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ANCHOR QEA

Weekly Temperature Report
McNary Dam

July 3, 2017

Prepared by: Kathleen Carter, Mainstem Fish Research, LLC

Report Period: June 23 to 29, 2017

Report No. MCN TEMP 17-3

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

Fish Collection

An estimated 109,801 juvenile salmonids were collected and 109,797 bypassed the McNary Juvenile Fish Facility (JFF; Table 1), comprising 99.6% subyearling Chinook salmon, 0.2% coho salmon, and 0.2% steelhead. There were 4 total facility mortalities, comprising 0 sample mortalities and 4 facility mortalities.

River Conditions

Average river flow for this reporting period was 289,000 cubic feet per second (289.0 kcfs), with an average spill of 146.5 kcfs.

Temperature Logger Operations

The file from the logger at the Unit 8 gatewell became corrupted during download and couldn't be read by the logger software. The data from 0800 hours on June 27 to 1000 on June 28 was not included in the June 28 daily report for this location; however, the data was recovered by the logger manufacturer and is included in this weekly report. The logger at the Unit 8 gatewell was replaced at approximately 1230 on June 28.

Weather Conditions

The weekly average daytime temperature for 0700 hours June 22 to 0700 hours June 29, 2017, was 77.1 °F. The weekly average nighttime temperature was 68.5 °F. Temperatures ranged from a maximum of 96.8 °F from 1530 to 1600 hours on June 26 to a minimum of 53.9 °F at 0700 hours on June 22 and 0530 hours on June 23 (Figure 1).

Winds averaged 1.3 miles per hour (mph) and were predominately from the north. The wind was highest at 1800 hours on June 26, with winds averaging 13 mph and gusts up to 24 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: 63.3 °F, forebay, (weekly average of 8 positions); 62.7 °F, gatewells, (weekly average of 14 positions); 62.8 °F, collection channel, (weekly average of positions at Units 1, 8, and 12); and 62.8 °F, JFF, (weekly average of the separator and sample tank "B"). The forebay at Units 8, 10, 12, and 14 had the highest weekly average temperature, 63.4 °F (Figure 3). The maximum temperature, 70.7 °F, was recorded in the forebay at 1700 hours on June 27 at Unit 3.

The average weekly temperature differentials within dam locations were: 1.6 °F, forebay; 1.4 °F, gatewells; 0.3 °F, collection channel; and 0.1 °F, JFF. The largest temperature differential, 6.6 °F was recorded in the forebay at 1900 hours on June 27 (Unit 1 low, Unit 12 high; Figure 4).

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 6.6 °F at 1700 hours on June 27 at Unit 5 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and collection channel was 0.4 °F. The gatewell was warmer than the collection channel at Unit 12 on average. The collection channel was warmer than the gatewell at Units 1 and 8. The largest temperature differential between the gatewell and corresponding collection channel location was 2.6 °F at 1800 on June 27 at Unit 1.

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours June 22 to 0700 Hours June 29

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sam.	Fac.				Avg.	Max	Avg.	Max
6/22-23					307.4	145.5	157.2	66.8	80.1	0.7	4.0
6/23-24	30,000	30,000	0	0	308.6	144.4	159.5	71.2	87.6	0.5	3.0
6/24-25					310.1	146.1	159.3	73.5	89.3	1.2	7.0
6/25-26	30,500	30,500	0	0	288.1	139.5	143.9	77.5	93.8	1.9	7.0
6/26-27					274.8	132.3	137.7	77.2	96.8	1.7	13.0
6/27-28	49,301	49,297	0	4	275.1	132.5	137.8	71.6	85.7	0.6	5.0
6/28-29					259.1	124.6	129.8	70.3	70.9	2.4	10.0
Weekly Total	**109,801**	**109,797**	**0**	**4**	**289.0**	**137.8**	**146.5**	**72.8**		**1.3**	

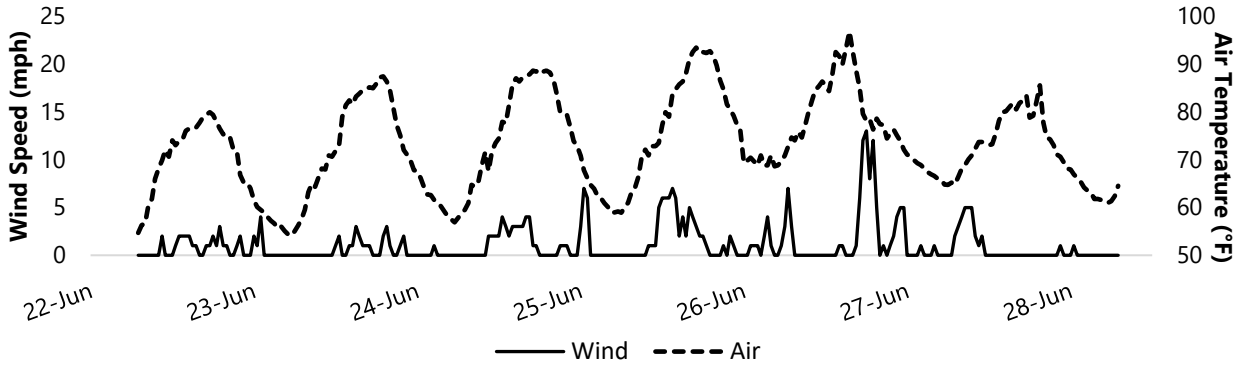

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours June 22 to 0700 Hours June 29

