1201 3rd Avenue, Suite 2600
Seattle, Washington 98101
206.287.9130

Weekly Temperature Report
McNary Dam

August 26, 2019

Prepared by: Meaghan Wright, Anchor QEA, LLC

Report Period: August 16 to 22, 2019

Report No. 2019 Anchor QEA: MCN Temperature Weekly for 0816-0822

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

Fish Collection

An estimated 360 juvenile salmonids were collected and 360 bypassed at the McNary Juvenile Fish Facility (JFF; Table 1), comprising 100.0% subyearling Chinook salmon. There were 0 total facility mortalities.

River Conditions

Average river flow for this reporting period was 130,100 cubic feet per second (130.1 kcfs) with an average spill of 71.5 kcfs.

Temperature Logger Operations

On August 21 and 22, the temperature logger for forebay 3 failed to record any data. The logger was removed and replaced on August 22 at 1100 hours.

Weather Conditions

The weekly average daytime temperature for 0700 hours August 15 to 0700 hours August 22, 2019, was 81.2°F. The weekly average nighttime temperature was 69.8°F. Temperatures ranged from a maximum of 98.8°F at 1630 hours on August 20 to a minimum of 60.4°F at 0500 hours on August 18 (Figure 1).

Winds averaged 2.6 miles per hour (mph) and were predominately from the east. The highest average wind speed was 12.0 mph at 1630 on August 21, and the highest gusts were up to 33 mph at 1630 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: 72.5°F, forebay (weekly average of 8 positions); 71.5°F, gatewells (weekly average of 14 positions); 71.3°F, collection channel (weekly average of positions at Units 1, 8, and 12); and 71.4°F, JFF (weekly average of the separator and sample tank "B"). The forebay at Unit 1 had the highest weekly average temperature, 73.4°F (Figure 3). The maximum temperature, 77.6°F, was recorded in the forebay at 1630 hours on August 20 at Unit 1.

The average weekly temperature differentials within dam locations were: 2.0°F, forebay; 2.6°F, gatewells; 0.4°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, 6.2°F, was recorded on August 20 in the gatewells at 1730 hours (Unit 10 high, Unit 3 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 1.3°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 7.2°F at 1630 hours on August 20 at Unit 1 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.9°F. On average, the gatewell was warmer than the collection channel at Units 8 and 12. The largest temperature differential between the gatewell and corresponding collection channel location was 3.3°F at 1630 on August 20 at Unit 8 (gatewell greater than collection channel).

Table 1
Bypass, Mortality, and River and Weather Conditions from 0700 Hours August 15 to 0700 Hours August 22

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
16-Aug					128.1	50.4	73.0	77.5	90.4	2.3	5.0
17-Aug	144	144	0	0	138.5	54.7	79.0	73.7	85.8	3.5	6.0
18-Aug					128.2	51.2	72.3	72.1	84.6	2.1	4.0
19-Aug	80	80	0	0	108.2	51.3	52.2	76.4	92.7	2.1	4.0
20-Aug					113.3	52.2	56.4	76.5	91.4	2.7	4.0
21-Aug	136	136	0	0	146.4	58.4	83.3	79.9	98.8	1.2	4.0
22-Aug					148.1	58.9	84.5	72.2	87.4	4.5	12.0
Weekly Total	**360**	**360**	**0**	**0**	**130.1**	**53.9**	**71.5**	**75.6**	**76.3**	**2.6**	7.7

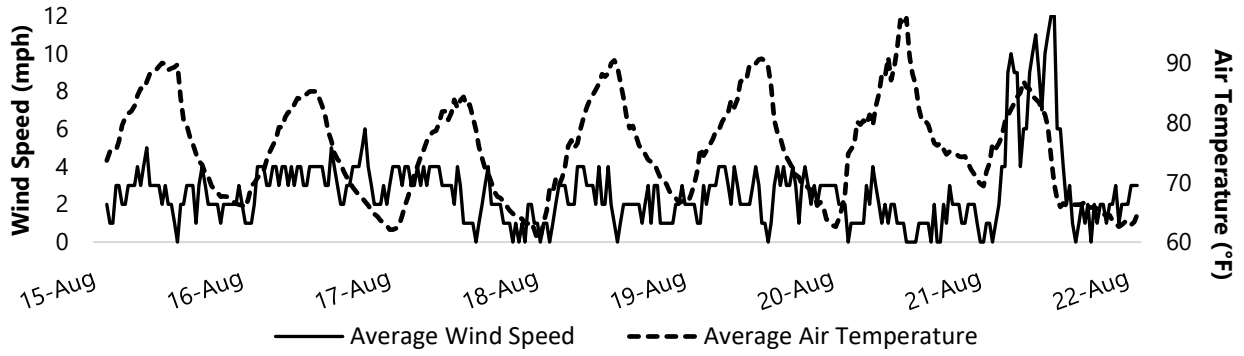

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from 0700 Hours August 15 to 0700 Hours August 22

