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McNary Temperature Report #11
August 20 - 26, 2010

A total of 35,175 juvenile salmonids were collected at the McNary Juvenile Fish Facility (JFF) for this weekly period. Peak collection day was August 25 with 14,685 fish (Figure 1 and Table 1). Subyearling fall chinook accounted for 99.9% of the total collection. Daily flows for this week averaged 116.1kcfs. There has been court ordered spill since April 10. Spill averaged 58.2kcfs. The system mortality averaged 0.8% and sample tank mortality averaged 0.7%. Mortalities are being enumerated from all raceways, the sample tanks and the recovery raceway.

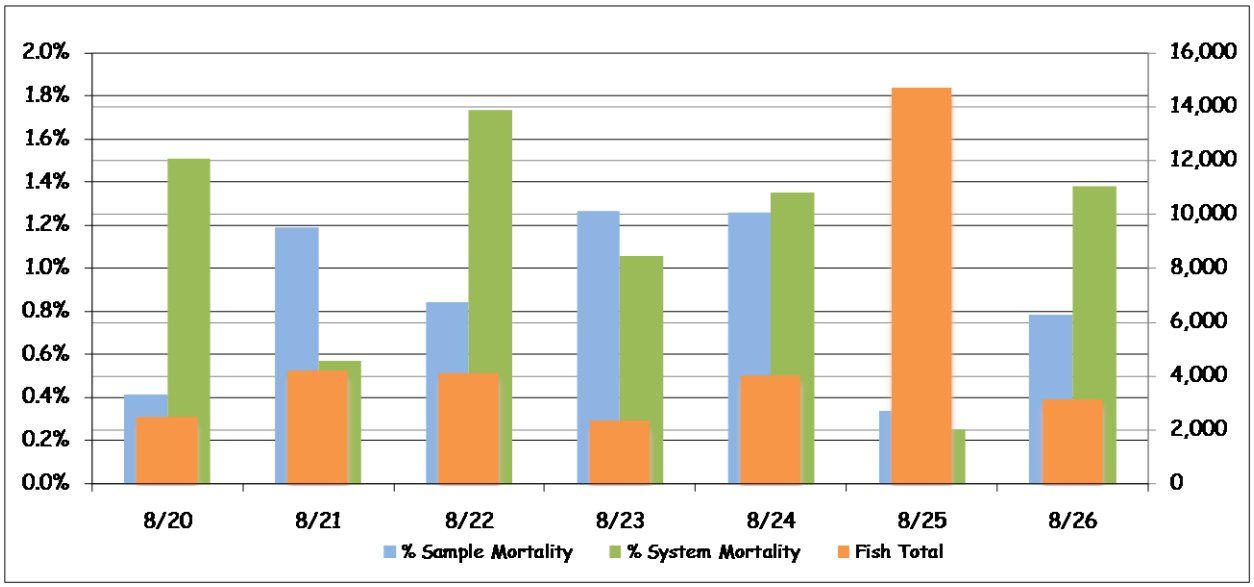

Figure 1: Collection and Mortality

Table 1: Collection and Mortality With Daily and Weekly Averages

		Mortality		Flow			Air Temp		Wind Speed	
	Collection	Sample	System	Total	Turbine	Spill	Avg.	Max	Avg.	Max.
8/20/10	2,520	0.41%	1.51%	112.4	51.0	56.6	71.3	86.3	0.3	10.0
8/21/10	4,210	1.19%	0.57%	119.5	54.9	59.9	71.5	82.6	0.3	16.0
8/22/10	4,150	0.84%	1.73%	119.0	54.7	59.6	67.6	76.0	5.8	30.0
8/23/10	2,365	1.27%	1.06%	113.4	51.9	56.8	65.6	80.1	0.0	7.0
8/24/10	4,065	1.26%	1.35%	109.1	49.9	54.6	60.6	80.9	0.0	0.0
8/25/10	14,685	0.34%	0.25%	107.4	49.0	53.8	76.1	86.7	0.0	0.0
8/26/10	3,180	0.79%	1.38%	132.0	62.2	66.1	71.9	86.3	6.8	38.0
Weekly Average	5,025	0.73%	0.84%	116.1	53.4	58.2	69.7	86.7	1.9	38.0

