Weekly Temperature Report
McNary Dam

August 2, 2021

Prepared by: Kristi Geris, Anchor QEA; and Wes Stonecypher and Eric Harries, Environmental Assessment Services, LLC

Report Period: July 23 to July 29, 2021

Report No. 2021 MCN Dam Temperature Weekly Report 0723–0729 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 onsite at the McNary Juvenile Fish Facility (JFF). Units operated in "sawtooth pattern" (operate every other unit) to reduce thermal stress to juvenile salmonids passing through the collection system. Gatewell Units 1, 2, and 5 were not operating this week.

Fish Collection

An estimated 2,180 juvenile salmonids were collected and 2,177 bypassed at the McNary JFF. Weekly fish mortalities were 2 in the sample and 1 in the facility (Table 1).

River Conditions

Average river flow for this reporting period was 146.7 kilo cubic feet per second (kcfs) with an average spill of 83.9 kcfs (Table 1).

Temperature Logger Operations

Temperature loggers were deployed on June 14.

Weather Conditions

The weekly average air temperature from July 23 to July 29 was 77.1°F. Air temperatures ranged from a maximum of 96.4°F on July 25 to a minimum of 64.5°F on July 24 (Figure 1). Wind speeds averaged 5.0 mph with gusts to 13.8 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: 71.8°F, forebay (weekly average of eight positions); 70.6°F, gatewell (weekly average of 13 positions); 70.5°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 70.5°F, JFF (weekly average of the separator and sample tank "B"). Forebay Units 1 and 3 had the highest weekly average temperature, 72.4°F (Figure 3). The maximum temperature, 77.9°F, was recorded in Forebay Unit 3 at 1900 hours on July 23.

The average weekly temperature differentials within dam locations were: 2.7°F, forebays; 3.0°F, gatewells; 0.2°F, collection channel; and 0.1°F, JFF (Figure 4). The largest temperature differential, 7.8°F, was recorded in the forebays at 1900 hours on July 23 (Unit 3 high, Unit 5 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 1.3°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 8.6°F at 1900 hours on July 23 at Unit 8 (forebay warmer than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.9°F. On average, the collection channels were warmer than the gatewells. The largest temperature differential between the gatewell and corresponding collection channel location was 2.6°F at 2130 hours on July 25 at Unit 12 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from July 23 to July 29

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
23-Jul					149.0	59.1	85.4	71.1	84.3	5.9	12.7
24-Jul	780	778	2	0	146.9	58.2	84.0	74.9	88.9	5.7	13.8
25-Jul					143.4	56.8	81.9	79.4	93.3	4.6	12.7
26-Jul	910	909	0	1	151.4	60.1	86.6	80.5	96.4	5.2	12.7
27-Jul					148.3	58.7	84.9	79.8	91.2	4.1	9.2
28-Jul	490	490	0	0	154.1	61.3	88.1	74.7	80.4	5.3	12.7
29-Jul					133.8	52.7	76.4	79.4	93.0	4.0	9.2
Weekly Total	**2,180**	**2,177**	**2**	**1**	**146.7**	**58.3**	**83.9**	**77.1**	**89.6**	**5.0**	**11.8**

