

# FISH PASSAGE CENTER

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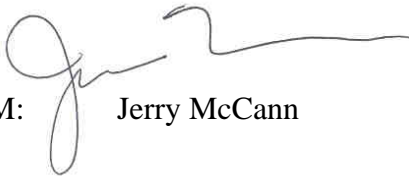
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## MEMORANDUM

TO: The Files

FROM:  Jerry McCann

DATE: March 15, 2007

RE: Time line of events related to increased mortality in samples at Bonneville Dam during the Spring Creek release.

### **Chronology of Events related to Spring Creek release and Bonneville Passage**

Spring Creek NFH released 6.6 million subyearling Chinook salmon on March 5 at about 10 am. The smolts began arriving at Bonneville Dam March 6 in the early afternoon. Fish arriving on that date were part of the sample examined at 7:00 am March 7. Those fish showed a “normal” level of mortality (about 1.5%) when the sample was worked up. In the late afternoon of March 7, mortalities began arriving in the sample tank, according to SMP personnel at Bonneville Dam. The mortalities continued arriving the next day, March 8, when SMP personnel contacted COE biologists at Bonneville Dam and the Fish Passage Center. See table 1 for a summary of daily samples and mortalities during this time period.

Smolt Monitoring personnel reported unusually high mortality in the Spring Creek smolts collected at Bonneville Dam (see Table 1). They reported roughly 4.5% mortality on March 8, and 8% mortality on the 9<sup>th</sup>. This was much higher than the typical mortality rate of 1 to 1.5%. No immediate cause of the mortality was apparent. The COE inspected gatewells and orifices on March 8 and 9 and found no blocked orifices, or dead fish in gatewells, or other likely cause for mortality. The COE also reported no visible dead fish in the forebay of Powerhouse 2. The COE continued inspections on March 9 to determine other possible causes of mortality.

Approximately 30 dead fish were obtained from the sample on March 8, and examined at the USFWS health lab at Spring Creek NFH and were found to show no obvious signs of disease or

injury. So the cause of the mortality is unknown at this point. SMP personnel report that most mortalities were neutrally buoyant when they enter the sample tank, possibly indicating mortality had occurred within a relatively short time period prior to arriving in the tank. A few fish were seen to have eyes missing or other trauma in the March 9 sample and the mortality rate rose to 8%.

Table 1. Summary of SMP sample data related to Spring Creek release mortalities in 2007.

Sample enddate	Passage Index	Collection Count	Sample Count	Percent Descaled	Sample Morts	Facility Morts (in sample)	Percent Facility Morts	Estimated Collection Morts
03/03/07	9	5	1	0%	0	0	0.0%	0
03/04/07	26	15	3	0%	0	0	0.0%	0
03/05/07	8	5	1	0%	0	0	0.0%	0
03/07/07	106,076	63,400	318	0%	0	5	1.6%	997
03/08/07	429,248	258,400	1,292	0%	1	55	4.3%	11,000
03/09/07	298,932	175,600	878	0%	2	72	8.2%	14,400
03/10/07	37,238	20,600	103	0%	0	12	11.7%	2,400
03/11/07	80,973	50,333	755	0%	0	17	2.3%	1,133
03/12/07	71,001	42,067	373	0%	0	11	2.9%	1,241
03/13/07	32,204	17,733	246	0%	0	11	4.5%	793
03/14/07	7,633	4,200	63	0%	0	2	3.2%	133
03/15/07	1,855	1,000	179	0%	0	3	1.7%	17

Facility morts are those fish that were dead prior to entering sample tank, while sample morts died while in sample tank or during sampling.

Based on the previous information, the Salmon Managers issued an SOR requesting spill begin immediately to decrease the proportion of fish passing via powerhouse 2, and thereby reduce the mortality risk for the population. The concern was both for the continued passage of the March 5 release, but also for the release that did occur on the morning of March 9. On the afternoon of the 9<sup>th</sup> TMT met and discussed the SOR. The COE noted their concern for the fish mortalities, and suggested that if new information was presented that indicated the bypass system at Bonneville was causing the mortalities, the COE would change course to implement a spread the risk operation. With the current information, the COE believed the best operation would be to continue operating the B2 corner collector and not to provide spill at the project. In other words, the SOR was not implemented. No spill was provided.

SMP personnel continued monitoring through the day on Friday. During the period from 7 am to about 3 pm the mortality rate spiked to 26%. This information, along with the fact that the mortalities appeared “old” (i.e. grey in appearance not fresh) was provided via phone to the TMT conference call. The Action Agencies decided not to spill based on the evidence that the mortalities appeared old, indicating the incident had occurred earlier and was not continuing.

Gary Fredricks of NOAA fisheries was at Bonneville Dam during SMP sampling on March 9. He also walked through the facility with the COE biologists that day. He reported that orifice lights in some of the units had been changed to LED lights that did not appear as bright as the older lights previously used. He requested that the old incandescent light be reinstalled as a precaution. Fish in the gatewells use lights as a cue to find the orifices and he thought this might

cause fish to delay in the gatewells. Delay in the gatewells could in turn lead to mortality if fish were exhausted swimming around in the turbulent environment.

Mortality rates remained above normal (1 to 1.5%) throughout the period of the Spring Creek release passage. As of March 15, the mortality rate was returning to normal at 1.7%. SMP personnel reported that subyearling morts in the past few days looked “extremely old” suggesting the mortality event was not continuing.

### **Mortality related to the Spring Creek fish passage at Bonneville 2 juvenile bypass**

The mortality rates reported in table 1 are based upon the number of mortalities in the sample on the date. Just as the live fish from the sample are expanded for the total collection, the facility morts can be expanded by the sample rate for a given day to arrive at the estimated number of morts in the collection. In other words the mortality rate presented in table 1 should be applied to the collection estimate to arrive at the total number of mortalities in the bypass over the course of the Spring Creek release. The last column in table 1 shows the estimated collection morts, which is the daily number of dead smolts in the bypass based on the sample rate. The sum of the daily numbers of morts through March 15, yields approximately 32,000 morts in the bypass during the Spring Creek release. That equates to about 5% bypass mortality for subyearling Chinook compared to the total collection of 633,000 estimated for the 2006 Spring Creek releases. However, if the mortality occurred during the first release (with morts trickling in the sample after a single mortality event), then the mortality rate in the bypass would have been close to 6%.

Based on the past 3 years sample data during the Spring Creek release, the average mortality rate was very low for Spring Creek releases; with the overall mortality well below 1%. This year’s rate was much higher and resulted in unusually high direct mortality through the bypass. Based on RT survival studies, bypass survival for subyearling Chinook would be predicted between 0.968 to 1.007 (from Counihan et al 2006). During the 2007 Spring Creek subyearling passage at Bonneville, the 5 to 6% mortality was “direct mortality” not relative. As such it is a much higher rate than would have predicted given RT research results.