Fish are being transported by truck with a 24-hour sample taken every day until the end of the season. The one exception to this was August 25 when unusually large amounts of fish were collected. There will be units that are off line for the remainder of the season. Units 2 and 7 are off for rewinding. Units 3 and 4 are off for transformer replacement. This means that the probes in 3 and 4 will be put in the "A" slot and "C" slot respectively. All other orifices are open. There were several technical glitches in the data this week. All of the data for the 25th was lost because of a malfunction of the Palm Pilot® which is used for downloading 25 MadgeTech® temperature probes. And the weather station decided to take a holiday August 24 – 25, reason unknown.

With what data that was taken, air temperatures averaged 69.7°F. Maximum hourly air temperature was 86.7°F on August 25 (Figure 2). The minimum temperature was 51.6°F on August 24 at 6:30a.m. Winds over the course of the week averaged 2.2mph with gust peaking up to 38.0mph on August 26.

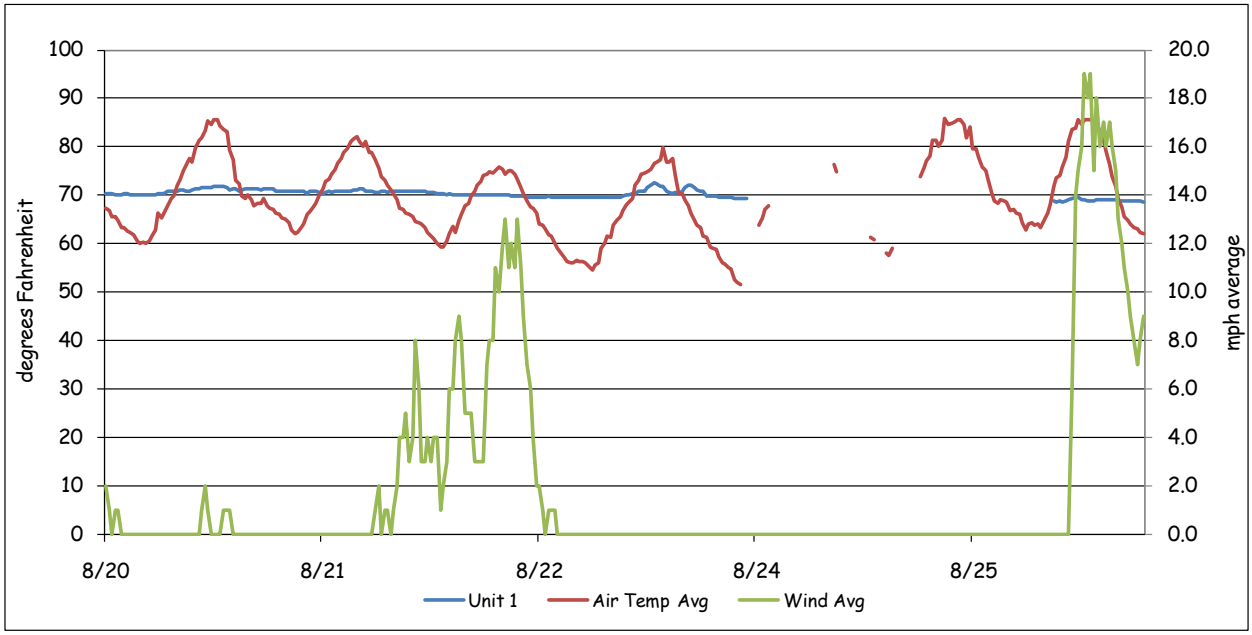

Figure 2: Weather and Forebay Water Temperature

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 75.2°F on August 23 at 4:00p.m., in front of unit 1. The average was 70.4°F across the forebay. Gatewell water temperatures for all units combined averaged 69.8°F (Table 3). Gatewell temperatures peaked at 73.9°F on August 26 in unit 2 at 7:30a.m. until 10:30a.m. This unit has been off all summer and is just now being brought back on line.

