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ANCHOR QEA

Weekly Temperature Report
McNary Dam

July 2, 2018

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Report Period: June 22 to June 28, 2018

Report No. 2018 Anchor QEA: MCN Temperature Weekly for 0622-0628

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

Fish Collection

An estimated 198,103 juvenile salmonids were collected and 198,094 bypassed the McNary Juvenile Fish Facility (JFF; Table 1), comprising 99.5% subyearling Chinook salmon, 0.2% steelhead, 0.2% yearling Chinook salmon, and 0.1% coho salmon. There were 9 total facility mortalities, comprising 5 sample mortalities and 4 facility mortalities.

River Conditions

Average river flow for this reporting period was 248,000 cubic feet per second (248.0 kcfs), with an average spill of 128.2 kcfs.

Temperature Logger Operations

The outfall pipe was damaged by high water and is not currently accessible for temperature logger deployment. The HOBO temperature loggers in the forebay at Units 1 and 10 did not log temperature data after the previously recorded temperatures were offloaded at 0843 and 0911, respectively, on June 24. The loggers were replaced with spare HOBO temperature loggers as of 0930 and 1000, respectively, on June 25. 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. There was no temperature string data for the project forebay posted between 1800 on June 25 and 0800 on June 26.

Weather Conditions

The weekly average daytime temperature for 0700 hours June 21 to 0700 hours June 22, 2018, was 77.0 °F. The weekly average nighttime temperature was 67.9 °F. Temperatures ranged from a maximum of 96.7 °F at 1800 hours on June 24 to a minimum of 52.2 °F at 0700 hours on June 25 (Figure 1).

Winds averaged 3.2 miles per hour (mph) and were predominately from the east north east and east. The wind was highest at 0700 hours on June 25, with winds averaging 12.0 mph and gusts up to 27 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: 65.8 °F, forebay (weekly average of 8 positions); 65.4 °F, gatewells (weekly average of 14 positions); 65.4 °F, collection channel (weekly average of positions at Units 1, 8, and 12); and 65.4 °F, JFF (weekly average of the separator and sample tank "B"). The forebay at Unit 8 had the highest weekly average temperature, 66.2 °F (Figure 3). The maximum temperature, 75.0 °F, was recorded in the forebay at 1830 hours on June 24 at Unit 7.

The average weekly temperature differentials within dam locations were: 1.7 °F, forebay; 2.3 °F, gatewells; 0.5 °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, 8.2 °F, was recorded on June 24 in the gatewell at 1900 hours (Unit 8 high, Unit 7 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.6 °F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 11.0 °F at 1830 hours on June 24 at Unit 7 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.5 °F. On average, the gatewell was warmer than the collection channel at Unit 1, Unit 8, and Unit 12. The largest temperature differential between the gatewell and corresponding collection channel location was 4.2 °F at 1630 on June 24 at Unit 1 (gatewell greater than collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours June 21 to 0700 Hours June 28

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sam.	Fac.				Avg.	Max	Avg.	Max
6/21-22	34,900	34,899	0	1	220.3	105.5	110.4	75.3	92.0	3.9	10.0
6/22-23					225.6	108.3	112.9	72.1	85.4	4.1	8.0
6/23-24	66,100	66,097	3	0	245.5	118.1	123.0	72.1	84.2	2.3	6.0
6/24-25					253.4	122.0	127.0	79.0	96.7	2.6	12.0
6/25-26	58,301	58,299	1	1	254.0	122.3	127.3	68.3	81.0	4.7	12.0
6/26-27					266.1	128.4	133.2	67.0	81.7	2.5	5.0
6/27-28	38,802	38,799	1	2	271.2	103.5	163.3	71.6	87.3	2.6	9.0
Weekly Total	**198,103**	**198,094**	**5**	**4**	**248.0**	**115.4**	**128.2**	**72.4**		**3.2**	

