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ANCHOR QEA

Weekly Temperature Report
McNary Dam

September 9, 2019

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Report Period: August 30 to 31, 2019

Report No. 2019 Anchor QEA: MCN Temperature Weekly for 0830-0831

Re: USACE Walla Walla District Biological Services: Temperature Monitoring Program at McNary Dam

This report reflects the final 2 days of temperature collection that extended beyond the normal 8-day collection week.

Fish Collection

An estimated 44 juvenile salmonids were collected and 44 bypassed at the McNary Juvenile Fish Facility (JFF; Table 1), comprising 100.0% subyearling Chinook salmon. There were 0 total facility mortalities.

River Conditions

Average river flow for this reporting period was 132,900 cubic feet per second (132.9 kcfs) with an average spill of 75.8 kcfs.

Temperature Logger Operations

On August 28, the temperature logger for forebay 8 failed to record any data. After consulting with the biologist at McNary, the logger was not replaced for the final 3 days of recording (August 29 to 31).

Weather Conditions

The weekly average daytime temperature for 0700 hours August 30 to 0700 hours August 31, 2019, was 81.4°F. The weekly average nighttime temperature was 73.2°F. Temperatures ranged from a maximum of 85.8°F at 1200 hours on August 30 to a minimum of 68.5°F at 0500 hours on August 31 (Figure 1).

Winds averaged 1.2 miles per hour (mph) and were predominately from the south. The highest average wind speed was 3.0 mph at 0830 on August 30, and the highest gusts were up to 13 mph at 0530 hours on August 31.

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: 71.9°F, forebay (weekly average of 8 positions); 71.0°F, gatewells (weekly average of 14 positions); 70.5°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 70.9°F, JFF (weekly average of the separator and sample tank "B"). The forebay at Unit 3 had the highest weekly average temperature, 72.6°F (Figure 3). The maximum temperature, 74.4°F, was recorded in the forebay at 0000 hours on August 30 at Unit 10.

The average weekly temperature differentials within dam locations were: 2.2°F, forebay; 2.7°F, gatewells; 0.6°F, collection channel; and 021°F, JFF (Figure 4). The largest gatewell differentials were recorded between units that were operational and non-operational. The largest temperature differential, 4.2°F, was recorded on August 30 in the gatewells at 2230 hours (Unit 11 high, Unit 2 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.1°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 3.7°F at 2030 hours on August 30 at Unit 5 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.1°F. On average, the gatewell was warmer than the collection channel at Units 1 and 8. The collection channel was warmer than the gatewell at Unit 12. The largest temperature differential between the gatewell and corresponding collection channel location was 2.9°F at 1900 on August 30 at Unit 1 (gatewell greater than collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours August 30 to 0700 Hours August 31

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
30-Aug					131.6	52.1	75.0	77.3	85.8	1.2	3.0
31-Aug	44	44	0	0	134.1	53.0	76.5	71.0	0.0	1.4	0.0
Weekly Total	**44**	**44**	**0**	**0**	**132.9**	**52.6**	**75.8**	**77.3**	**76.0**	**1.2**	5.8

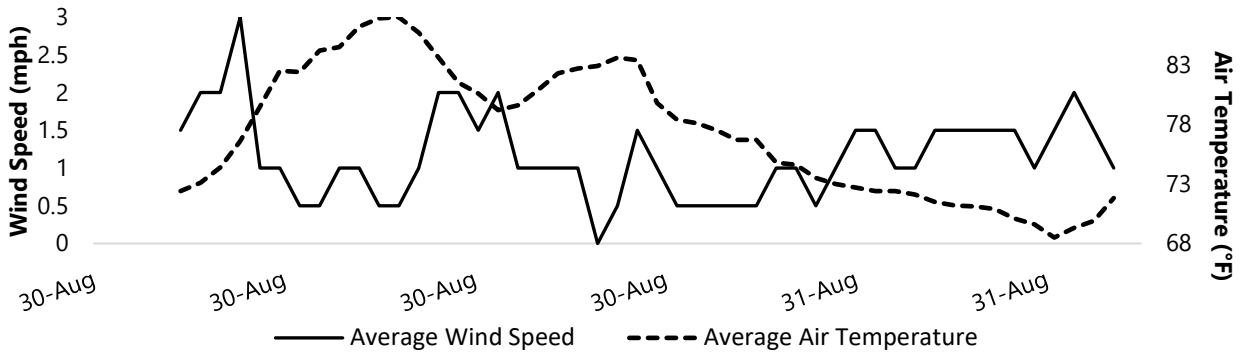

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours August 30 to 0700 Hours August 31

