



PSMFC McNary Dam, P.O. Box 1230, Umatilla, Oregon 97882
 Phone (541) 922-3630 Fax (541) 922-4101

McNary Temperature Report #10
August 19 - 25, 2011

A total of 57,800 juvenile salmonids were collected at the McNary Juvenile Fish Facility (JFF) for this weekly period (Figure 1 and Table 1). Subyearling fall chinook accounted for 99.4% of the total collection. Daily flows for this week averaged 199.2cfs. There has been court ordered spill since April 10. Spill averaged 100.0kcfs. The system mortality averaged 0.6% for the week. Sample tank mortality averaged 0.5%. Mortalities are being enumerated from the sample tanks and all raceways.

Fish are being collected every day, and transported every other day by truck. Units 1 and 10 are off for rewinding. All orifices are open.

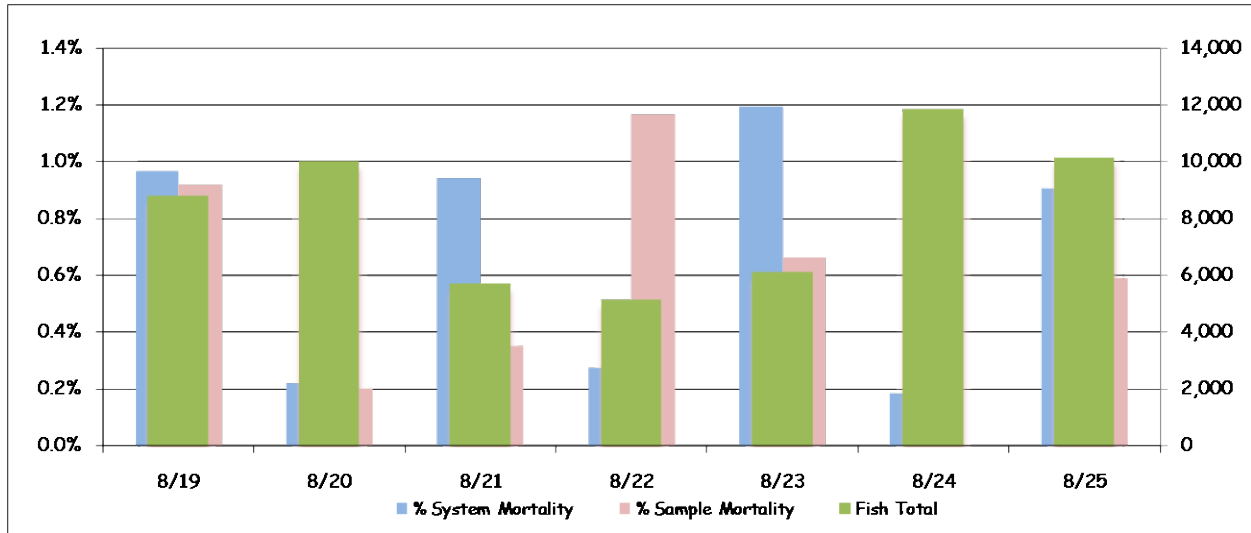


Figure 1: Collection and Mortality

Table 1: Collection and Mortality With Daily and Weekly Averages

	Collection	Mortality		Flow			Air Temp		Wind Speed	
		Sample	System	Total	Turbine	Spill	Avg.	Max.	Avg.	Max
8/19/11	8,800	0.92%	0.97%	206.5	97.8	104.0	73.2	87.2	1.8	13.0
8/20/11	10,020	0.20%	0.22%	211.6	100.6	106.3	73.4	91.8	1.2	10.0
8/21/11	5,720	0.35%	0.94%	190.5	90.3	95.6	75.0	97.5	0.8	10.0
8/22/11	5,140	1.17%	0.27%	186.8	88.5	93.7	1.5	73.5	0.0	6.0
8/23/11	6,120	0.66%	1.19%	191.4	90.7	96.0	32.7	90.5	0.0	0.0
8/24/11	11,840	0.00%	0.19%	196.8	93.4	98.7	73.8	92.1	0.0	2.0
8/25/11	10,160	0.59%	0.91%	211.1	100.6	105.8	79.5	94.5	0.0	1.0
Weekly Average	8,257	0.49%	0.63%	199.2	94.6	100.0	58.4	97.5	0.5	13.0

Air temperatures stayed fairly constant at the McNary JFF, with an average of 76.1°F for the week. Maximum hourly air temperature was 97.1°F on August 21 (Figure 2). Although, temperatures are starting to rise considerably with the 26th through the 28th expected to be the hottest of the season. The minimum temperature was 57.3°F on August 21 from 6:00 to 7:00a.m. Winds over the course of the week averaged 0.7mph with gust peaking up to 13.0mph on August 19. There was an issue with the power source to the weather station and some data was lost for August 22 and 23.