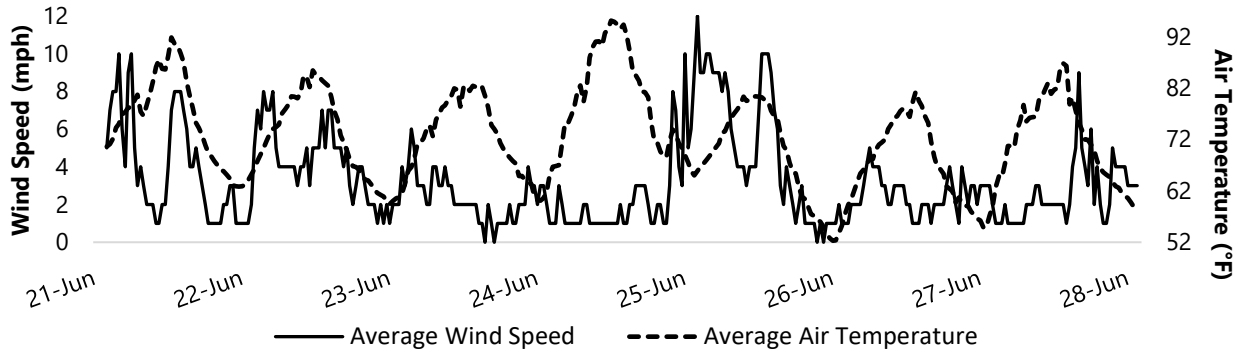

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours June 21 to 0700 Hours June 28

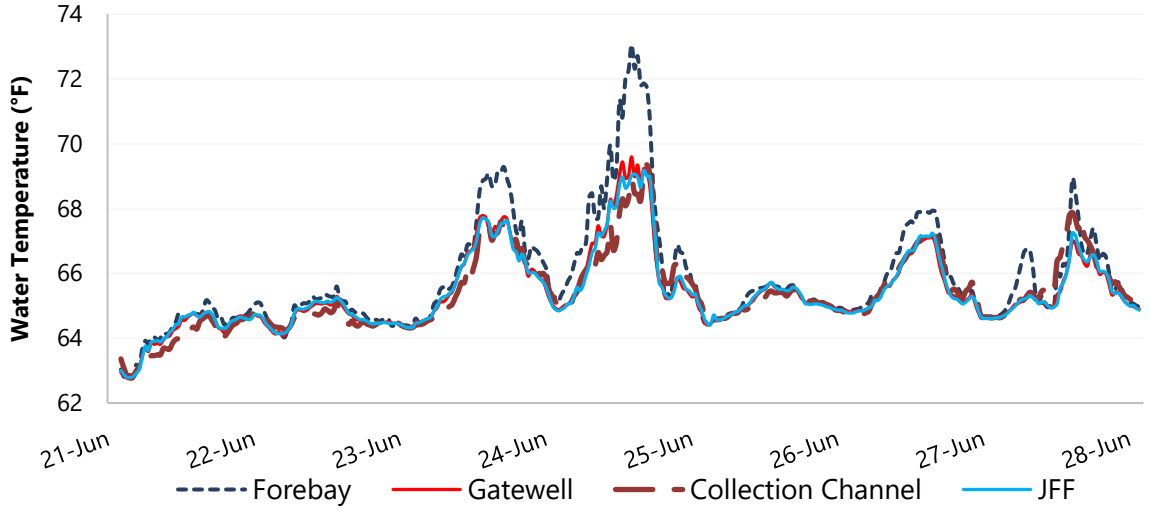

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from 0700 Hours June 21 to 0700 Hours June 28

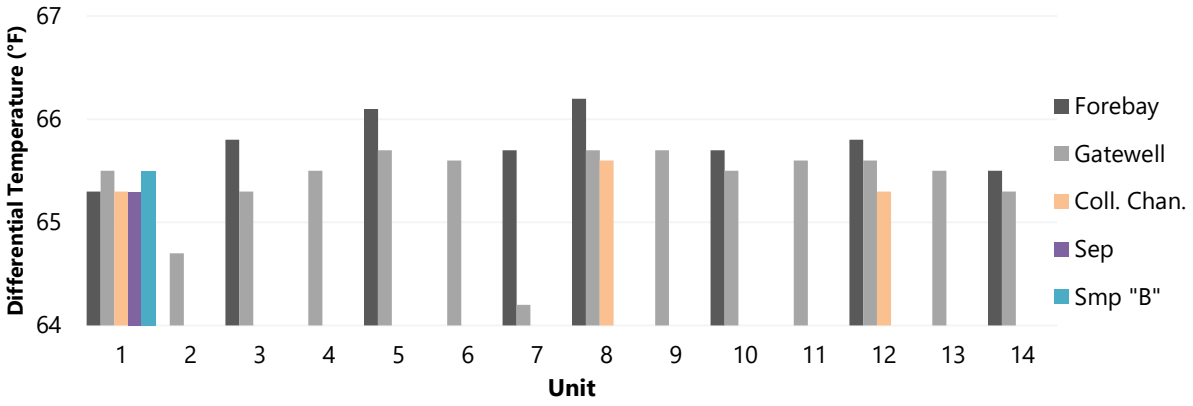

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours June 21 to 0700 Hours June 28

