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ANCHOR QEA

Weekly Temperature Report
McNary Dam

July 15, 2019

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Report Period: July 5 to July 11, 2019

Report No. 2019 Anchor QEA: MCN Temperature Weekly for 0705-0711

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

Fish Collection

On July 2, a valve in the channel broke, which resulted in an inability to go into secondary bypass at the McNary Juvenile Fish Facility (JFF). It was not fixed until the afternoon of July 10. Therefore there was no sample conducted on July 6, 8, or 10.

An estimated 0 juvenile salmonids were collected and 0 bypassed the McNary Juvenile Fish Facility (Table 1). There were 0 total mortalities.

River Conditions

Average river flow for this reporting period was 143,400 cubic feet per second (143.4 kcfs) with an average spill of 81.6 kcfs.

Temperature Logger Operations

On July 6, the logger at Forebay 12 failed to record from 0830 onward. It was reset on July 7 at 0800. The same logger failed again on July 9 and was replaced with a new logger on July 10. The logger at Gatewell 6 failed on July 9 and was replaced with a new logger on July 10.

Weather Conditions

The weekly average daytime temperature for 0700 hours July 4 to 0700 hours July 11, 2019, was 67.8°F. The weekly average nighttime temperature was 78.4°F. Temperatures ranged from a maximum of 91.2°F at 1700 hours on July 5 to a minimum of 57.6°F at 0600 hours on July 7 (Figure 1).

Winds averaged 2.8 miles per hour (mph) and were predominately from the northeast. The highest average wind speed was 12.0 mph at 2000 on July 6, and the highest gusts were up to 26 mph at 1230 hours on July 6.

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: 68.1°F, forebay (weekly average of 8 positions); 66.7°F, gatewells (weekly average of 14 positions); 66.7°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 66.7°F, JFF (weekly average of the separator and sample tank "B"). The forebay at Unit 5 had the highest weekly average temperature, 68.9°F (Figure 3). The maximum temperature, 74.7°F, was recorded in the forebay at 1830 hours on July 9 at Unit 7.

The average weekly temperature differentials within dam locations were: 2.5°F, forebay; 4.0°F, gatewells; 0.7°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, 7.1°F, was recorded on July in the forebay at 1800 hours (Unit 12 high, Unit 14 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 1.5°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 9.3°F at 1830 hours on July 9 at Unit 7 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 1.5°F. On average, the gatewell was warmer than the collection channel at Units 1, 8, and 12. The largest temperature differential between the gatewell and corresponding collection channel location was 4.4°F at 1730 on July 10 at Unit 1 (gatewell greater than collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours June 28 to 0700 Hours July 4

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
5-Jul					136.8	54.2	77.9	76.1	91.2	2.5	5.0
6-Jul					146.0	58.2	83.1	71.5	82.8	4.9	12.0
7-Jul					142.5	56.6	81.2	69.2	80.7	3.5	8.0
8-Jul					144.5	57.5	82.2	70.8	84.5	2.3	5.0
9-Jul					158.1	63.5	89.9	74.8	91.0	2.4	6.0
10-Jul					139.8	55.5	79.6	75.2	87.1	1.8	3.0
11-Jul					136.3	54.0	77.6	69.3	72.1	1.8	4.0
Weekly Total	**0**	**0**	**0**	**0**	**143.4**	**57.1**	**81.6**	**72.9**		**2.8**	

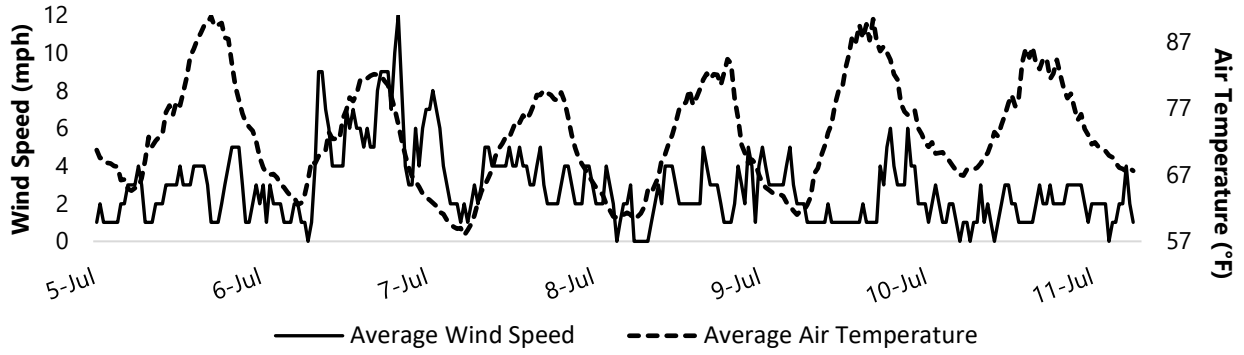

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours July 5 to 0700 Hours July 11

