Exceedance History

During monitoring at the Lone Tree Creek sites, exceedances of WQTLs of numerous field, physical, bacteriological, and organic parameters have occurred including 23 dissolved oxygen (DO), four pH, two total dissolved solids (TDS), one SC, four ammonia, and 28 *E. coli* exceedances (Table II-8). Seven exceedances of the chlorpyrifos WQTL occurred in the Lone Tree Creek subwatershed. Several other pesticides experienced exceedances: once each for cypermethrin, DDT, DDE, and simazine; twice each for thiobencarb and diazinon; and three exceedances for diuron (Tables II-8, II-9). The analysis of metals was initiated during the 2006 irrigation season. Since that time, one exceedance of the WQTL for lead, three exceedances for cadmium and eight exceedances of the WQTL for copper have occurred. Samples taken from sites within the Lone Tree Creek subwatershed have also experienced water column toxicity to *Ceriodaphnia* twice, *Pimephales* three times, and to *Selenastrum* ten times. Sediment samples were toxic to *Hyalella* twice (Table II-9). Of these totals, eight of the DO exceedances, two of the pH exceedances, five of the *E. coli* exceedances, one of the copper exceedances, and three of the toxicities to *Selenastrum* occurred during the 2008 irrigation season.

Lone Tree Creek is currently listed under the Central Valley Basin Plan 303d list of impaired water bodies for ammonia, biochemical (biological) oxygen demand, and specific conductivity. The potential source of the stressors/pollutants is indicated as dairies. Lone Tree Creek has experienced one specific conductivity exceedance and three ammonia exceedances over the past three years of Coalition sampling. The exceedances were attributed to discharges from dairies.

Using the priority flow chart outlined in the Management Plan introduction, priorities were assigned to the constituents experiencing more than one exceedance. Based on the exceedances at the Lone Tree Creek sites, the constituents receiving the highest priorities were chlorpyrifos (A), diazinon (A), copper (C), diuron (C) and *Ceriodaphnia* toxicity (C).

Table II-8. Field, bacteria, inorganic and legacy pesticide exceedances (low priority) experienced in samples collected from locations within the Lone Tree Creek site subwatershed between August 2004 and September 2008 (sorted by season and date).

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Dissolved Solids, mg/L	Ammonia as N, mg/L	E. coli, MPN/100 mL	DDE(p,p')$^{-1}$, µg/L	DDT(p,p')$^{-1}$, µg/L
Lone Tree Creek @ Brennan Rd	Irrigation	20-Sep-05	5.1					1600		
Lone Tree Creek @ Brennan Rd	Storm	27-Feb-06			1370	730		1600		
Lone Tree Creek @ Brennan Rd	Storm	15-Mar-06						1600		
Lone Tree Creek @ Brennan Rd	Storm	24-Mar-06	3.3							
Lone Tree Creek @ Jack Tone Rd	Irrigation	24-Aug-04	6.3					500		
Lone Tree Creek @ Jack Tone Rd	Irrigation	17-May-05						900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	21-Jun-05						500		
Lone Tree Creek @ Jack Tone Rd	Irrigation	19-Jul-05	6.1					900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	16-Aug-05	6.9					500		
Lone Tree Creek @ Jack Tone Rd	Irrigation	20-Sep-05	4.5					1600		
Lone Tree Creek @ Jack Tone Rd	Irrigation	16-May-06	6.7					2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	20-Jun-06	4.7					2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	18-Jul-06	5.6					770		
Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Aug-06	6.62					920		
Lone Tree Creek @ Jack Tone Rd	Irrigation	22-May-07						730		
Lone Tree Creek @ Jack Tone Rd	Irrigation	12-Jun-07						580		
Lone Tree Creek @ Jack Tone Rd	Irrigation	10-Jul-07					2.5	2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7-Aug-07						1400	0.058	0.031
Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Apr-08	5.85					650		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*13-May-08*	*5.29*	*5.91*						
Lone Tree Creek @ Jack Tone Rd	Irrigation	13-May-08	4.65	6.10				1300		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*10-Jun-08*	*6.62*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	10-Jun-08						690		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*15-Jul-08*	*6.07*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Jul-08						460		
Lone Tree Creek @ Brennan Rd	*Irrigation*	*12-Aug-08*	*6.66*							

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Dissolved Solids, mg/L	Ammonia as N, mg/L	E. coli, MPN/100 mL	DDE(p,p')[1], µg/L	DDT(p,p')[1], µg/L
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*12-Aug-08*	*4.2*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	12-Aug-08						310		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*16-Sep-08*	*5.93*							
Lone Tree Creek @ Jack Tone Rd	Storm	16-Feb-05	6					1600		
Lone Tree Creek @ Jack Tone Rd	Storm	21-Mar-05		8.58				900		
Lone Tree Creek @ Jack Tone Rd	Storm	27-Feb-06		9				900		
Lone Tree Creek @ Jack Tone Rd	Storm	15-Mar-06	6.3					1600		
Lone Tree Creek @ Jack Tone Rd	Storm	24-Mar-06	6.7							
Lone Tree Creek @ Jack Tone Rd	Storm	11-Feb-07	5.54				2.8	2400		
Lone Tree Creek @ Jack Tone Rd	Storm	28-Feb-07					2.1	2400		
Lone Tree Creek @ Jack Tone Rd	Storm	23-Jan-08	3.79			580	10	>2400		
Constituent Priority			**E**	**E**	**E**	**E**	**E**	**E**		

[1]Montitoring for this analyte was not initiated until May of 2006.