Table 2: Forebay Water Temperatures

	Daily Average								Daily
	1F	3F	5F	7F	8F	10F	12F	14F	Max
8/20/10	71.4	70.8	71.1	71.2	71.1	71.0	71.1	70.5	72.5
8/21/10	71.1	70.7	71.0	71.1	71.1	70.7	70.8	70.3	71.9
8/22/10	70.1	69.8	70.1	70.2	70.1	69.8	69.7	69.4	71.0
8/23/10	71.2	70.8	70.9	70.8	70.7	70.8	71.2	70.4	75.2
8/24/10	70.7	70.1	70.5	70.6	69.7	70.6	70.9	70.7	73.7
***8/25/10**	70.9	69.3	69.7	70.8		69.7	70.8	69.9	74.6
8/26/10	69.4	68.9	69.2	69.7	69.3	69.2	69.7	68.8	71.3
Weekly Average	70.7	70.2	70.5	70.6	70.5	70.4	70.6	70.1	75.2

*Data incomplete

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
8/20/10	70.8	70.1	70.7	71.8	70.2	71.8	70.2	70.0	70.3
8/21/10	70.8	69.7	70.5	71.4	70.0	71.6	70.3	69.4	69.8
8/22/10	70.1	69.4	69.6	70.9	69.6	70.2	69.4	69.1	69.3
8/23/10	70.3	69.4	70.0	72.7	69.4	72.7	69.4	69.3	69.1
8/24/10	69.6	69.5	70.4	70.7	70.5	72.1	69.3	69.1	69.4
***8/25/10**		69.3	70.0		69.8	70.7		69.1	69.6
8/26/10	68.9	68.8	68.9	69.6	69.3	69.4	68.5	68.4	68.5
Average	70.3	69.5	70.1	61.0	69.8	71.2	59.6	69.2	69.4

*Data incomplete

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.

