Weekly Temperature Report
McNary Dam

July 6, 2020

Prepared by: Paul Wagner, Wes Stonecypher, Casey Hurn

Report Period: June 26 through July 2

Report No. 2020 EAS: MCN Dam Temperature Weekly for 0626 to 0702

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

During the fish collection and bypass season, the 24-hour fish collection day begins at 0700 and goes to 0700 the next day. The ending date is used to identify each 24-hour period. For consistency, this same 24-hour period is used to designate each temperature monitoring day.

Temperature monitoring at the McNary juvenile collection system began at 0700 hours on June 14 and is scheduled to continue through 0700 hours August 31.

Fish Collection

An estimated 28,691 juvenile salmonids were collected and 28,681 bypassed at the McNary Juvenile Fish Facility (JFF; Table 1), comprising mostly subyearling Chinook salmon. There were 5 sample and 5 facility mortalities.

River Conditions

Average river flow for this reporting period was 311.9 thousand cubic feet per second (kcfs) with an average spill of 180.6 kcfs.

Temperature Logger Operations

Temperature sampling began on June 14. Temperature loggers in gatewell unit 7 and forebay unit 14 failed this week and were subsequently replaced with new loggers.

Weather Conditions

The weekly average daytime temperature for 0700 hours June 26 to 0700 hours June 30 was 73.7°F. The weekly average nighttime temperature was 62.7°F. Temperatures ranged from a maximum of 95.1°F at 1330 hours on June 26 to a minimum of 55.1°F at 0100 hours on July 1 (Figure 1). Vantage Pro Weather Station air thermometer malfunctioned July 1 and 2.

Winds averaged 5.8 miles per hour (mph) for the week with a maximum velocity recorded on June 28 at 36 mph (Table 1).

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: 62.6°F, forebay (weekly average of 8 positions); 62.4°F, gatewells (weekly average of 14 positions); 62.4°F, collection channel (weekly average of positions at Units 1, 8,

and 12); and 62.4°F, JFF (weekly average of the separator and sample tank "B"). Forebay Units 7, 8, and 12 had the highest weekly average temperature, 63.0°F (Figure 3). The maximum temperature, 70.3°F, was recorded in Unit 7 at 1530 hours on June 26.

The average weekly temperature differentials within dam locations were: 1.2°F, forebay; 0.9°F, gatewells; 0.2°F, collection channel; and 0.2°F, JFF (Figure 4). The largest temperature differential, 8.8°F, was recorded on June 25 in the forebays at 1530 hours (Unit 7 high, Unit 5 low).

The average weekly temperature differential between the forebay and corresponding gatewell was 0.3°F. The forebay was warmer than the corresponding gatewell on average across the powerhouse. The largest temperature differential was 4.9°F at 1600 hours on June 25 at Unit 3 (forebay greater than gatewell; Figure 5). The average weekly temperature differential between the gatewell and corresponding collection channel location was 0.2°F. On average, the gatewell was warmer than the collection channel at Unit 12. The collection channel was warmer than the gatewells at Units 1 and 8. The largest temperature differential between the gatewell and corresponding collection channel location was 2.4°F at 1900 hours on June 27 at Unit 1 (collection channel greater than gatewell).

Table 1
Bypass, Mortality, and River and Weather Conditions from June 26 to July 2

Date	Fish Collected	Fish Bypassed	Mortality		Avg. River Flow	Avg. Turbine Flow	Avg. Spill	Air Temperature		Wind Speed	
			Sample	Facility				Avg.	Max	Avg.	Max
26-Jun	6,000	5,999	0	1	301.2	117	179.5	67.6	82.4	2.9	7.0
27-Jun					314.1	129.8	179.7	79.1	95.1	2.4	21.0
28-Jun	11,340	11,333	4	3	308.2	120.8	182.7	67.2	82.6	6.7	36.0
29-Jun					320.2	133.4	182.1	62.8	77.9	2.2	17.0
30-Jun	8,650	8,649	1	0	320	135.1	180.2	71.4	84.3	6.9	25.0
1-Jul					320.1	135.2	180.2			10.1	34.0
2-Jul	2,701	2,700	0	1	299.4	114.8	180			9.7	16.0
Weekly Total/Ave	**28,691**	**28,681**	**5**	**5**	**311.9**	**126.6**	**180.6**	**69.6**	**84.5**	**5.8**	**22.3**