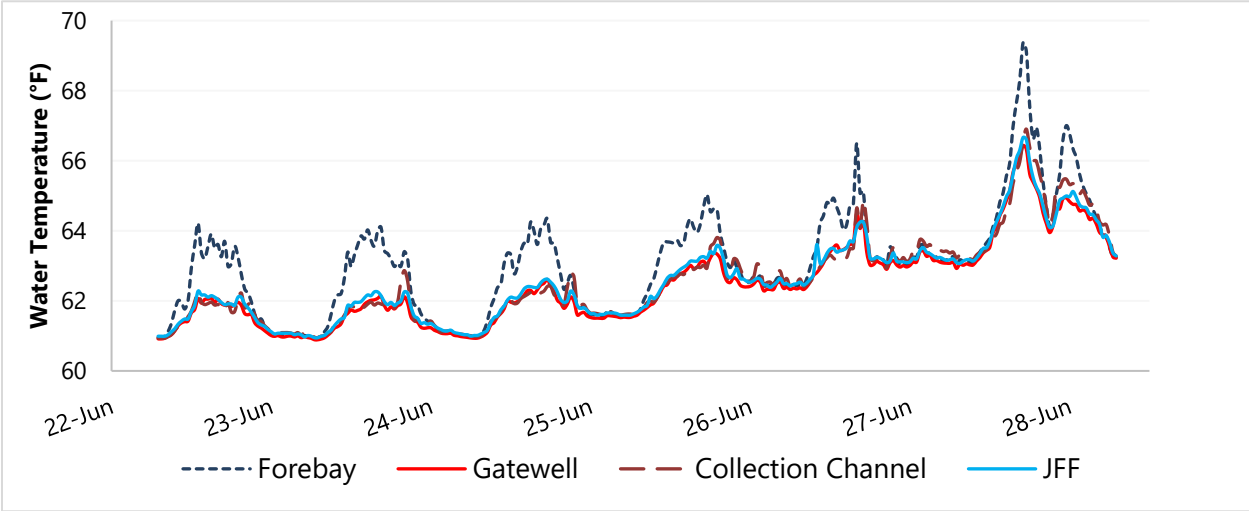

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from 0700 Hours June 22 to 0700 Hours June 29

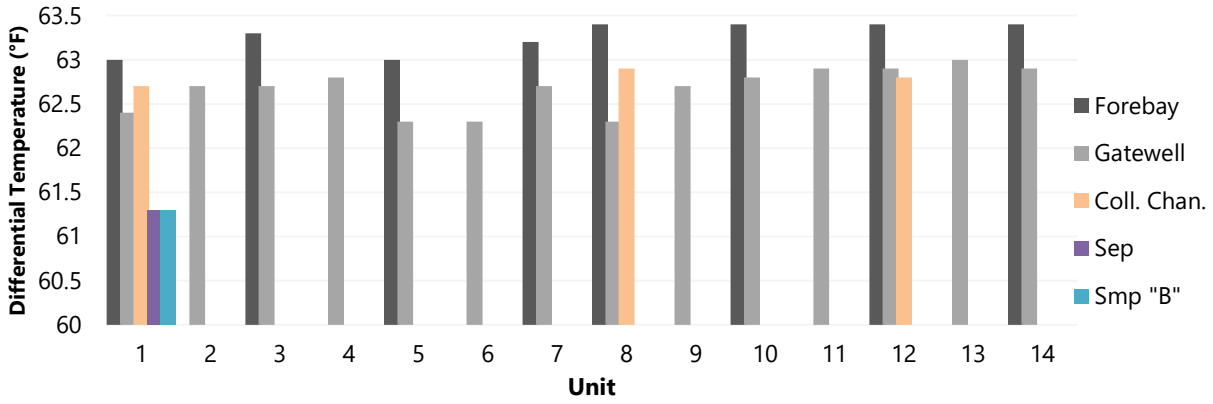

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours June 22 to 0700 Hours June 29