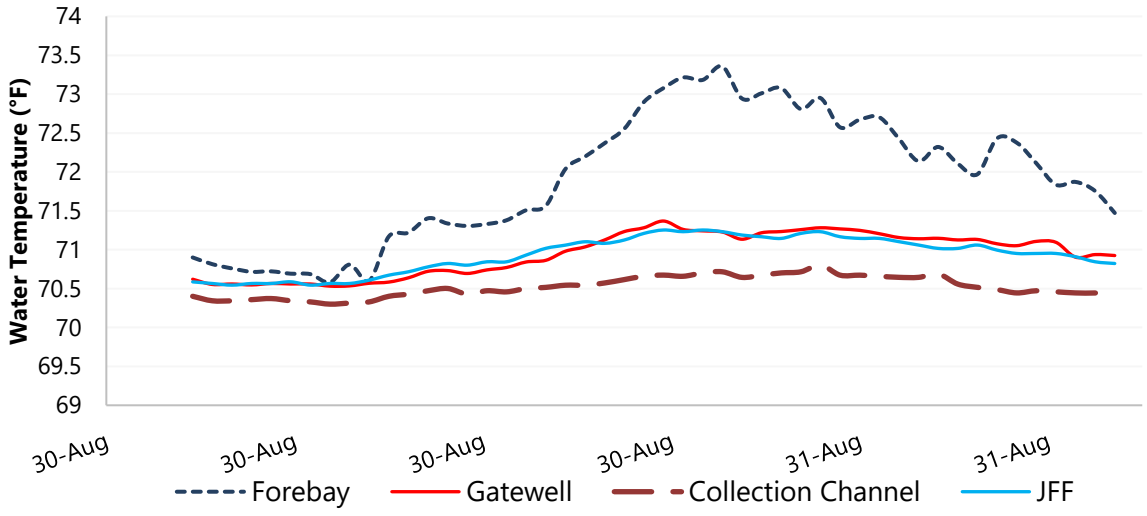

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from 0700 Hours August 30 to 0700 Hours August 31

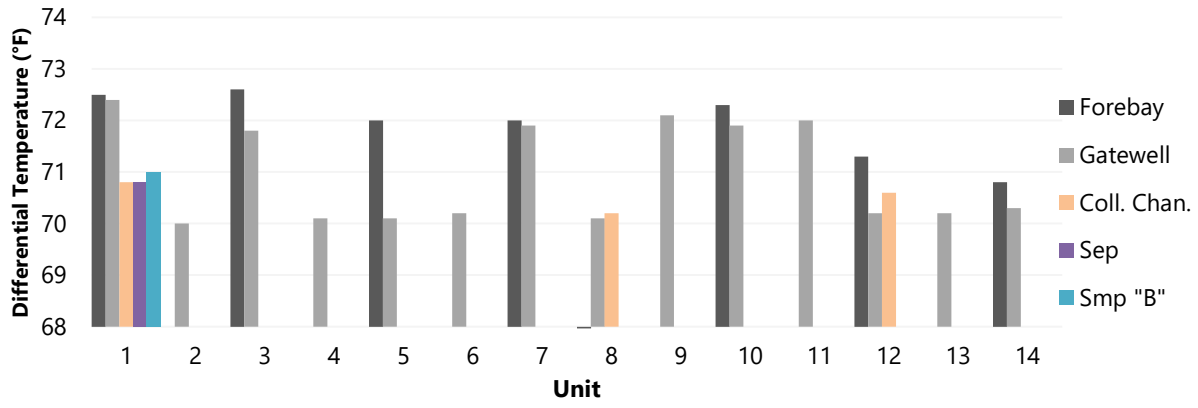

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours August 30 to 0700 Hours August 31