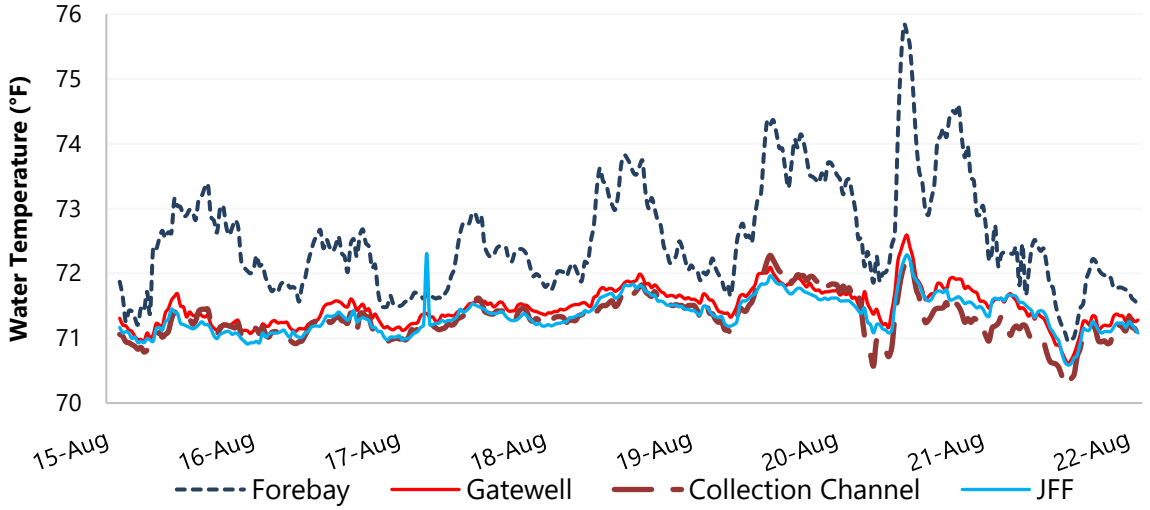

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from 0700 Hours August 15 to 0700 Hours August 22

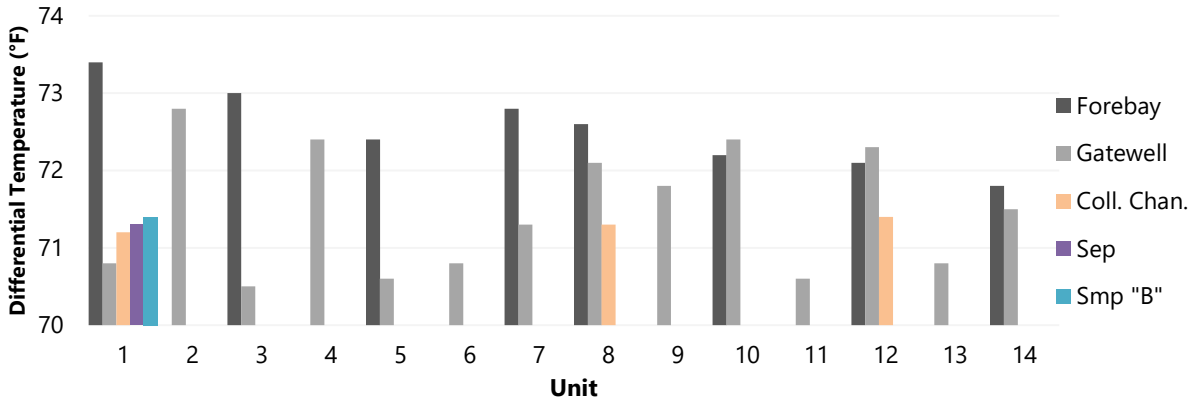

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours August 15 to 0700 Hours August 22