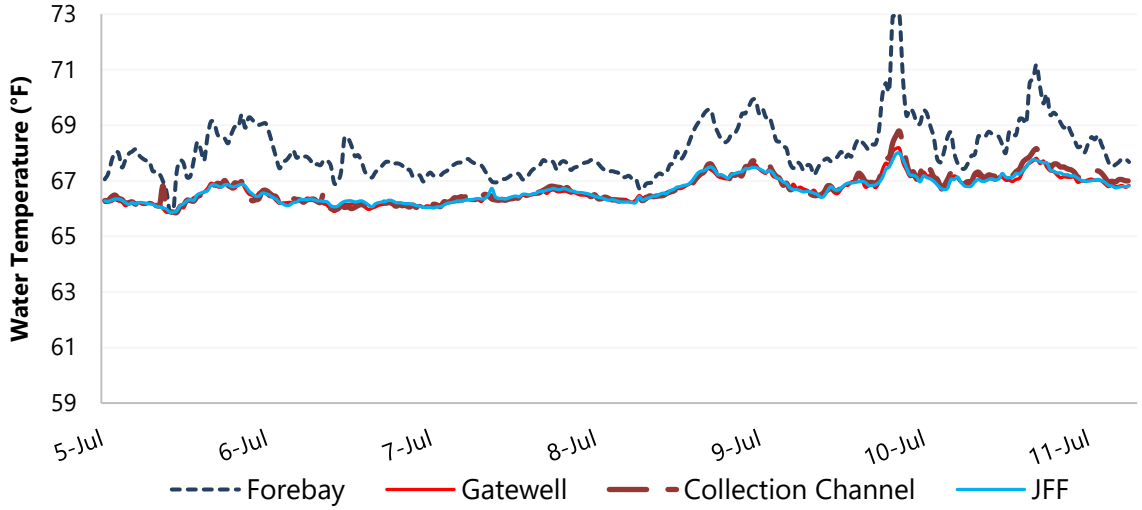

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from 0700 Hours July 5 to 0700 Hours July 11

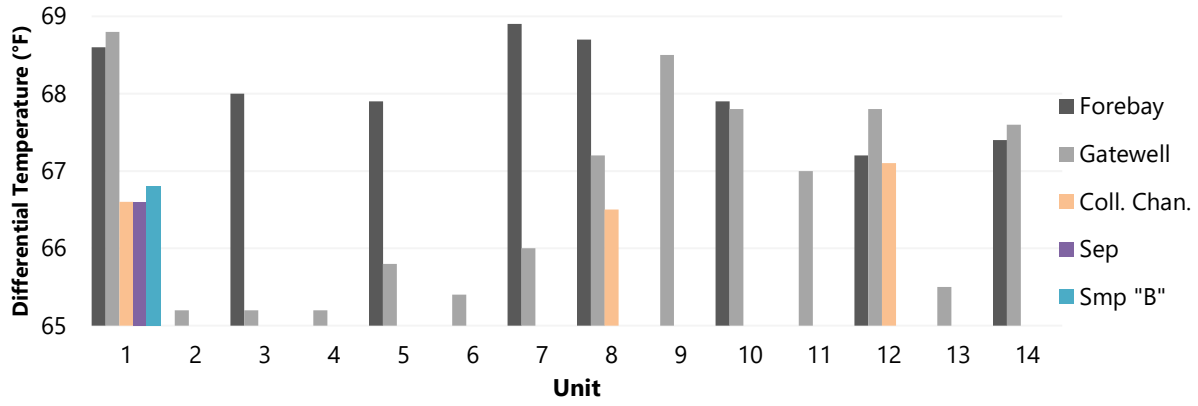

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours July 5 to 0700 Hours July 11