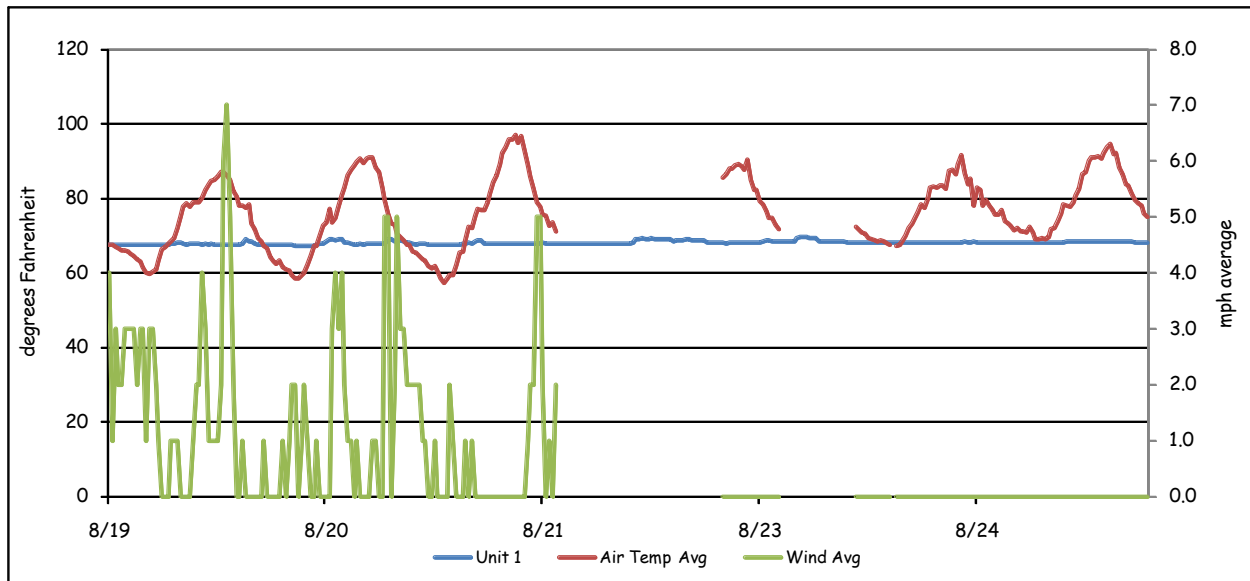


Figure 2: Weather and Forebay Water Temperature

There are 36 temperature probes located through out the Project and the JFF. These probes are set to record temperatures at 30-minute intervals. These probes are located at the following locations:

- 1) Forebay, near elevation 335 approximately 5 feet below the surface. These are attached to the pier noses in front of turbine units 1, 3, 5, 7, 8, 10, 12, and 14.
- 2) In front of spillbays 21, 17, 12, 7 and 2, approximately 5 feet below the surface. These probes are hung in the center of the spillbay, on the tailrace side.
- 3) Attached to the handrail in the center of the “B” turbine gatewell slots, approximately 2 to 3 feet below the surface, in all 14 turbine units.

- 4) Tailwater locations are at turbine unit 1 and 14 (tailrace), and the wingwall of the navigation lock. These were placed 5 feet below the water surface.
- 5) The collection channel had probes installed below turbine units 12, 8 and past unit 1 at the beginning of the transition screen.
- 6) The barge transportation dock.
- 7) Fish separator.
- 8) Transport holding raceway #1 at a depth of 2 – 3 feet.

Forebay water temperatures (Table 2) peaked this week with 79.5°F on August 27 from 5:30 to 6:30p.m., in front of unit 7. The average was 69.9°F across the forebay. Gatewell water temperatures for all units combined averaged 68.98°F (Table 3). Gatewell temperatures peaked at 76.4°F on August 25 in unit 2 at 5:00p.m. Temperatures in the forebay and gatewells continue to rise over the weekend that is outside of this weekly reporting period.