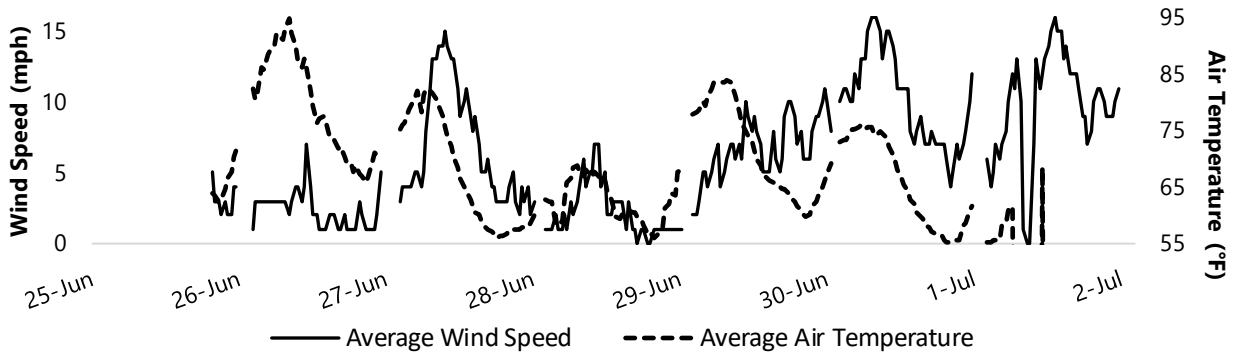

Figure 1
Average Wind Speed and Air Temperature for Each Half-Hour Interval from June 26 to July 2

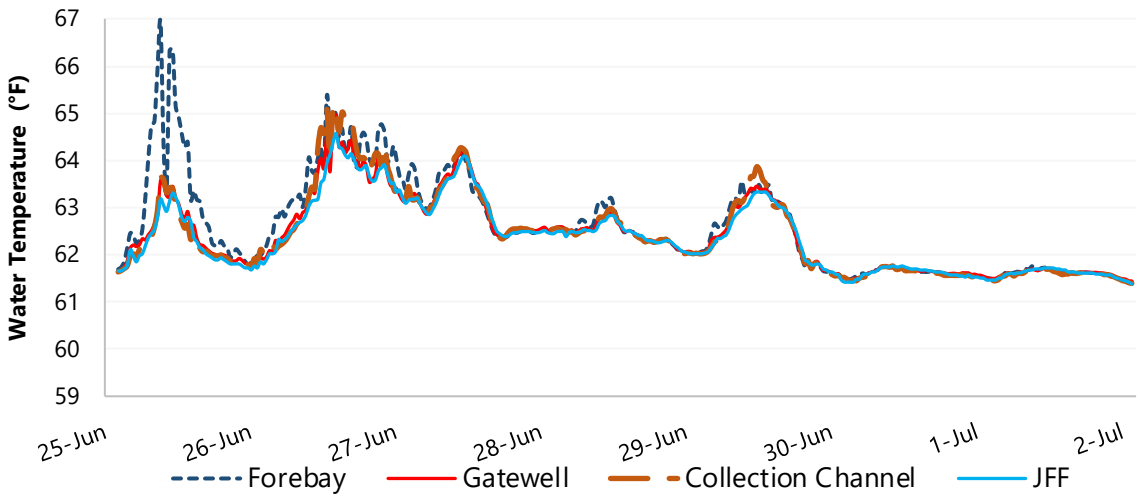

Figure 2
Average Water Temperatures for Each Half-Hour Interval for Four Dam Locations from June 26 to July 2

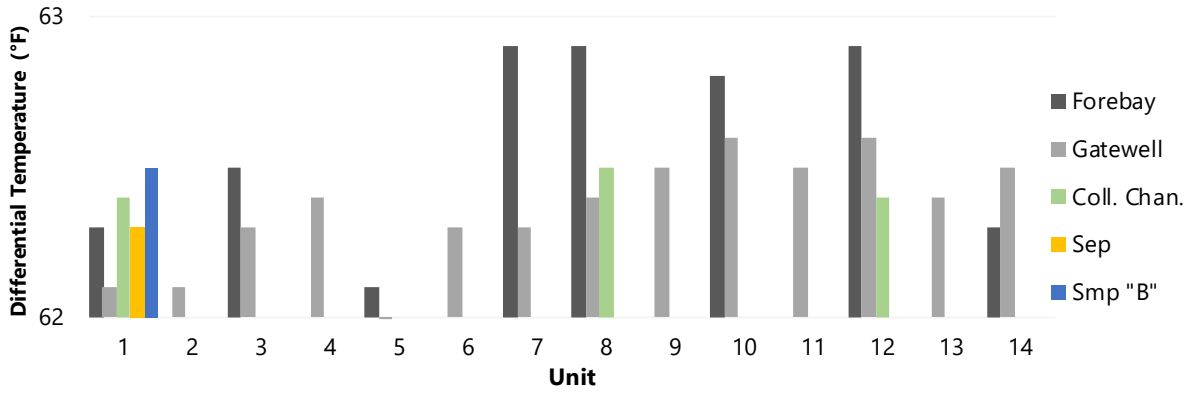

Figure 3
Average Weekly Water Temperatures by Position for Five Dam Locations from 0700 Hours June 26 to 0700 Hours July 2

