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ANCHOR QEA

Weekly Temperature Report
McNary Dam

August 27, 2018

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Report Period: August 17 to August 23, 2018

Report No. 2018 Anchor QEA: MCN Temperature Weekly for 0817-0823

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

Fish Collection

An estimated 624 juvenile salmonids were collected and 624 bypassed the McNary Juvenile Fish Facility (JFF; Table 1), comprising 100% subyearling Chinook salmon. There were no mortalities.

River Conditions

Average river flow for this reporting period was 136,100 cubic feet per second (136.1 kcfs), with an average spill of 68.2 kcfs.

Temperature Logger Operations

The outfall pipe was damaged by high water and is not currently accessible for temperature logger deployment. The digital thermometer in the ScrollCase of Unit 1 is currently not functioning so data were collected from the analog thermometer of the closest in-service ScrollCase. The loggers in the forebay at Units 5 and 12 failed to offload data on August 20, resulting in no water temperature data collected at those locations from 0900 hours and 0930 hours, respectively, on August 19 until they were replaced by spare loggers at 0900 hours and 0930 hours, respectively, on August 20.

Weather Conditions

The weekly average daytime temperature for 0700 hours August 16 to 0700 hours August 23, 2018, was 80.4 °F. The weekly average nighttime temperature was 73.1 °F. Temperatures ranged from a maximum of 96.5 °F at 1500 hours on August 16 to a minimum of 57.9 °F at 0700 hours on August 22 (Figure 1). Weather became very hazy around midmorning August 19 due to wildfire smoke moving in from Canada and remained hazy throughout the reporting period.

Winds averaged 3.2 miles per hour (mph) and were predominately from the east north east and the east. The highest average wind speed was 18.0 mph at 0100 hours on August 21, and the highest gusts were up to 32 mph also at 0100 hours on August 21.

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: 71.5 °F, forebay (weekly average of 8 positions); 71.0 °F, gatewells (weekly average of 14 positions); 70.8 °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 10 and the gatewell at Units 1 and 9 had the highest weekly average temperature, 71.7 °F (Figure 3). The maximum temperature, 78.5 °F, was recorded in the forebay at 1630 hours on August 16 at Unit 10.

The average weekly temperature differentials within dam locations were: 1.2 °F, forebay; 1.9 °F, gatewells; 0.2 °F, collection channel; and 0.2 °F, JFF (Figure 4). The largest gatewell differentials were recorded between units that were operational and non-operational. The largest temperature differential, 5.7 °F, was recorded on August 16 in the forebay at 1500 hours (Unit 1 high, Unit 14 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.8 °F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 7.6 °F at 1630 hours on August 16 at Unit 10 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.6 °F. On average, the gatewell was warmer than the collection channel at Unit 1 and the collection channel was warmer than the gatewell at Units 8 and 12. The largest temperature differential between the gatewell and corresponding collection channel location was 3.6 °F at 1830 on August 22 at Unit 1 (gatewell greater than collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours August 16 to 0700 Hours August 23

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sam.	Fac.				Avg.	Max	Avg.	Max
8/16-17	124	124	0	0	134.7	62.5	67.5	82.4	96.5	3.3	7.0
8/17-18					119.7	54.9	60.1	76.6	91.5	2.5	6.0
8/18-19	56	56	0	0	118.9	54.6	59.7	76.0	91.8	1.8	4.0
8/19-20					119.8	55.0	60.1	77.5	90.7	4.6	16.0
8/20-21	140	140	0	0	140.4	65.6	70.3	74.7	86.0	5.4	18.0
8/21-22					153.2	71.9	76.7	72.7	87.9	2.0	5.0
8/22-23	304	304	0	0	166.2	78.4	83.1	76.3	94.2	2.6	7.0
Weekly Total	**624**	**624**	**0**	**0**	**136.1**	**63.3**	**68.2**	**76.8**		**3.2**	

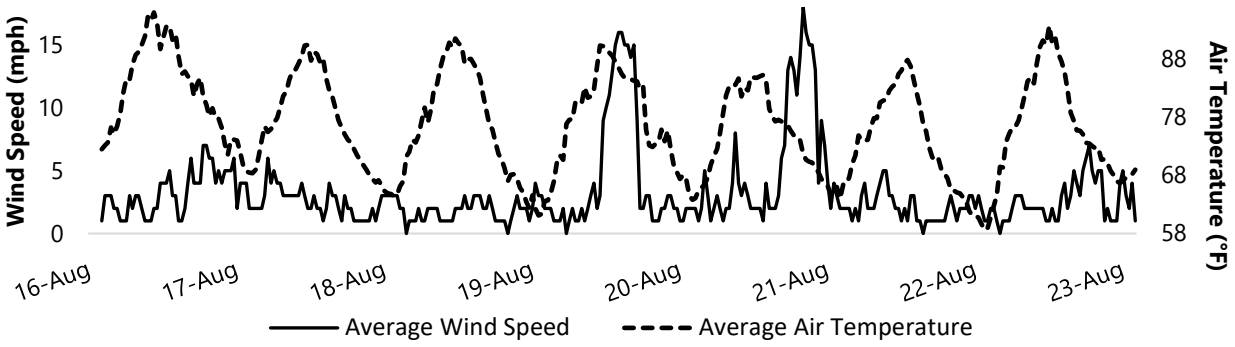

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours August 16 to 0700 Hours August 23