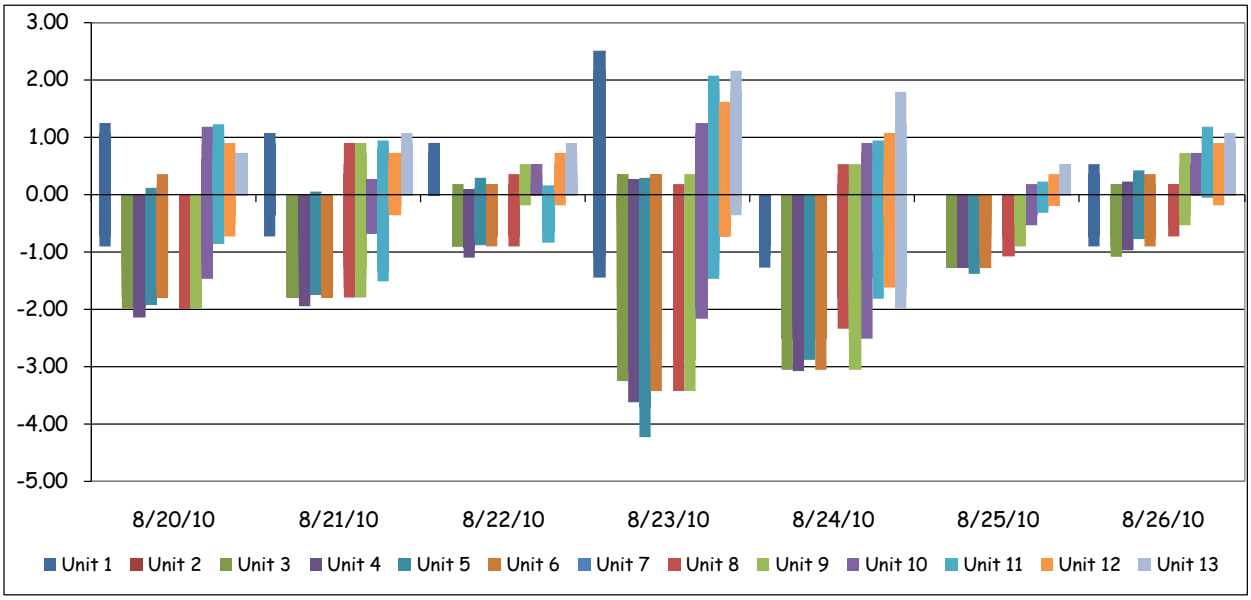

Figure 3: Gatewell Temperature Differentials for Units 1 - 14

Forebay differentials (Figure 4) are calculated by taking the forbay 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.

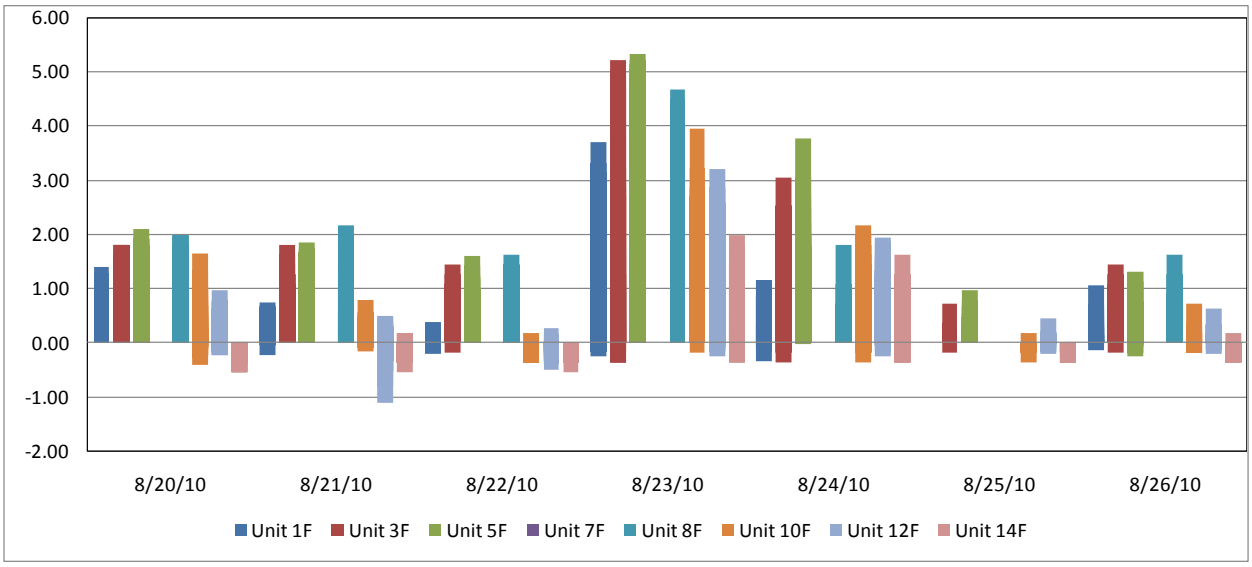

Figure 4: Temperature Differentials Between Forebay and Gatewell

Average water temperature in the collection channel was 69.9°F (Table 4) for the week. A maximum temperature of 71.9°F was recorded August 23 at 9:00p.m. below Unit 12. Temperatures at the separator averaged 69.7°F for the week with a maximum daily temperature of 70.5°F (Table 5). The temperature in raceway #1 averaged 69.7°F with a high of 70.5°F August 24 from 9:00 until 9:30 in the evening.