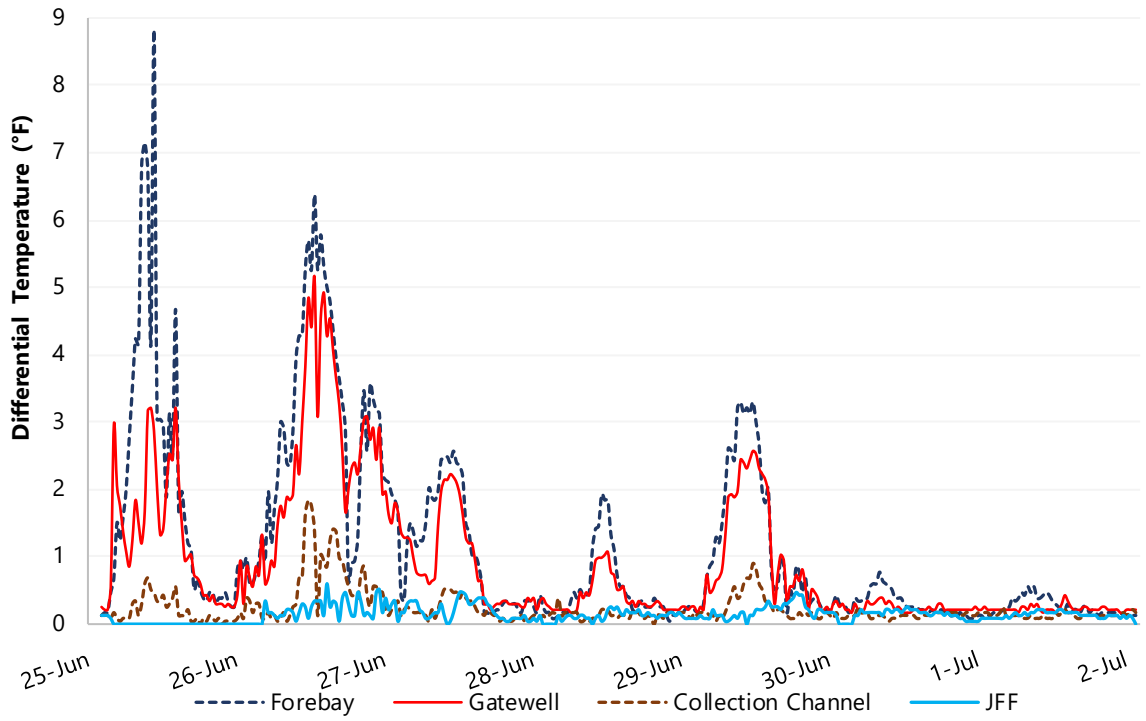

Figure 4
Average Differential Temperatures Within Four Dam Locations from 0700 Hours June 26 to 0700 Hours July 2

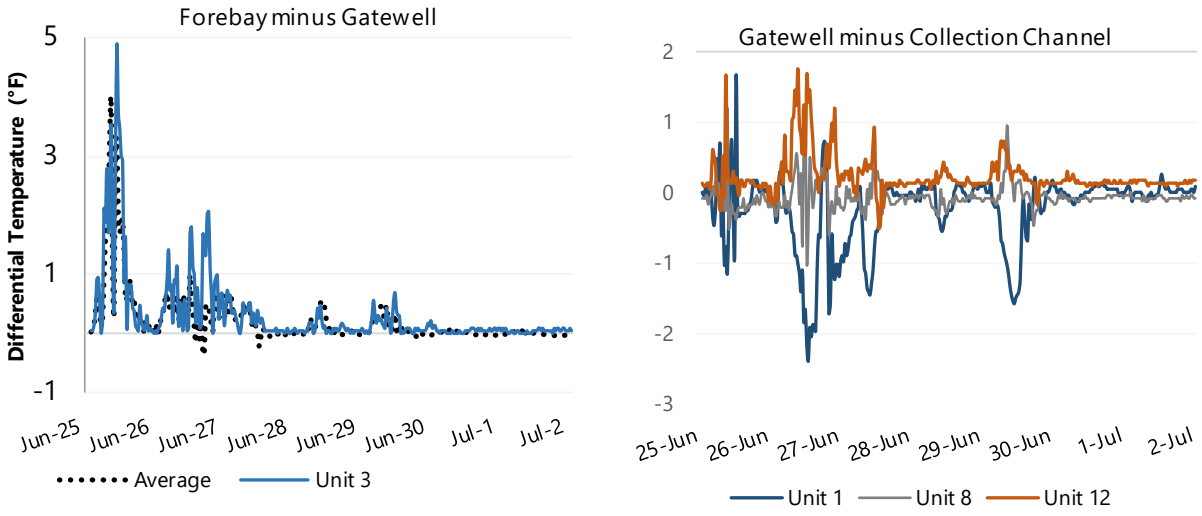

Figure 5
Average Differential Temperatures across Three Dam Locations from 0700 Hours June 26 to 0700 Hours July 2