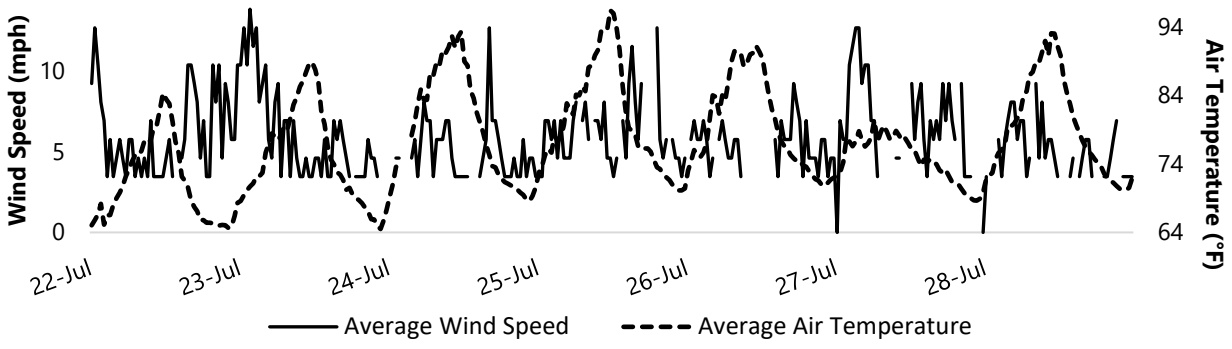

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from July 23 to July 29

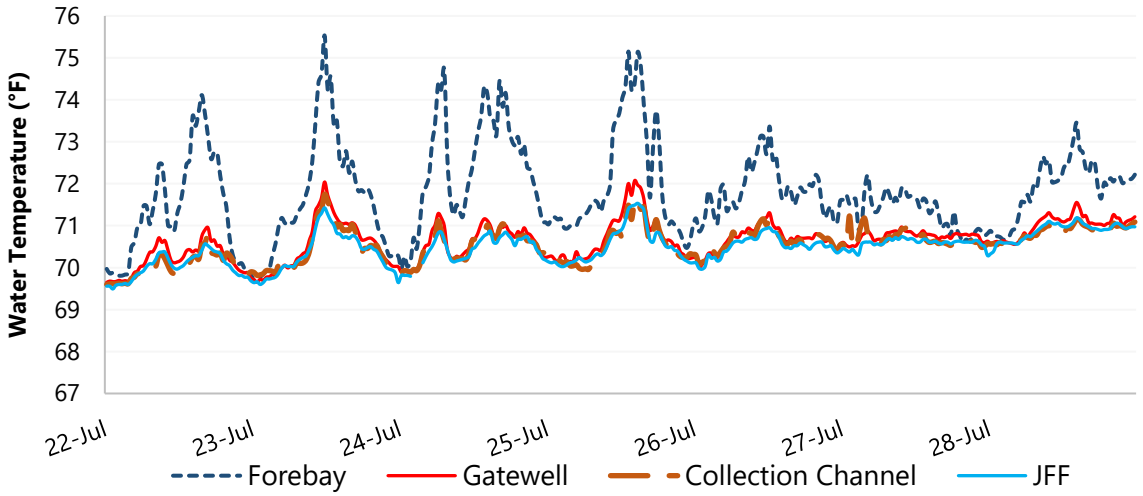

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from July 23 to July 29

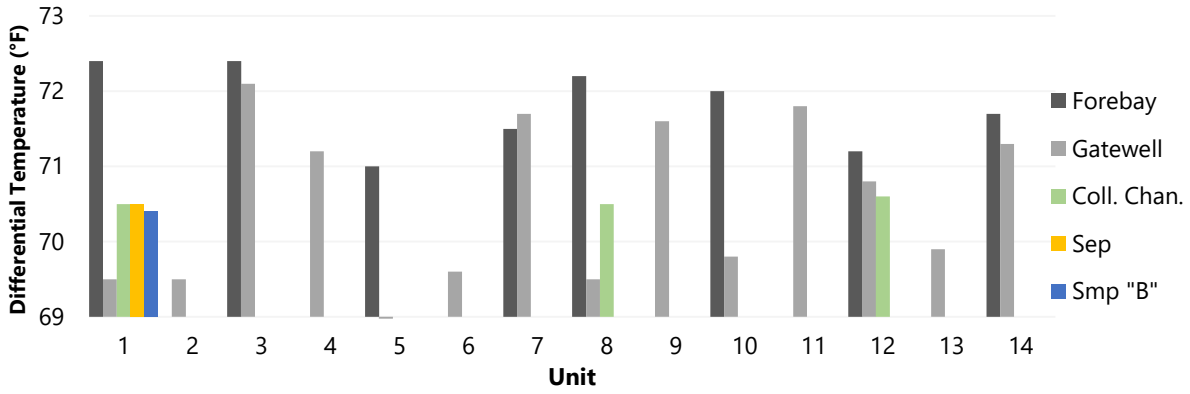