Table II-9. Metals, pesticides and toxicity (high priority) exceedances experienced in samples collected from locations within the Lone Tree Creek site subwatershed between August 2004 and September 2008 (sorted by season and date).

Station Name	Season	Sample Date	Cadmium, µg/L	Copper[1,2], µg/L	Lead[1,2], µg/L	Chlorpyrifos, µg/L	Cypermethrin, total, µg/L	Diazinon, µg/L	Diuron[1], µg/L	Simazine[1], µg/L	Thiobencarb[1], µg/L	*Ceriodaphnia dubia*, Survival (%)	*Hyalella azteca*, Survival (%)	*Pimephales promelas*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count
Lone Tree Creek @ Brennan Rd	Storm	27-Feb-06				0.018						0		0	1286750
Lone Tree Creek @ Brennan Rd	Storm	15-Mar-06													680250
Lone Tree Creek @ Brennan Rd	Storm	24-Mar-06													1234500
Lone Tree Creek @ Jack Tone Rd	Irrigation	17-May-05											93.8		
Lone Tree Creek @ Jack Tone Rd	Irrigation	19-Jul-05				0.036	0.03								
Lone Tree Creek @ Jack Tone Rd	Irrigation	16-Aug-05				0.019									
Lone Tree Creek @ Jack Tone Rd	Irrigation	18-Jul-06				0.019									
Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Aug-06		8.9 (6.4)											
Lone Tree Creek @ Jack Tone Rd	Irrigation	22-May-07									0.5				
Lone Tree Creek @ Jack Tone Rd	Irrigation	12-Jun-07									0.12				
Lone Tree Creek @ Jack Tone Rd	Irrigation	10-Jul-07		12 (5.3)		0.035									
Lone Tree Creek @ Jack Tone Rd	Irrigation	7-Aug-07	0.06	4.6 (4.1)											
Lone Tree Creek @ Jack Tone Rd	Irrigation	4-Sep-07		3.5 (3.1)											
Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Apr-08													862738
Lone Tree Creek @ Jack Tone Rd	Irrigation	23-Apr-08													1360982
Lone Tree Creek @ Jack Tone Rd	Irrigation	13-May-08													250516
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*15-Jul-08*		*7 (6.5)*											
Lone Tree Creek @ Jack Tone Rd	Storm	16-Feb-05												0	1380000
Lone Tree Creek @ Jack Tone Rd	Storm	15-Mar-06													753750
Lone Tree Creek @ Jack Tone Rd	Storm	27-Apr-06											80		
Lone Tree Creek @ Jack Tone Rd	Storm	11-Feb-07	0.1	21 (12.4)	3.8 (3.6)	0.052		0.14	12						
Lone Tree Creek @ Jack Tone Rd	Storm	28-Feb-07	0.1	19 (13.9)					4.3	4.1					353000
Lone Tree Creek @ Jack Tone Rd	Storm	23-Jan-08		40 (21.1)		1.7		0.2	4.9			0		75	742247
Constituent Priority			**E**	**C**	**E**	**A**		**A**	**C**		**NP[3]**	**C**	**D**	**D**	**D**

[1]Montitoring for this analyte was not initiated until May of 2006.
[2]Water quality trigger for each sample is based on hardness and is shown in parenthesis.
[3]NP – Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are turned over to the Rice Coalition.

2007 and 2008 Management Plan Monitoring Results

In 2007, Management Plan Monitoring was implemented at Lone Tree Creek @ Jack Tone Road for chlorpyrifos (Table II-5). During the irrigation season of 2007 the Coalition did not conduct Management Plan Monitoring for copper since only one exceedance occurred during the irrigation season. All *Selenastrum* and diuron exceedances occurred during the storm season. After experiencing copper exceedances the last three months of the 2007 irrigation season, 2008 upstream Management Plan Monitoring included chlorpyrifos at only Lone Tree Creek @ Brennan Road and metals at both Lone Tree Creek @ Valley Home Road and Lone Tree Creek @ Brennan Road (Table II-6). During the 2007 and 2008 irrigation seasons, the chlorpyrifos WQTL was only exceeded once during normal monitoring on July 10, 2007. Copper exceeded its WQTL three times during 2007 normal monitoring but only once the following year during upstream MPM at Lone Tree Creek @ Valley Home Road on July 15, 2008. Table II-10 provides monitoring results for chlorpyrifos and copper from all sampling events during the 2007 and 2008 irrigation seasons.

Table II-10. Lone Tree Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos and metals from the 2007-2008 irrigation seasons. Exceedance values are in bold.