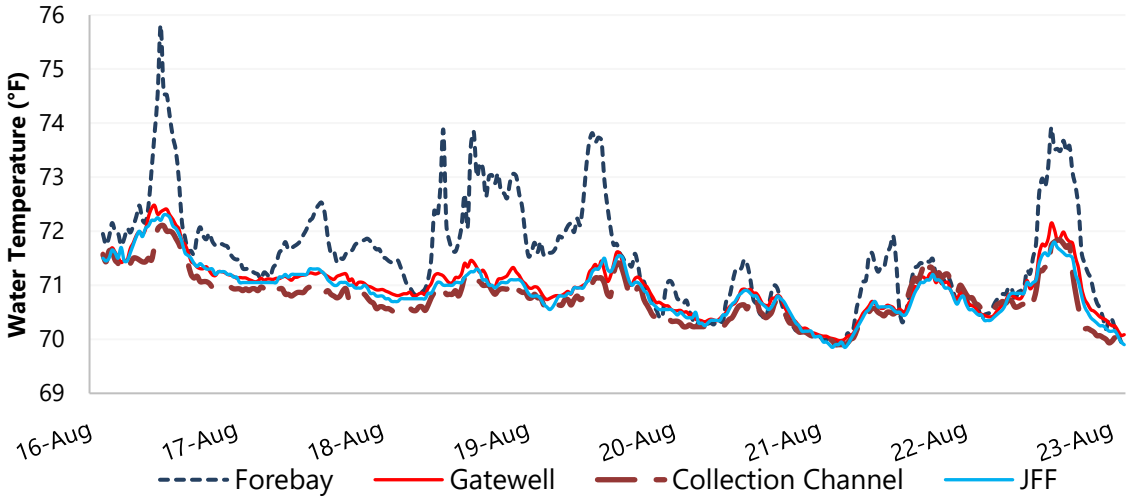

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from 0700 Hours August 16 to 0700 Hours August 23

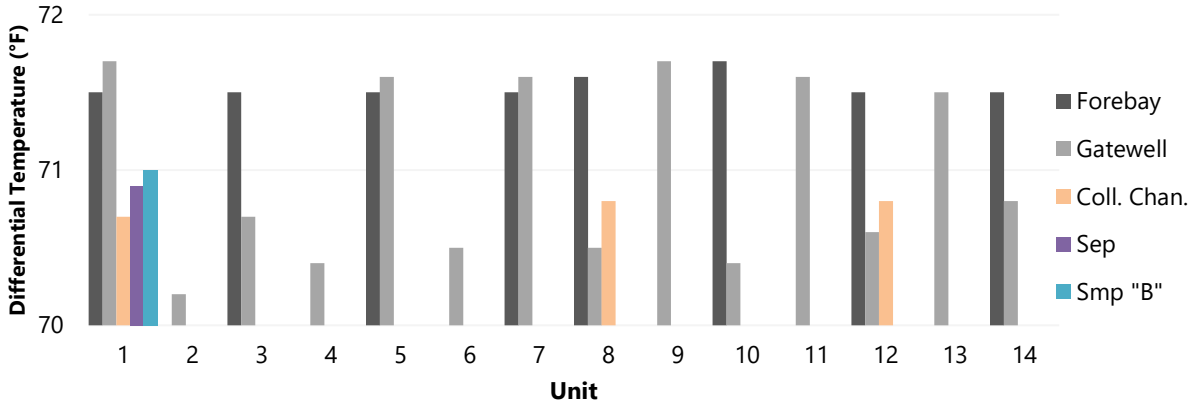

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours August 16 to 0700 Hours August 23