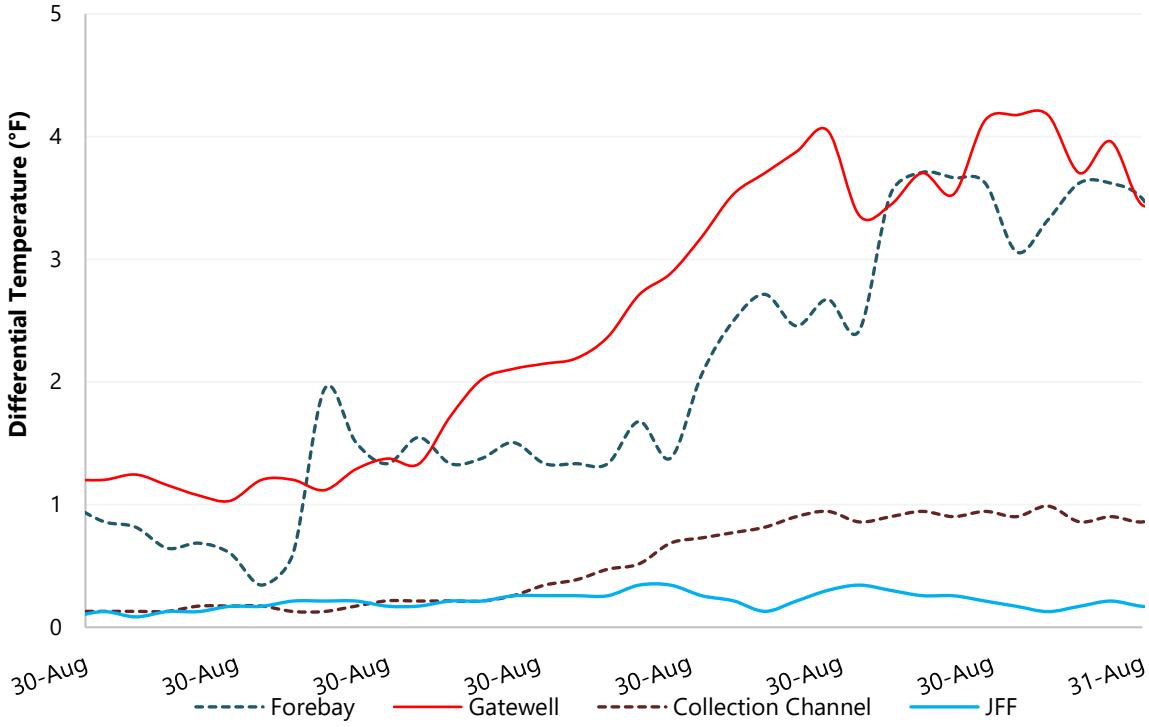

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours August 30 to 0700 Hours August 31

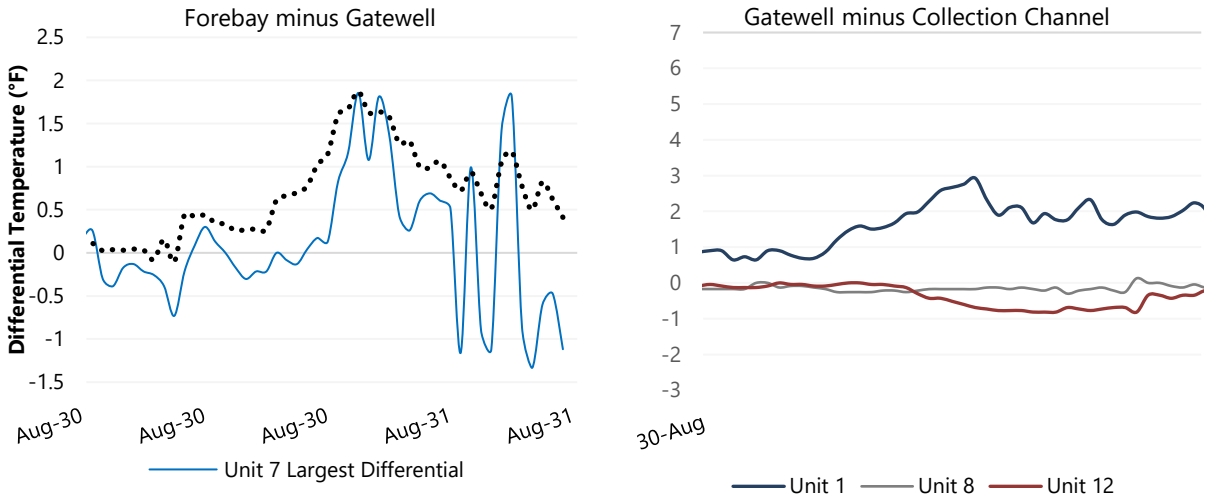

Figure 5
Average Differential Temperatures across Three Dam Locations from 0700 Hours August 30 to 0700 Hours August 31