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ANCHOR QEA

Weekly Temperature Report
McNary Dam

July 17, 2017

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Report Period: July 7 to July 13, 2017

Report No. MCN TEMP 17-5

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

Fish Collection

An estimated 139,200 juvenile salmonids were collected and 139,189 bypassed the McNary Juvenile Fish Facility (JFF; Table 1), comprising 100% subyearling Chinook salmon. There were 11 total facility mortalities, comprising 7 sample mortalities and 4 facility mortalities.

River Conditions

Average river flow for this reporting period was 212,300 cubic feet per second (212.3 kcfs), with an average spill of 106.4 kcfs.

Temperature Logger Operations

The temperature logger at Forebay 8 failed to collect data after 2330 on July 12. It was replaced at 0930 on July 13.

Weather Conditions

The weekly average daytime temperature for 0700 hours July 6 to 0700 hours July 13, 2017, was 81.9 °F. The weekly average nighttime temperature was 73.9 °F. Temperatures ranged from a maximum of 103.3 °F at 1900 on July 6 to a minimum of 60.4 °F from 0500 to 0530 hours on July 11 (Figure 1).

Winds averaged 0.8 miles per hour (mph) and were predominately from the north. The wind was highest at 1700 and 1930 to 2000 hours on July 10, with winds averaging 8.0 mph and gusts up to 23 mph.

Water Temperatures

Average water temperatures within dam locations varied with air temperatures and wind velocities (Figure 2). The weekly average temperature within dam locations were: 69.9 °F, forebay, (weekly average of 8 positions); 69.1 °F, gatewells, (weekly average of 14 positions); 69.1 °F, collection

channel, (weekly average of positions at Units 1, 8, and 12); 69.1 °F, JFF, (weekly average of the separator and sample tank "B") and 67.7°F outfall pipe. The forebay at Unit 1 had the highest weekly average temperature, 70.3 °F (Figure 3). The maximum temperature, 78.2 °F, was recorded in the forebay at 1800 hours on July 8 at Unit 1.

The average weekly temperature differentials within dam locations were: 2.4 °F, forebay; 3.7 °F, gatewells; 0.7 °F, collection channel; and 0.1 °F, JFF (Figure 4). The largest gatewell differentials were recorded between units that were operational and non-operational. The largest temperature differential, 10.3 °F was recorded in the forebay at 1800 hours on July 8 (Unit 14 low, Unit 1 high).

The average weekly temperature differential between the forebay and corresponding gatewell was 1.1 °F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 11.4 °F at 1800 hours on July 8 at Unit 1 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and collection channel was 1.0 °F. On average, the gatewell was warmer than the collection channel at Unit 8 and Unit 12, and cooler than the collection channel at Unit 1. The largest temperature differential between the gatewell and corresponding collection channel location was 5.5 °F at 1800 on July 8 at Unit 1 (gatewell low, collection channel high).

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours July 6 to 0700 Hours July 13

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sam.	Fac.				Avg.	Max	Avg.	Max
7/6-7					221.1	105.4	110.9	82.6	103.3	0.5	4.0
7/7-8	54,800	54,796	3	1	227.9	109.0	114.2	79.6	98.5	0.7	6.0
7/8-9					228.5	109.5	114.4	78.9	97.3	0.1	3.0
7/9-10	27,900	27,895	3	2	207.6	99.0	103.9	78.5	92.5	0.4	2.0
7/10-11					192.0	91.0	96.2	74.2	86.3	2.8	8.0
7/11-12	56,500	56,498	1	1	210.8	100.4	105.7	72.6	86.7	0.6	5.0
7/12-13					198.4	94.3	99.4	77.4	95.6	0.5	4.0
Weekly Total	**139,200**	**139,189**	**7**	**4**	**212.3**	**101.2**	**106.4**	**77.9**		**0.8**	