Table 2: Forebay Water Temperatures

	Daily Average								Daily Max
	1F	3F	5F	7F	8F	10F	12F	14F	
8/19/11	68.2	68.8	68.8	68.9	68.9	69.4	69.4	69.5	73.6
8/20/11	68.1	68.4	68.7	69.2	69.1	69.5	69.4	69.8	72.9
8/21/11	69.4	69.9	70.0	70.1	69.9	69.7	69.9	69.7	76.6
8/22/11	68.6	68.9	68.9	69.0	68.9	69.5	69.2	69.5	71.6
8/23/11	68.8	69.1	69.1	68.9	68.7	69.1	68.8	69.1	70.5
8/24/11	70.6	71.6	71.8	71.1	70.9	71.1	71.3	70.6	75.6
8/25/11	70.3	71.9	72.2	72.8	72.4	71.6	72.6	71.7	79.5
Weekly Average	69.2	69.8	69.9	70.0	69.8	70.0	70.1	70.0	79.5

Table 3: Gatewell Water Temperatures for Units 1, 7 & 14

	Daily Avg.			Daily Max.			Daily Min.		
	1	7	14	1	7	14	1	7	14
8/19/11	67.8	68.3	68.8	68.9	69.6	70.0	67.6	67.5	68.0
8/20/11	67.9	68.7	68.9	69.1	70.5	70.7	67.3	67.5	68.2
8/21/11	67.9	69.6	69.1	68.7	73.0	71.4	67.6	67.6	68.2
8/22/11	68.3	68.8	69.0	69.3	70.5	70.7	67.8	67.8	68.4
8/23/11	68.5	68.5	68.8	69.6	69.8	70.0	67.8	67.8	68.2
8/24/11	68.2	69.4	69.8	68.4	73.0	71.4	68.2	68.0	68.9
8/25/11	68.3	70.1	70.3	68.4	73.8	73.2	68.2	68.4	68.7
Weekly Average	68.1	69.0	69.2	68.9	71.5	71.1	67.8	67.8	68.4

The differences in temperatures between the gatewell at unit 1 and the gatewell at unit 14 are illustrated in Figure 3. This graph takes the temperature in the gatewell and subtracts unit 14 from that gatewell (unit 1 – 14). It then continues down the powerhouse subtracting unit 14 from each consecutive unit. A negative number indicates that unit 14 was the warmer unit. Conversely, a positive number indicates that unit 1 was warmer. This shows the reader the amount of variance from one end of the powerhouse to the other that can be seen through out a 24-hour period.