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from July 23 to July 29

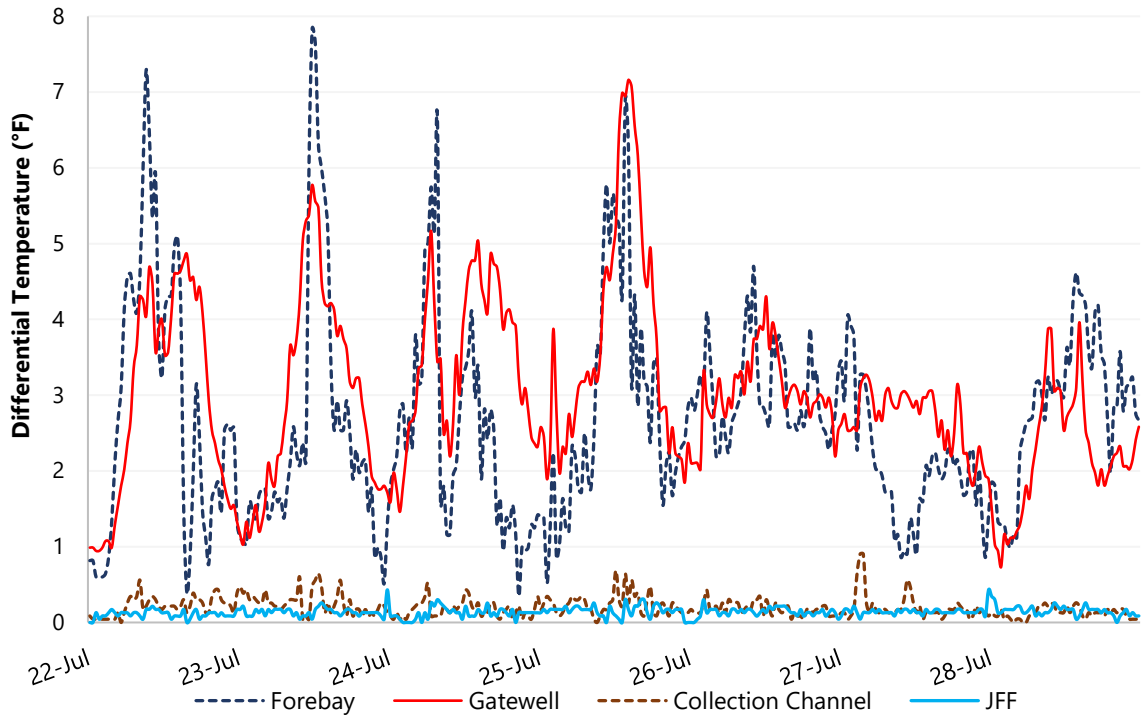

Figure 4
Average Differential Temperatures within Four Dam Locations from July 23 to July 29

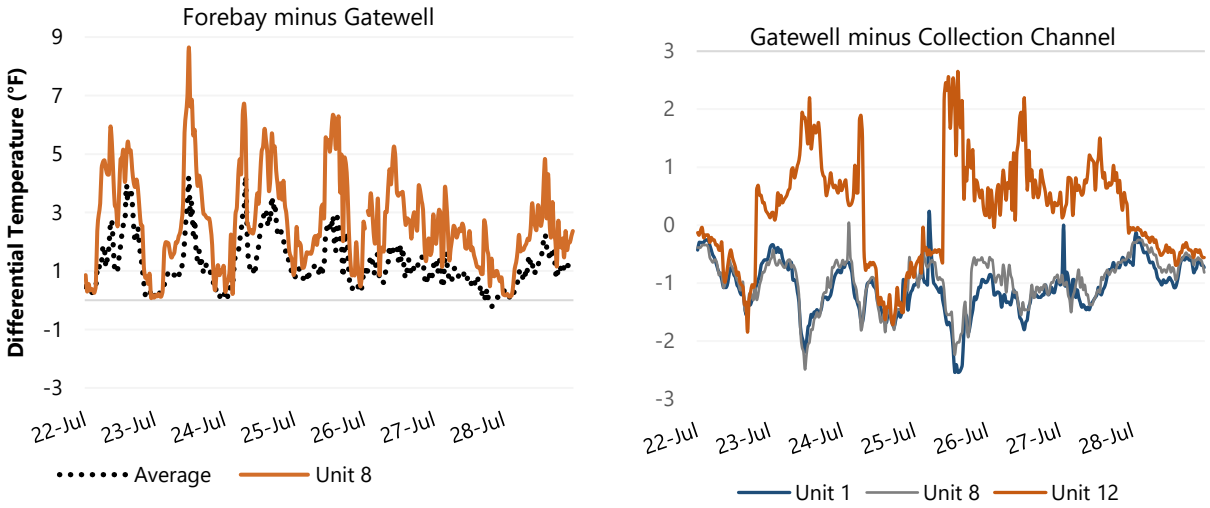

Figure 5
Average Differential Temperatures across Three Dam Locations from July 23 to July 29