Table 4: Collection Channel Average and Maximum Water Temperatures

	Daily Avg.			Daily Max.		
	1	**8**	**12**	**1**	**8**	**12**
8/20/10	70.6	70.3	70.7	70.9	70.7	71.6
8/21/10	70.3	70.1	70.6	70.7	70.5	71.4
8/22/10	69.6	69.4	69.6	70.0	69.8	70.2
8/23/10	69.8	69.6	70.1	70.5	70.7	72.0
8/24/10	69.9	69.8	70.2	70.9	70.7	71.4
***8/25/10**	69.6	69.6	69.9	70.2	70.2	70.5
8/26/10	69.1	68.8	69.0	69.3	69.3	69.3
Average	69.9	69.7	70.1	70.3	70.3	70.9

*Data incomplete

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

	Daily Avg.			Daily Max.		
	Separator	**Raceway 1**	**Dock**	**Separator**	**Raceway 1**	**Dock**
8/20/10	70.2	70.3	70.5	70.5	70.5	70.7
8/21/10	70.0	70.0	70.2	70.2	70.3	70.4
8/22/10	69.5	69.5	69.7	69.6	69.6	69.8
8/23/10	69.6	69.6	69.7	70.2	70.2	69.8
8/24/10	69.7	69.7	69.6	70.5	70.5	70.4
***8/25/10**	69.3	69.4	69.3	69.8	70.0	69.8
8/26/10	68.9	68.9	69.0	69.3	69.3	69.5
Average	69.7	69.7	69.7	70.0	70.1	70.1

*Data incomplete

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**
8/20/10	0.8	0.8	0.3
8/21/10	0.8	0.9	0.2
8/22/10	0.5	0.7	0.1
8/23/10	1.4	1.1	1.1
8/24/10	0.8	0.3	0.7
***8/25/10**	-0.2		0.2
8/26/10	0.1	0.5	0.2
Average	0.7	0.8	0.4
Maximum	4.9	3.4	3.2
Minimum	-1.2	-0.2	-0.9

*Data incomplete

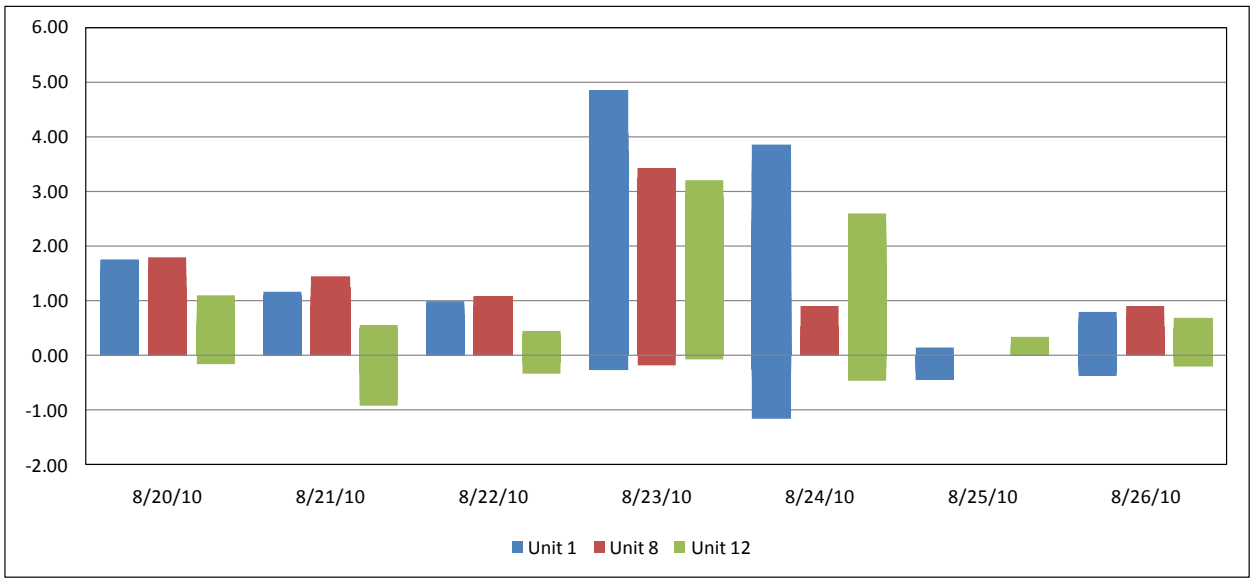

Figure 5: Temperature Differentials Between Forebay and Collection Channel