

**From:** Susan Fregien  
**To:** Chris Jimmerson  
**Date:** 9/30/2011 10:55 AM  
**Subject:** Fwd: RE: Minnow Mgt Plans  
**Attachments:** ESJ\_FHMTotoxicity\_ProbableCauses.xls

Case File

>>> Melissa Turner <[mturner@mlj-llc.com](mailto:mturner@mlj-llc.com)> 9/29/2011 10:06 PM >>>

Hi Susan,

Of the 12 samples toxic to fathead minnows (FHM), 10 have ammonia as the probable cause of toxicity. For the tests that had survival of 80% or below, 100% of these tests attributed ammonia as the cause (8 of 8) and every sample that had a TIE run on it attributed ammonia as the cause of toxicity. The 2 samples that had toxicity and are not associated with high levels of ammonia, were both collected from Deadman Creek @ Gurr (6/13/06 and 5/29/07) - ammonia concentrations were non-detect in both samples. The survivals for each sample were 88% and 87% survival, respectively, which is greater than the 80% threshold that we use to determine if the toxicity is "ecologically relevant". Also, for the 5/29/07 sample, the toxic sample was the field duplicate. The associated grab sample was not toxic with a survival of 90%. For those two samples (6/13/06 and 5/29/07 collected from Deadman Creek @ Gurr), its not clear what the cause of the statistically significant difference in survival was. Future samples collected from the same location that have had FHM toxicity have been attributed to ammonia.

I've attached an excel workbook with information for each FHM toxic sample including station name, sample date, constituents with exceedances (i.e. ammonia, DO, E. coli), TIE narrative (if a TIE was performed) and a column listing probable cause of FHM toxicity.

Let me know if you have any questions.

Melissa

-----Original Message-----

From: Susan Fregien [<mailto:sfregien@waterboards.ca.gov>]  
Sent: Monday, September 26, 2011 4:24 PM  
To: Melissa Turner  
Subject: Minnow Mgt Plans

Hi Melissa,

I am looking into the Fathead Minnow management plans in our region. According to my database, the Delta Coalition has 2 (Lone Tree Creek and Kellogg Creek) and the ESJWQC has 3 (Prairie Flower Drain, Deadman Creek,

and Highline Canal). I was wondering if the cause of toxicity was determined for those locations/events?

Susan

Station Name	Season	Sample Date	Dissolved Oxygen, mg/L	pH	Temperature, °C	Total Dissolved Solids, mg/L	Ammonia, mg/L	Nitrite, MPN/100 mL	Nitrate, µg/L	Copper Total, µg/L	Chlorophyll a, µg/L	Chlorophyll b, µg/L	Chlorophyll c, µg/L	Chlorophyll total, µg/L	% Ceriodaphnia dubia	% Pimephales promelas	% Control	TIE Narrative (performed on samples greater than 50% mortality compared to control)	Probable Cause	
Deadman (Dutchman) Creek @ Gurr	Irrigation	6/13/2006	5.01					310										NA	Unknown - survival > 80%, no detection of NH4	
Deadman (Dutchman) Creek @ Gurr	Irrigation	5/29/2007	5.11					1400		8.8 (7.5)								NA	Unknown - survival > 80%, no detection of NH4; associated grab sample was NOT toxic.	
Deadman (Dutchman) Creek @ Gurr	Winter1	1/20/2009	5.61		762	470	5.5	>2400	18									NA	Ammonia	
Deadman (Dutchman) Creek @ Gurr	Storm1	2/7/2009	1.01		1802	1100	50.0	>2400	30						0	0	7	Due to low and unstable DO, the sample was aerated throughout test. Complete mortality on Day 1. TIE initiated on 02/17/09 and it was concluded that ammonia was the cause of toxicity.	Ammonia	
Deadman (Dutchman) Creek @ Gurr	Non Contiguous, Storm2	12/15/2009	5.02		995	610	15.0	>2400									75	In samples collected in January 2009, ammonia was detected at 5.5 mg/L, an exceedance of the WQTL for ammonia and enough to account for the 13 percent <i>Pimephales</i> mortality experienced.	Ammonia	
Deadman (Dutchman) Creek @ Gurr	Non Contiguous, Winter1, MPM, NM	3/23/2010	0.20		4023	2100	155.4	>2400		0.1					0	0		A TIE was not initiated due to the inability to maintain dissolved oxygen levels at protocol specifications and exceedingly high ammonia levels that could not be removed.	Ammonia	
Deadman (Dutchman) Creek @ Gurr	Fall2, NM	11/16/2010	6.8		1547	840	31.0	>2400							0	0		Ammonia was detected at 31 mg/L (environmental sample) and 31 mg/L (FD); the amount of ammonia detected in these samples was enough to account for complete mortality to both <i>Ceriodaphnia dubia</i> and <i>Pimephales promelas</i> . Results of the Phase I TIE was conducted on the November 16, 2010 toxic water samples indicate ammonia to be the cause of the toxicity	Ammonia	
Highline Canal @ Lombardy Rd	Storm2 NM	2/26/2008					1.7			32 (10.1)							12	90	NA	Ammonia
Highline Canal @ Lombardy Rd	Storm Sed	3/4/2008	0.34		1402		56.0											0	Resampling occurred at this site one week after the original samples were collected (March 4, 2008) and resulted in complete mortality to the test species. There were no chemistry analyses coinciding with the resampling event, but tests at the toxicity laboratory showed levels of ammonia at 56 mg/L. The high concentration of ammonia is the most likely cause of the <i>Pimephales</i> toxicity.	Ammonia
Prairie Flower Drain @ Crows Landi	Irrigation	7/13/2006	5.45	###	1560	720	18.0	790										7.7	Significant toxicity in sample. Phase I TIE 7/16/06. Toxicity persistent (100% mortality Baseline) Zeolite removed tox, ammonia main cause. C18SPE slight nonpolar organic. Resampled, toxicity persistent but with diminishing magnitude.	Ammonia
Prairie Flower Drain @ Crows Landi	Irrigation1	7/20/2006	6.41		1950		NA											70	Resample. Significant reduction in survival, indicating that toxicity persistent but with diminishing magnitude.	Resample - most likely ammonia which was the cause of toxicity in the original sample
Prairie Flower Drain @ Crows Landi	MPM, NM	4/19/2011	2.14		1471	800	12.0	>2400										80	NA	Ammonia