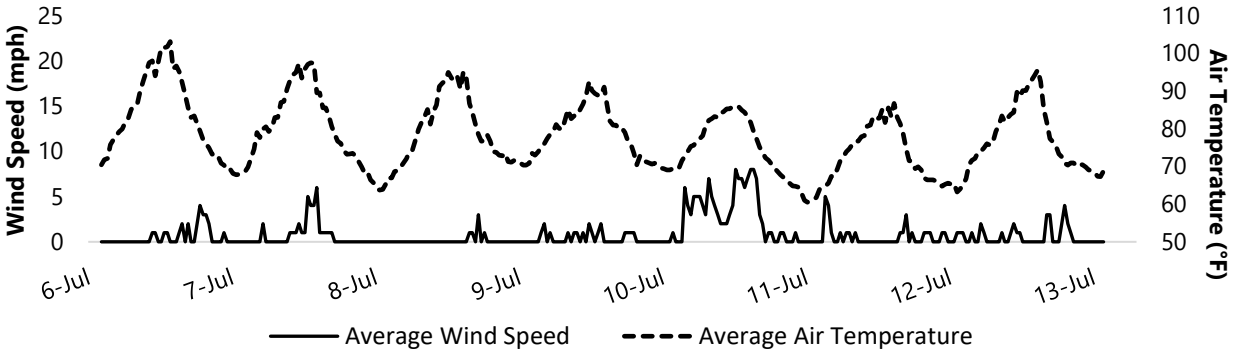

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours July 6 to 0700 Hours July 13

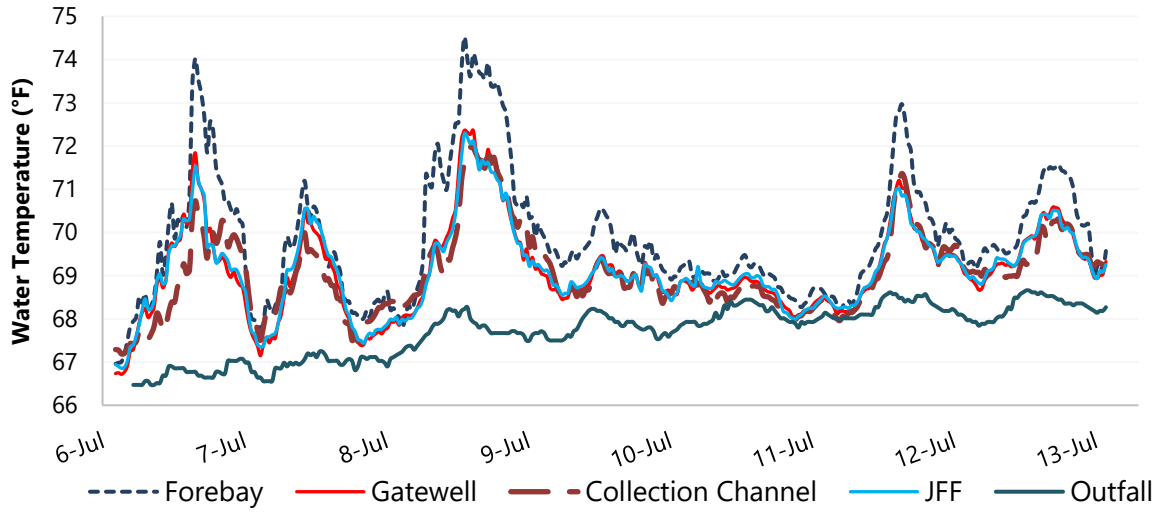

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Five Dam Locations from 0700 Hours July 6 to 0700 Hours July 13

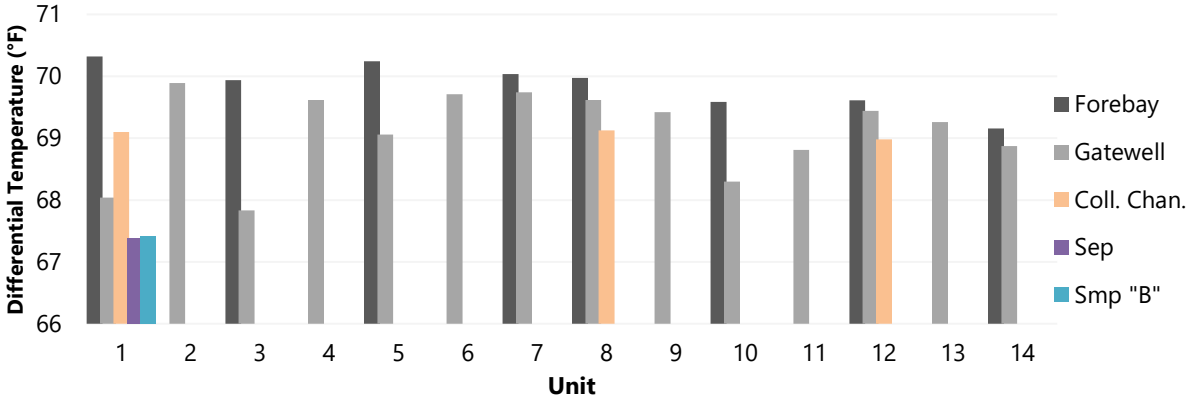

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours July 6 to 0700 Hours July 13

