Weekly Temperature Report
McNary Dam

August 21, 2023

Prepared by: Eric Harries, Environmental Assessment Services

Report Period: August 11 through August 17

Report No. 2023 MCN Temperature Weekly Report 0811-0817 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 1,279 juvenile salmonids were collected and 1,270 were bypassed at the McNary JFF (Table 1). There were three sample mortalities and six facility mortalities for the reporting period.

River Conditions

The average river flow for the reporting period was 148.2 kilo cubic feet per second (kcfs) with an average spill of 62.1 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 August 11 to August 17 was 81.9°F. Air temperatures ranged from a minimum of 66.0°F on August 12 to a maximum of 104.2°F on August 15 (Figure 1). Wind speeds averaged 5.7 mph with wind speeds up to 19.6 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: 73.3°F, forebay (weekly average of eight positions); 72.5°F, gatewell (weekly average of eleven positions); 71.6°F, collection channel (weekly average of positions at Units 1, 8, 12, 13 and 14); and 72.2°F, JFF (weekly average of the separator and sample tank “B”). Forebay Unit 1 had the highest weekly average temperature, 73.8°F (Figure 3). The maximum temperature, 84.8°F, was recorded in forebay Unit 1 at 16:00 hours on August 16.

The average weekly temperature differentials within dam locations were: 2.4°F, forebay; 3.0°F, gatewells; 1.2°F, collection channel; and 0.3°F, JFF (Figure 4). The largest temperature differential, 12.3°F, was recorded in the forebay at 16:00 hours on August 16 (Unit 1 high, Unit 11 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.9°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 7.3°F at 18:30 hours on August 16 at Unit 7 (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 Unit 1 and 8. The largest temperature differential between the gatewell and corresponding collection channel location was 6.7°F at 15:30 hours on August 16 at Unit 1 (gatewell was warmer than the collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from August 11–August 17

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
11-Aug	410	407	1	2	145	65.1	75.2	76.3	91.2	8.3	13.8
12-Aug	0	0	0	0	157.1	69.1	83.3	77.7	88.7	6.5	12.7
13-Aug	112	112	0	0	148	55.6	87.6	81.0	96.3	4.1	6.9
14-Aug	0	0	0	0	146.2	57.1	84.4	81.9	99.6	4.5	9.2
15-Aug	184	184	0	0	150.7	81.4	64.6	86.0	104.2	4.2	9.2
16-Aug	0	0	0	0	144.6	120	19.9	86.1	101.2	5.0	9.2
17-Aug	573	567	2	4	145.6	120.9	20	84.1	97.8	7.5	19.6
Weekly Total	**1,279**	**1,270**	**3**	**6**	**148.2**	**81.3**	**62.1**	**81.9**	**104.2**	**5.7**	**19.6**

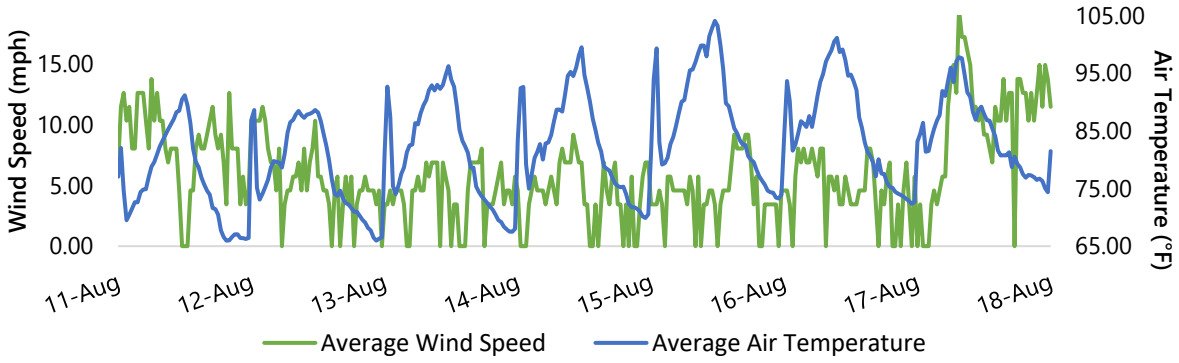

Figure 1
Average Wind Speed and Air Temperature for each half hour interval from August 11–August 17

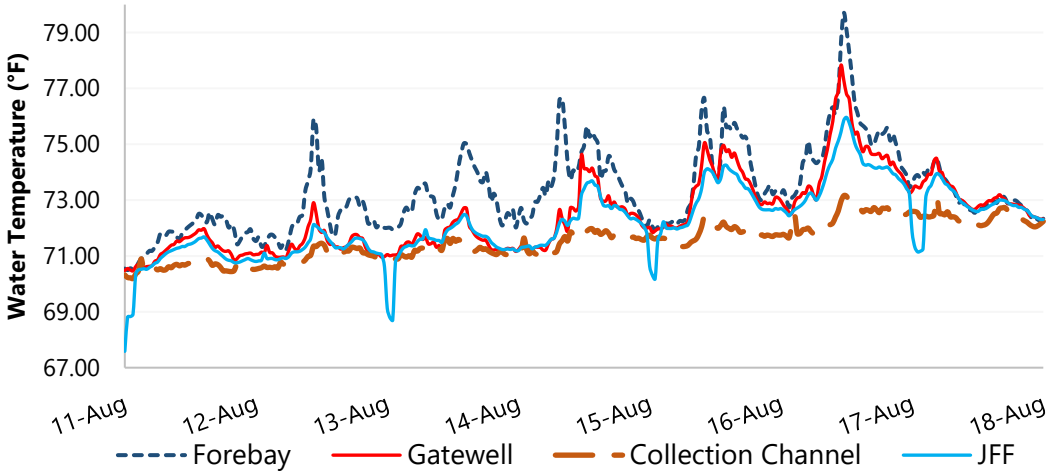

Figure 2
Average Water Temperatures at half hour intervals for the four Dam Locations from August 11–August 17