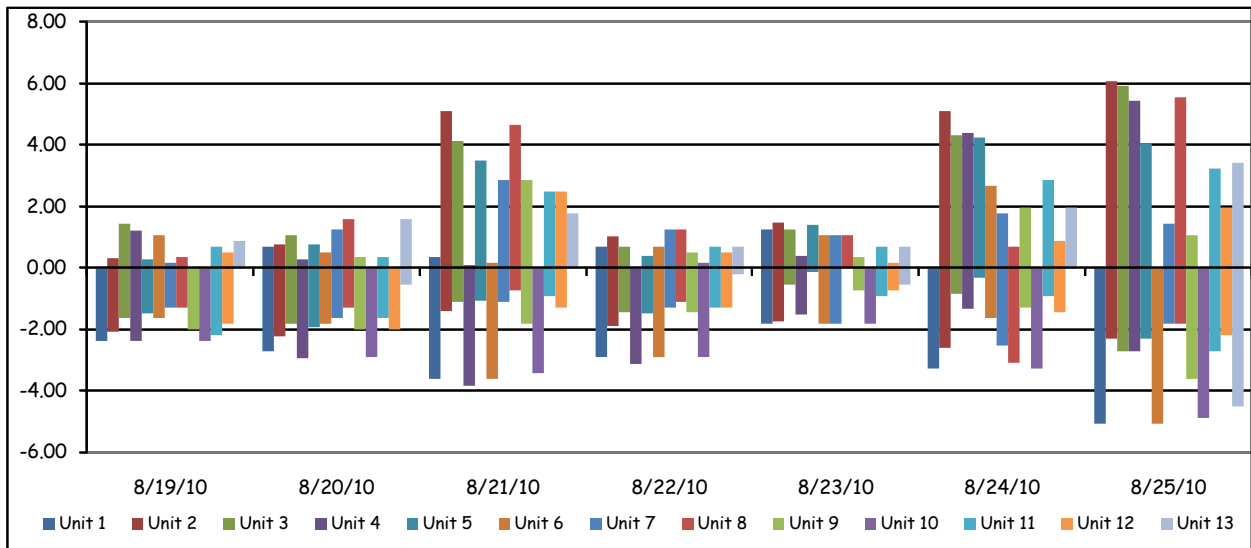


Figure 3: Gatewell Temperature Differentials for Units 1 - 14

Forebay differentials (Figure 4) are calculated by taking the forebay temperature and subtracting the corresponding gatewell temperature from it (1F – unit 1). A negative number would indicate that the gatewell was warmer. Conversely, a positive number indicates that the forebay is warmer. Again, this shows the reader the amount of variance that can be seen between the forebay and the gatewell through out a 24-hour period. The forebay is starting to heat up and some gradients are developing.

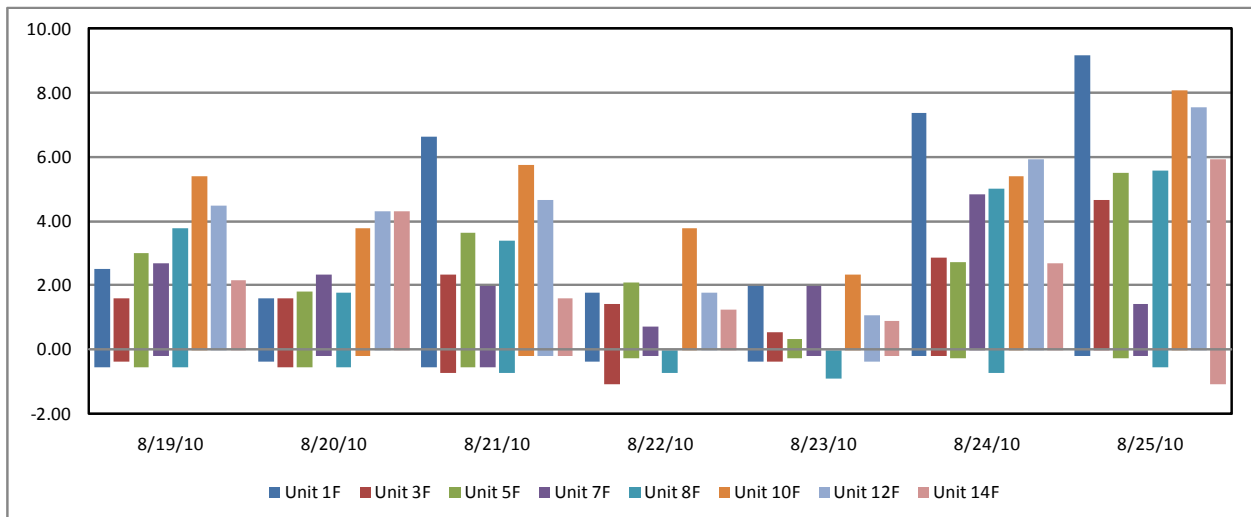


Figure 4: Temperature Differentials Between Forebay and Gatewell

Average water temperature in the collection channel was 69.9°F (Table 4) for the week. A maximum temperature of 72.3°F was recorded August 25 at 7:00 pm, below Unit 12. Temperatures at the separator averaged 68.9°F for the week with a maximum daily temperature of 71.4°F (Table 5). The temperature in raceway #1 averaged 68.99°F with a high of 71.6°F August 25 at 7:00pm.

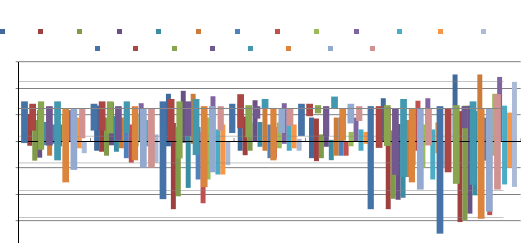


Table 4: Collection Channel Average and Maximum Water Temperatures

	Daily Avg.			Daily Max.		
	1	8	12	1	8	12
8/19/11	68.2	68.6	69.1	69.1	69.4	70.2
8/20/11	68.3	68.8	69.1	69.4	70.2	70.9
8/21/11	68.8	69.3	69.5	70.5	71.8	72.0
8/22/11	68.6	69.0	69.2	69.3	70.2	70.9
8/23/11	68.6	68.9	68.9	69.4	70.0	70.2
8/24/11	69.6	69.7	70.3	71.1	70.9	72.0
8/25/11	69.7	70.1	70.5	71.4	71.4	72.3
Weekly Average	68.8	69.2	69.5	70.0	70.5	71.2