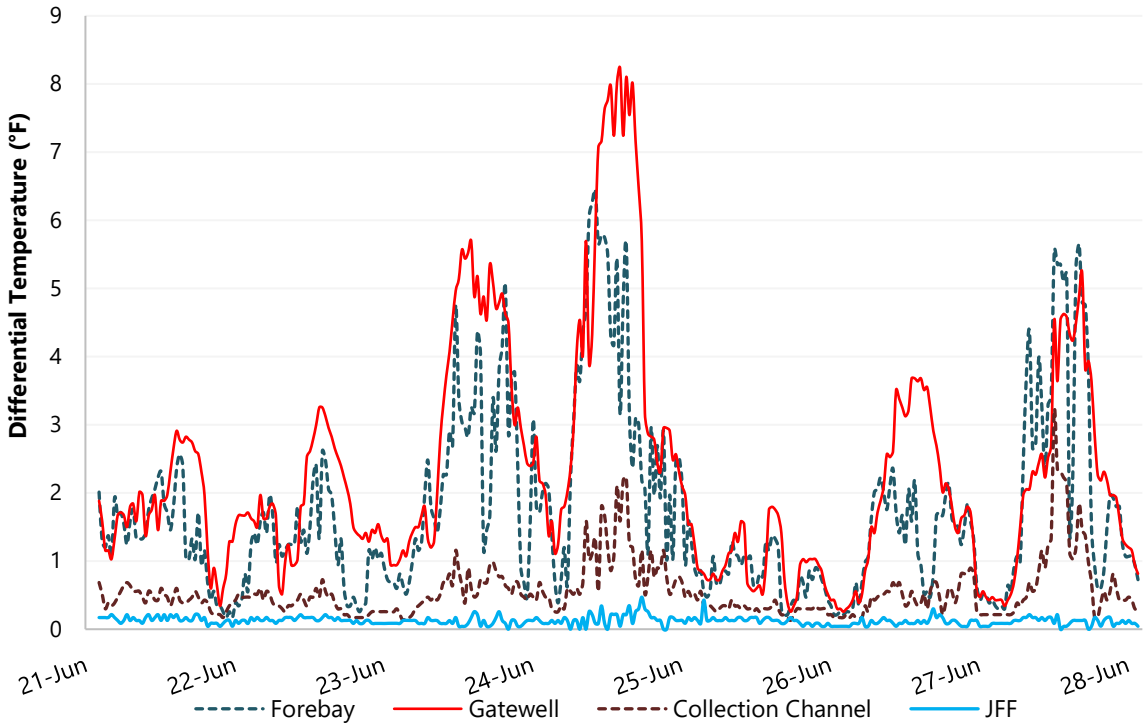

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours June 21 to 0700 Hours June 28

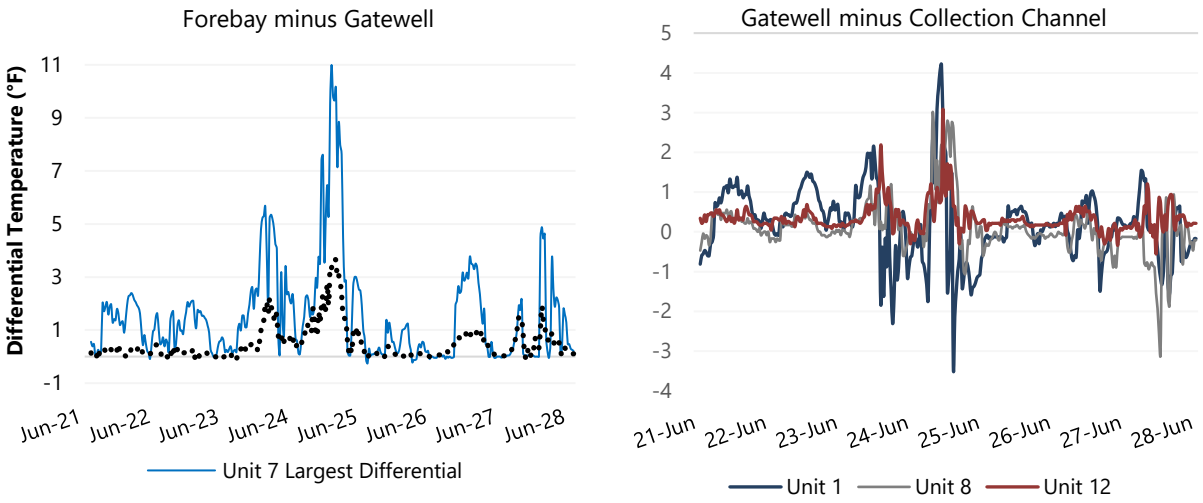

Figure 5
Average Differential Temperatures Across Three Dam Locations from 0700 Hours June 21 to 0700 Hours June 28