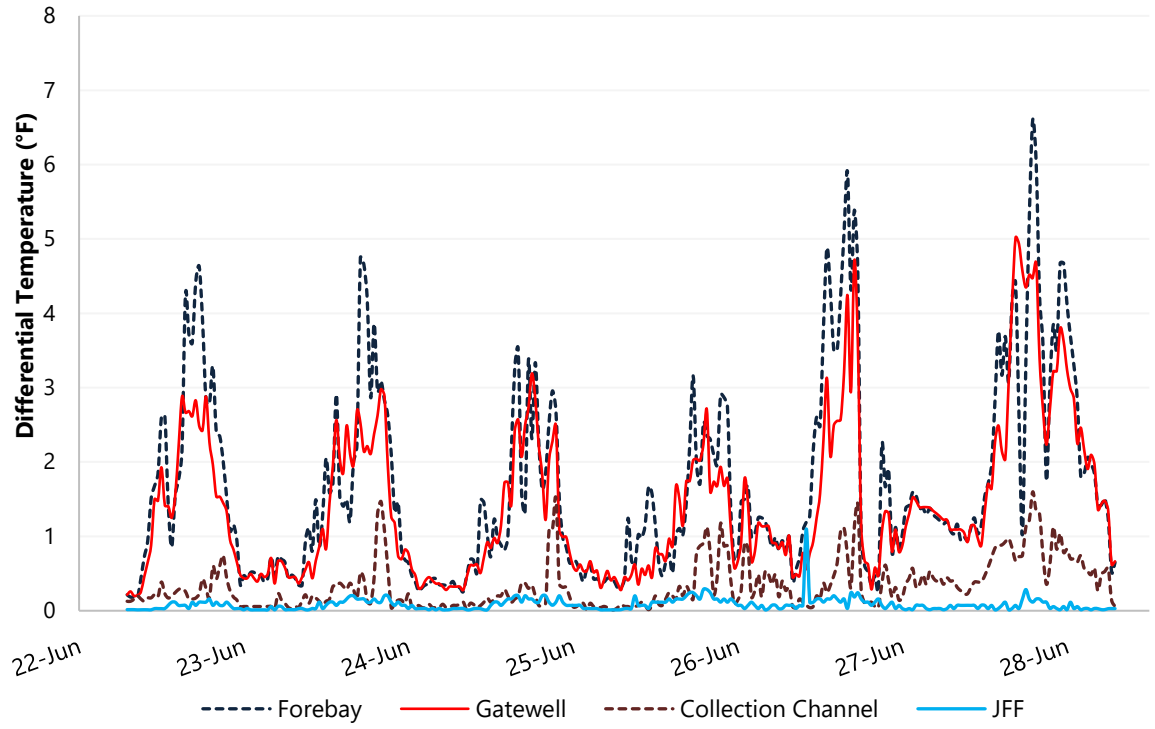

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours June 22 to 0700 Hours June 29

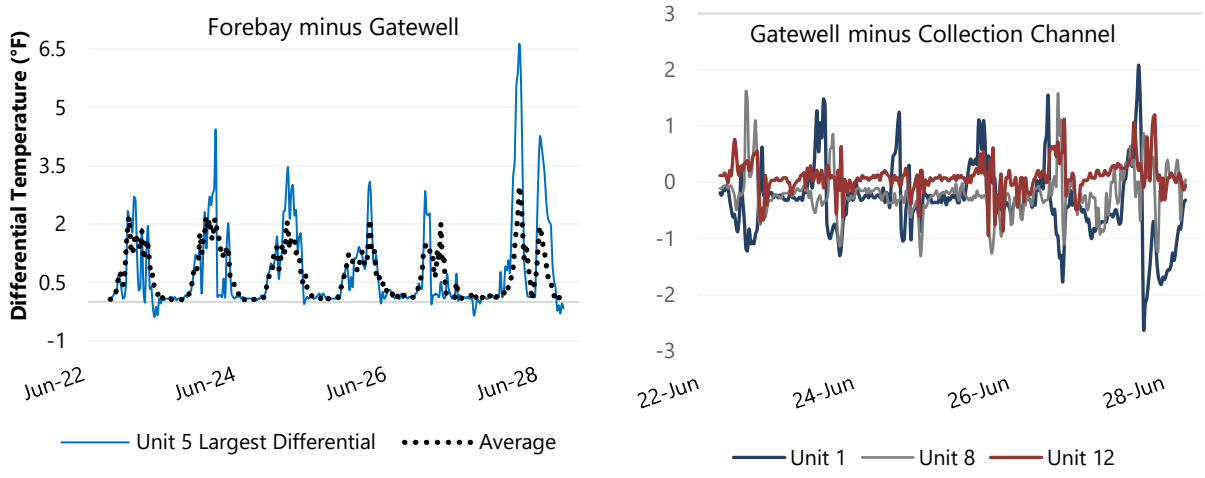

Figure 5
Average Differential Temperatures Across Three Dam Locations from 0700 Hours June 22 to 0700 Hours June 29