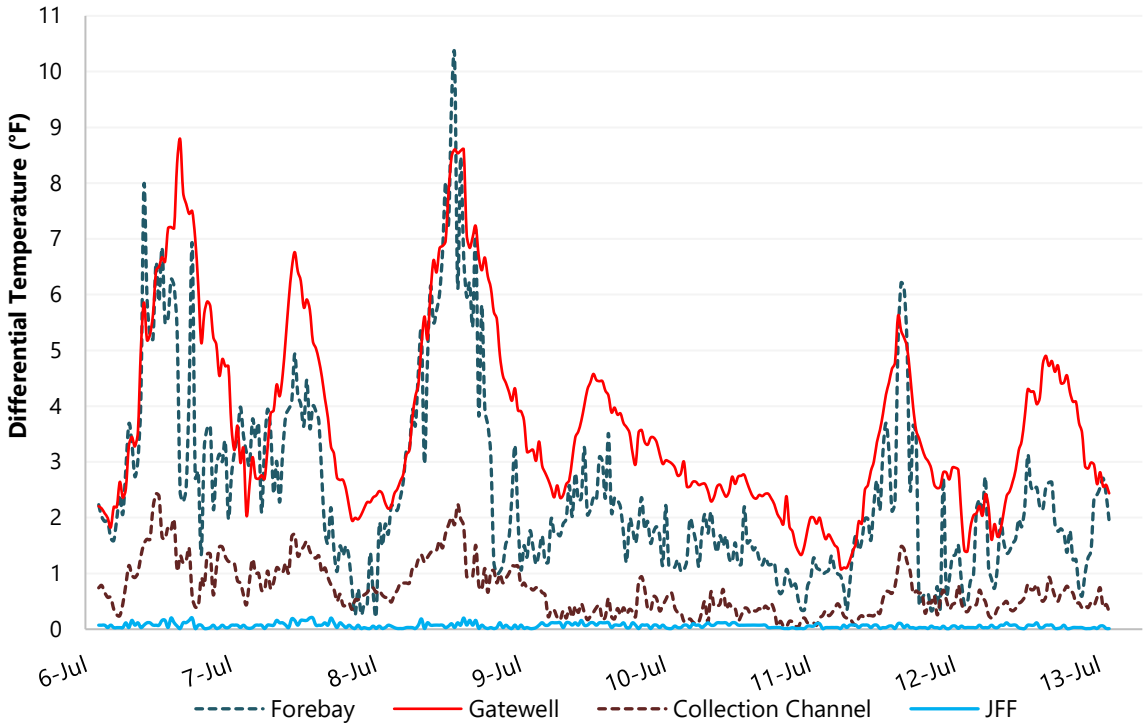

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours July 6 to 0700 Hours July 13

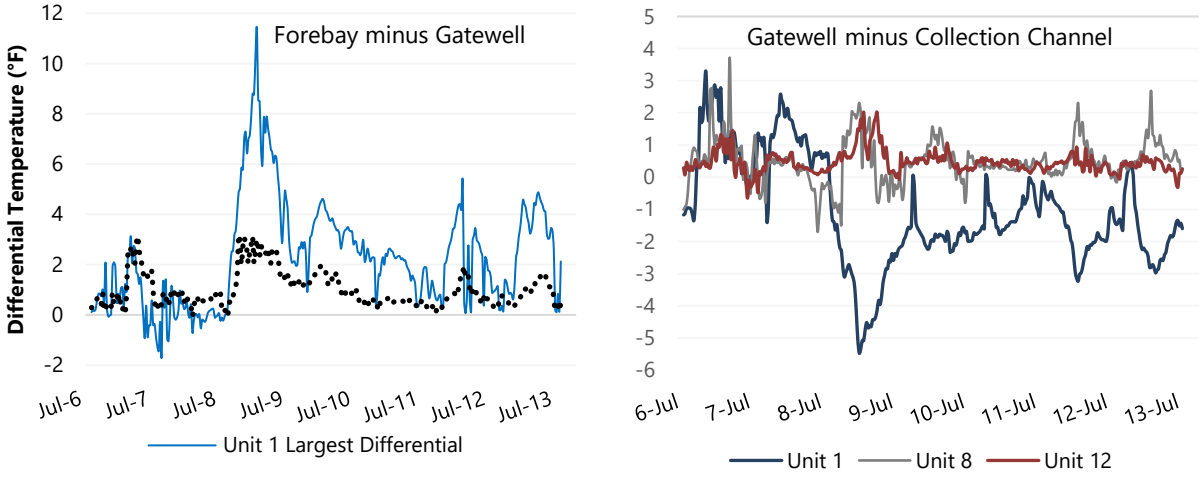

Figure 5
Average Differential Temperatures Across Three Dam Locations from 0700 Hours July 6 to 0700 Hours July 13