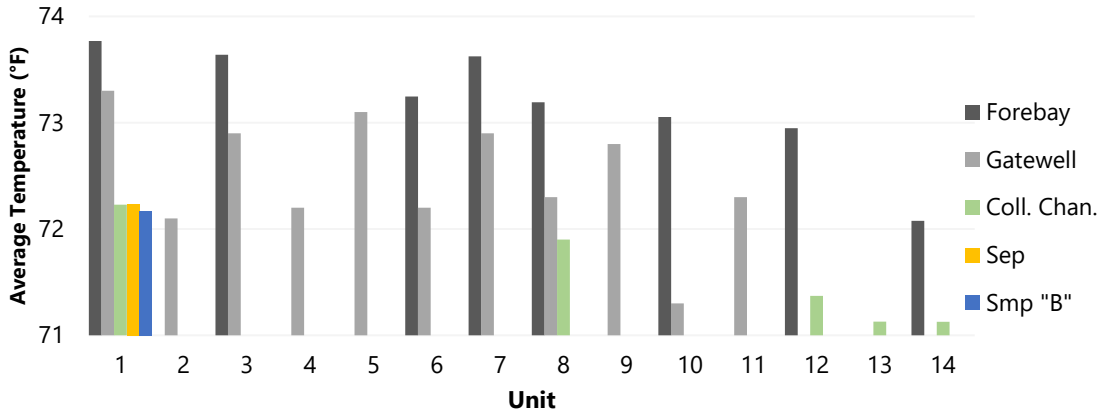

Figure 3
Average Weekly Water Temperatures by Position for five Dam Locations from August 11–August 17

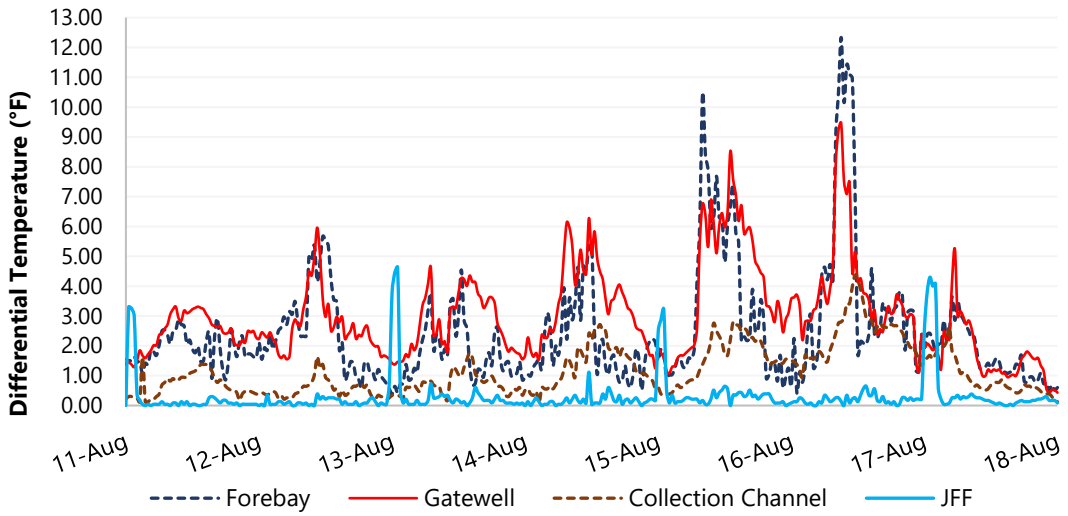

Figure 4
Average Differential Temperatures within four Dam Locations from August 11–August 17

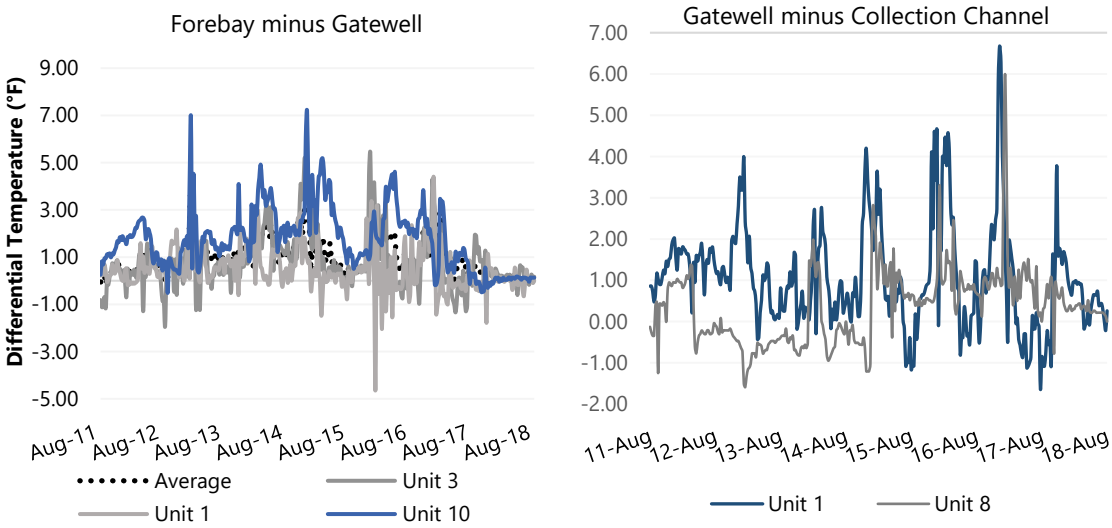

Figure 5
Average Differential Temperatures across Three Dam Locations from August 11–August 17