Table 5: Raceway, Barge Dock and Separator Maximum and Average Water Temperatures

	Daily Avg.			Daily Max.		
	Separator	Raceway 1	Dock	Separator	Raceway 1	Dock
8/19/11	68.2	68.3	67.8	69.1	69.3	68.1
8/20/11	68.4	68.5	67.9	69.6	69.6	69.0
8/21/11	68.8	68.9	68.2	70.5	70.7	69.0
8/22/11	68.6	68.8	68.4	69.3	69.4	69.0
8/23/11	68.7	68.8	68.5	69.4	69.6	69.3
8/24/11	69.6	69.8	68.6	71.1	71.2	69.0
8/25/11	69.8	69.9	68.6	71.4	71.6	69.3
Average	68.9	69.0	68.3	70.1	70.2	68.9

Collection channel differentials (Table 6) are calculated by taking the forebay temperature and subtracting the collection channel temperature from it at the three corresponding points. This is an average of the variances between the forebay and the collection channel. A negative number indicates that the collection channel was warmer. A positive number indicates the forebay was warmer. The graph (Figure 5) shows the variance through out the week.

Table 6: Average Differences between Forebay and Collection Channel

	1	8	12
8/19/11	0.1	0.3	0.4
8/20/11	-0.2	0.3	0.3
8/21/11	0.6	0.5	0.4
8/22/11	0.1	-0.1	0.0
8/23/11	0.2	-0.2	-0.2
8/24/11	1.0	1.2	1.0
8/25/11	0.6	2.4	2.1
Average	0.3	0.6	0.6
Maximum	6.7	8.5	7.7
Minimum	-2.0	-1.3	-0.9

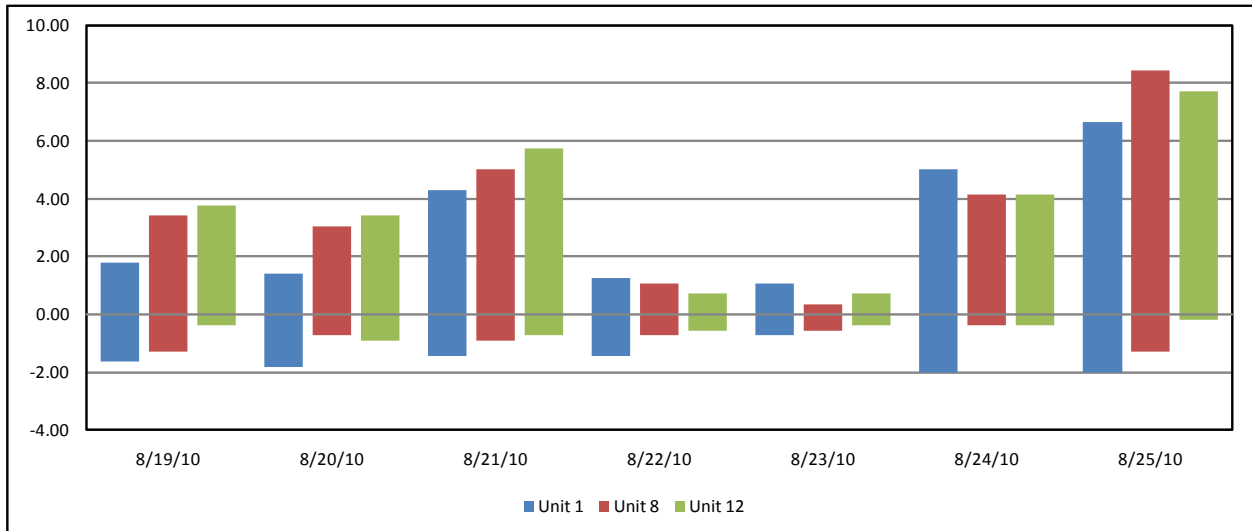


Figure 5: Temperature Differentials Between Forebay and Collection Channel

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