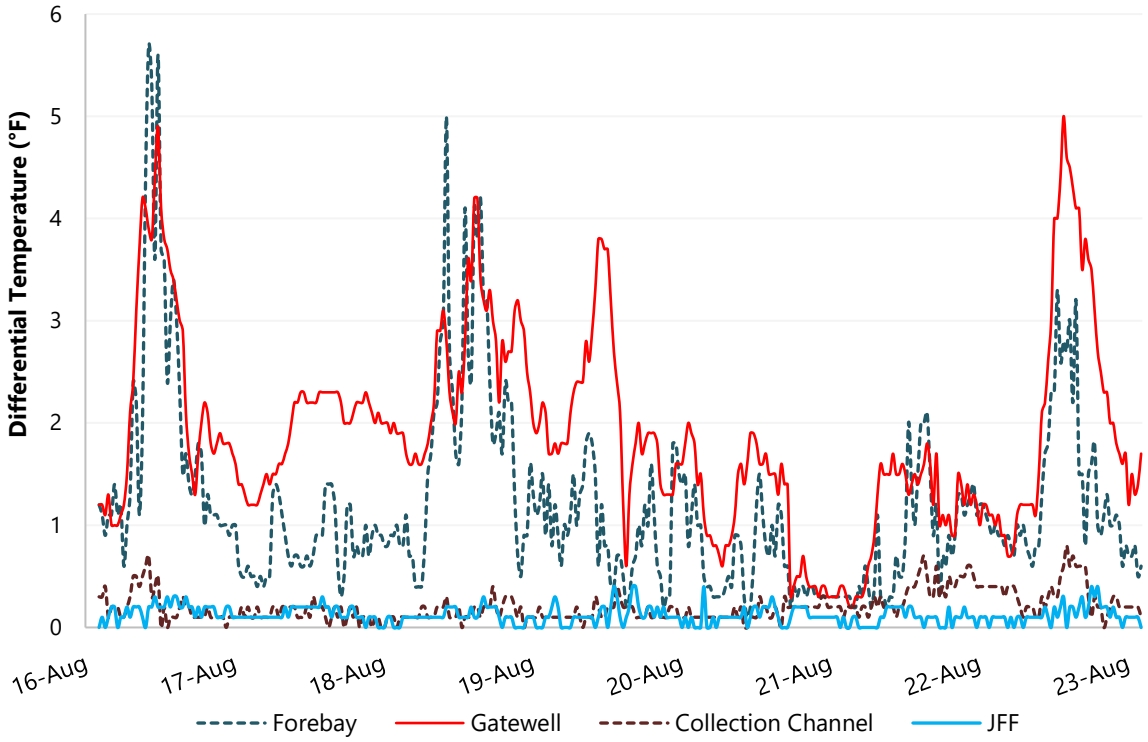

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours August 16 to 0700 Hours August 23

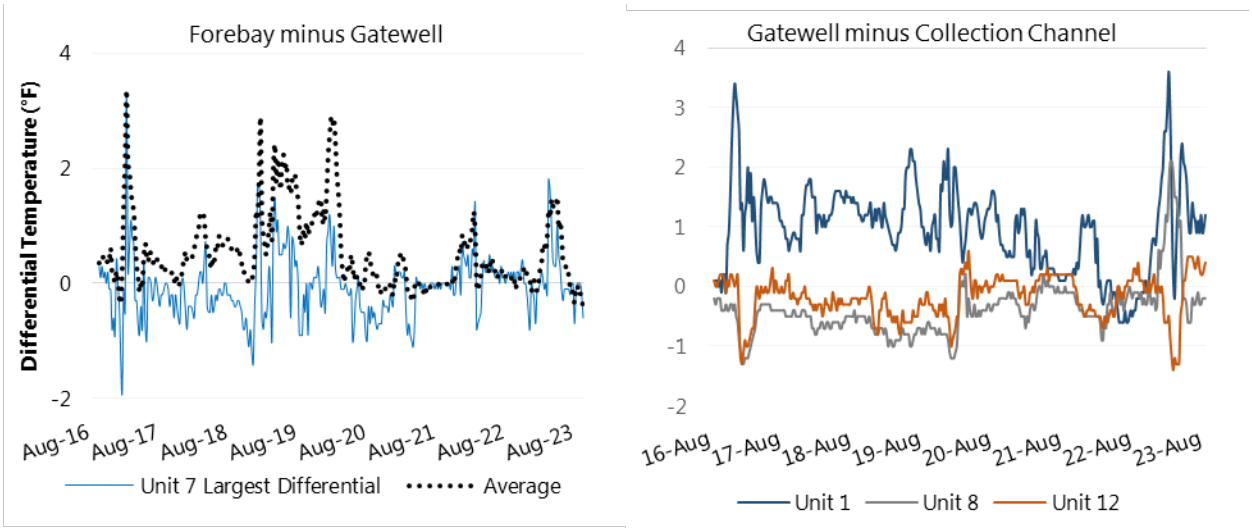

Figure 5
Average Differential Temperatures Across Three Dam Locations from 0700 Hours August 16 to 0700 Hours August 23