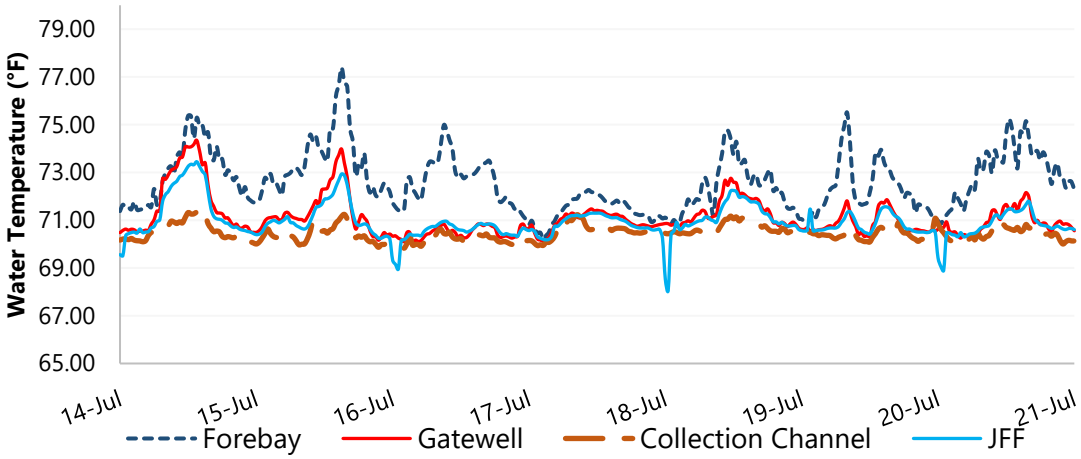

Figure 2
Average Water Temperatures at half hour intervals for the four Dam Locations from July 14–20

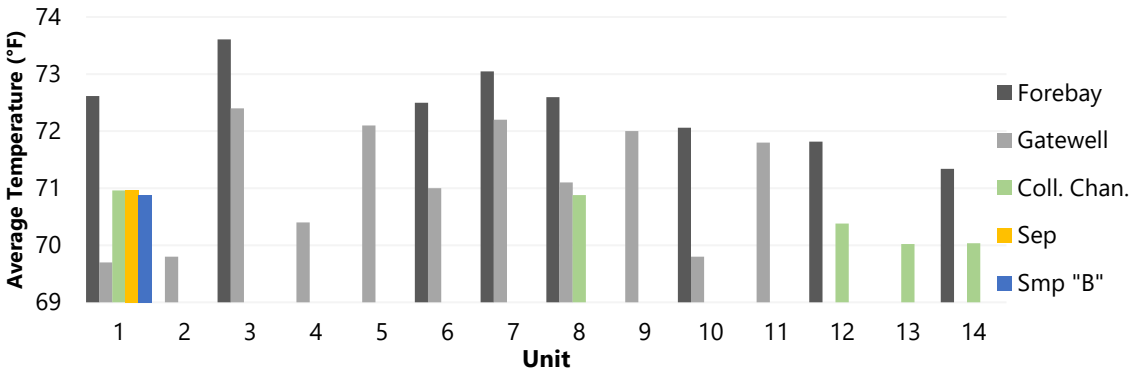

Figure 3
Average Weekly Water Temperatures by Position for five Dam Locations from July 14–20

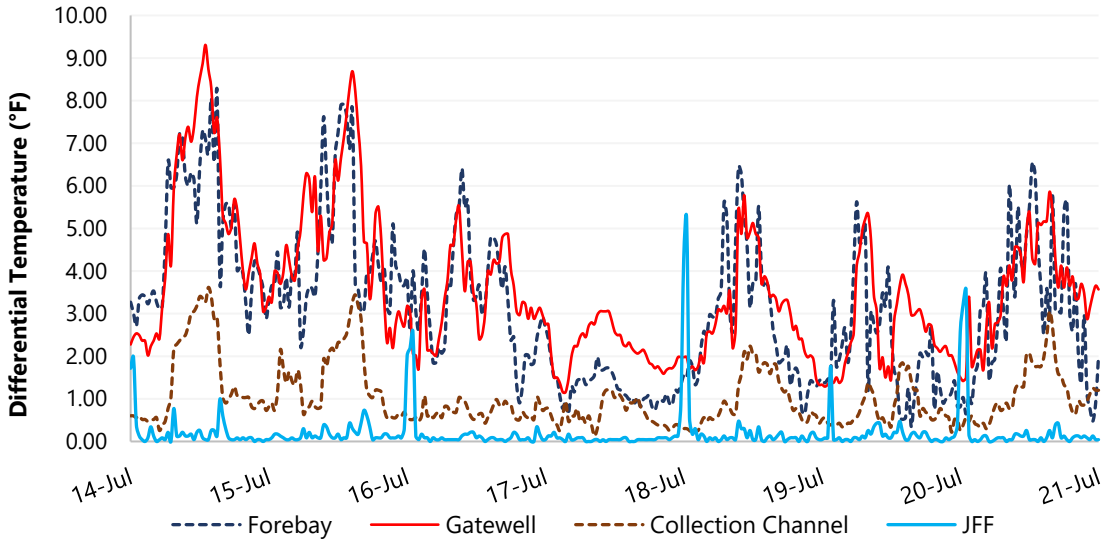

Figure 4
Average Differential Temperatures within four Dam Locations from July 14–20

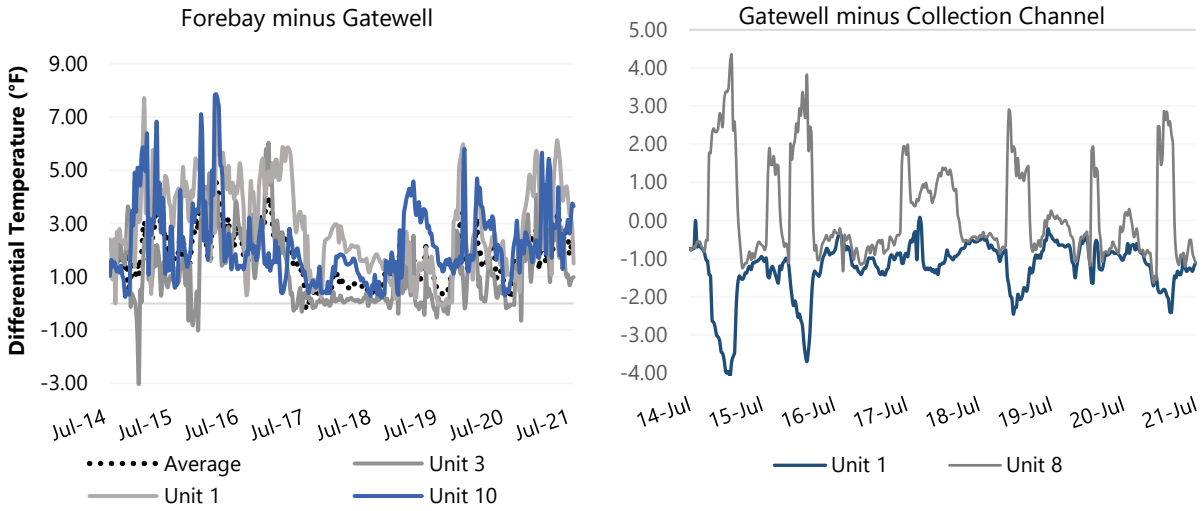

Figure 5
Average Differential Temperatures across Three Dam Locations from July 14–20