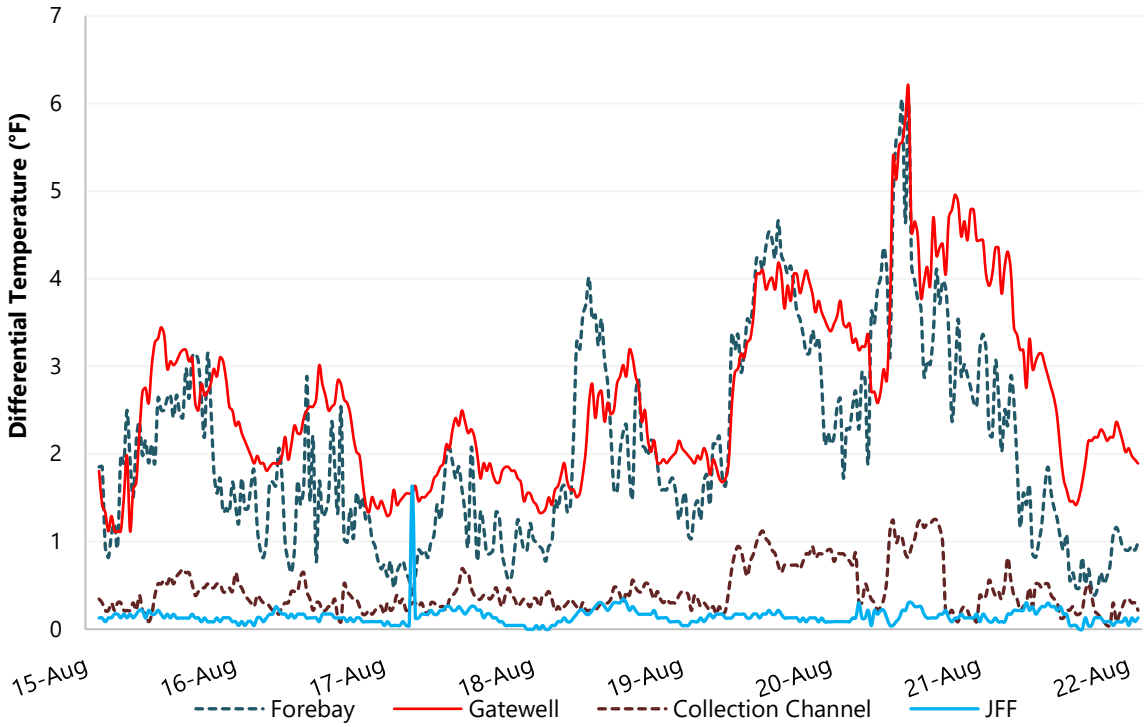

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours August 15 to 0700 Hours August 22

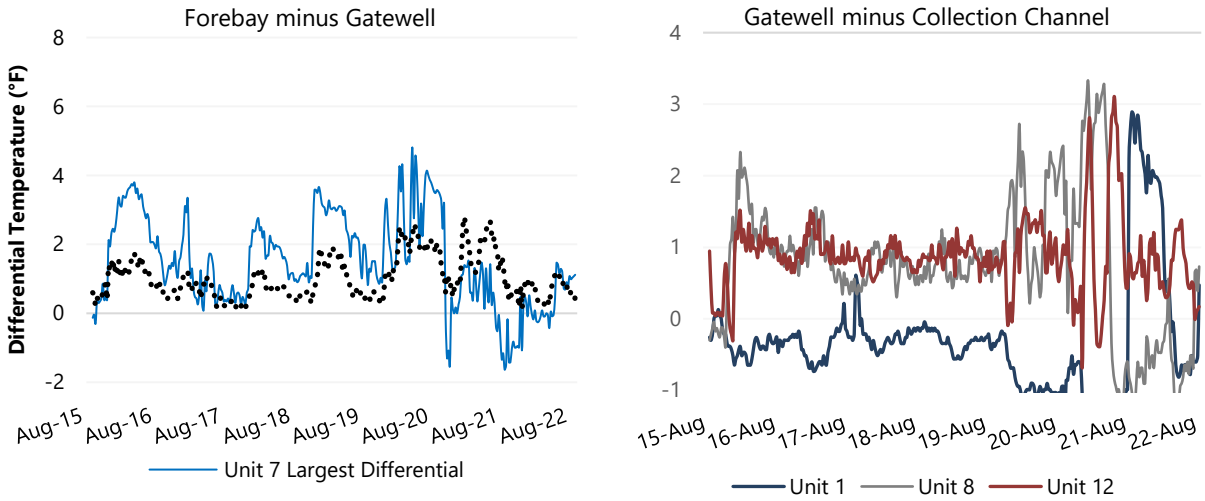

Figure 5
Average Differential Temperatures across Three Dam Locations from 0700 Hours August 15 to 0700 Hours August 22