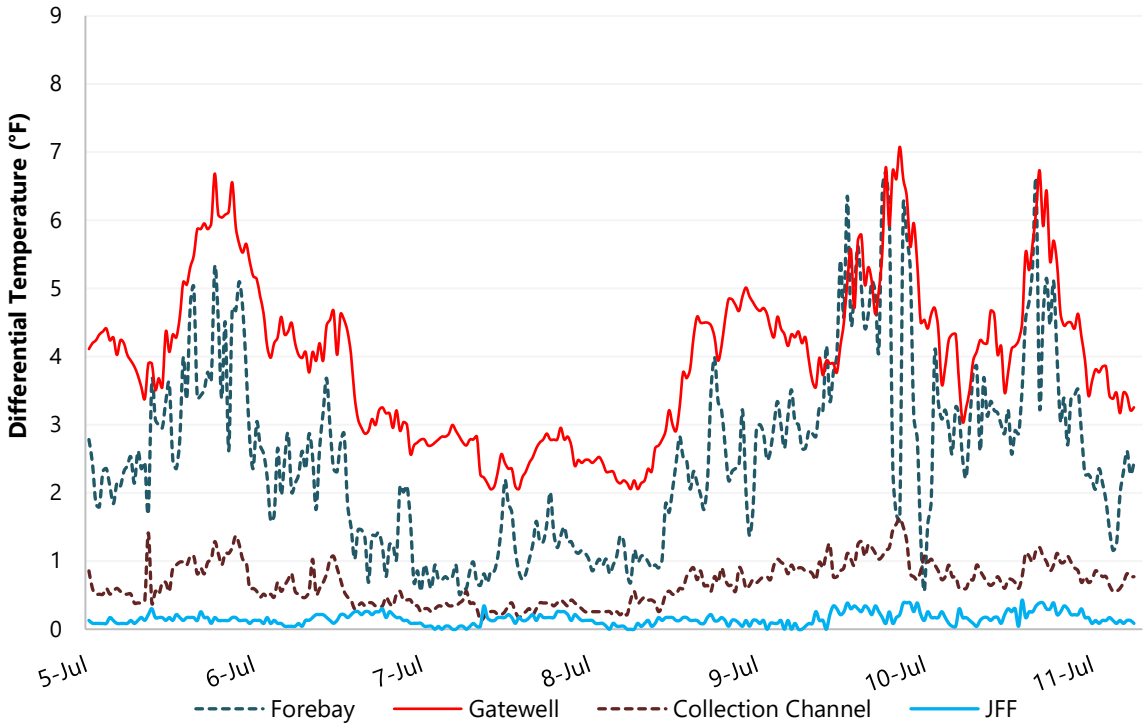

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours July 5 to 0700 Hours July 11

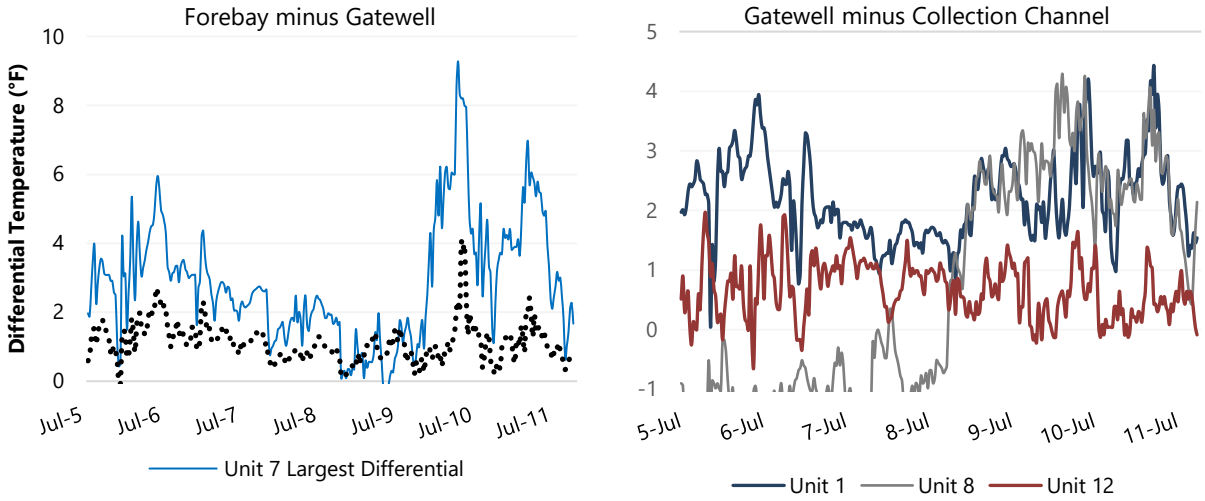

Figure 5
Average Differential Temperatures across Three Dam Locations from 0700 Hours July 5 to 0700 Hours July 11