	Month	April	May	June	July	August	September
2007 NM (@ Jack Tone Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	<0.00259	<0.00259	0.011	**0.035**	<0.003	<0.003
	Copper (µg/L)	3.4	4.8	5.1	**12.0**	**4.6**	**3.5**
2007 MPM A (@ Jack Tone Rd)	Date	NA	NA	NA	7/30/07	8/28/07	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	0.01	<0.003	NA
	Copper (µg/L)	NA	NA	NA	NA	NA	NA
2008 NM (@ Jack Tone Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	Copper (µg/L)	3.5	4.5	3	3.6	3.5	2.2
2008 MPM US (@ Valley Home Rd)	Date	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA
	Copper (µg/L)	NA	4.6	5.7	**7.0**	3.7	3.8
2008 MPM US (@ Brennan Rd)	Date	NA	NA	NA	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	Copper (µg/L)	NA	NA	NA	3.8	3.3	2.9

NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads were calculated for the chlorpyrifos, copper, and diuron detections based on the following formula (Table II-11):

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/L X 1000 or µg/L).

The load values presented for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table II-11. Lone Tree Creek site subwatershed. Instantaneous load calculations for chlorpyrifos, copper, diazinon, and diuron (sorted by site, analyte and date).

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	16-Feb-05	0.63	0.014	0.25
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	19-Jul-2005	NR	0.036	NA
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	16-Aug-05	25.85	0.019	13.91
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	27-Feb-06	0.34	0.014	0.13
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Mar-06	27.84	0.013	10.25
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	18-Jul-06	NR	0.019	NA
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11-Feb-07	26.7	0.052	39.32
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12-Jun-07	39.21	0.011	12.21
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	10-Jul-07	35.9	0.035	35.58
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	30-Jul-07	26.77	0.01	7.58
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	23-Jan-08	18.88	1.7	908.86
Lone Tree Creek @ Jack Tone Rd	Copper	16-May-06	13.95	3.6	1422.08
Lone Tree Creek @ Jack Tone Rd	Copper	20-Jun-06	NR	4.9	NA
Lone Tree Creek @ Jack Tone Rd	Copper	18-Jul-06	NR	4.9	NA
Lone Tree Creek @ Jack Tone Rd	Copper	15-Aug-06	49.49	8.9	12472.53
Lone Tree Creek @ Jack Tone Rd	Copper	19-Sep-06	NR	2.5	NA
Lone Tree Creek @ Jack Tone Rd	Copper	11-Feb-07	26.7	21	15877.34
Lone Tree Creek @ Jack Tone Rd	Copper	28-Feb-07	7.85	19	4223.48
Lone Tree Creek @ Jack Tone Rd	Copper	10-Apr-07	24.9	3.4	2397.32
Lone Tree Creek @ Jack Tone Rd	Copper	12-Jun-07	39.21	5.1	5662.58
Lone Tree Creek @ Jack Tone Rd	Copper	10-Jul-07	35.9	12	12198.96
Lone Tree Creek @ Jack Tone Rd	Copper	7-Aug-07	19.43	4.6	2530.92
Lone Tree Creek @ Jack Tone Rd	Copper	4-Sep-07	NR	3.5	NA
Lone Tree Creek @ Jack Tone Rd	Copper	23-Jan-08	18.88	40	21385.00
Lone Tree Creek @ Jack Tone Rd	Copper	15-Apr-08	NR	3.5	NA
Lone Tree Creek @ Jack Tone Rd	Copper	13-May-08	NR	4.5	NA
Lone Tree Creek @ Jack Tone Rd	Copper	10-Jun-08	NR	3	NA
Lone Tree Creek @ Jack Tone Rd	Copper	15-Jul-08	24.15	3.6	2461.88
Lone Tree Creek @ Jack Tone Rd	Copper	12-Aug-08	13.94	3.5	1381.59
Lone Tree Creek @ Jack Tone Rd	Copper	16-Sep-08	NR	2.2	NA
Lone Tree Creek @ Jack Tone Rd	Diazinon	11-Feb-07	27.09	0.072	55.23

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Jack Tone Rd	Diazinon	23-Jan-08	12.18	0.2	9.31
Lone Tree Creek @ Jack Tone Rd*	Diazinon	23-Jan-08	12.18	0.038	13.11
Lone Tree Creek @ Jack Tone Rd	Diuron	*20-Jun-06*	*NR*	0.52	*NA*
Lone Tree Creek @ Jack Tone Rd	Diuron	11-Feb-07	26.7	12	9072.77
Lone Tree Creek @ Jack Tone Rd	Diuron	28-Feb-07	7.85	4.3	955.84
Lone Tree Creek @ Jack Tone Rd	Diuron	10-Apr-07	24.9	0.23	162.17
Lone Tree Creek @ Jack Tone Rd	Diuron	23-Jan-08	18.88	4.9	2619.66
Lone Tree Creek @ Jack Tone Rd	Diuron	15-Apr-08	NR	0.32	NA
Lone Tree Creek @ Jack Tone Rd	Diuron	13-May-08	NR	0.21	NA
Lone Tree Creek @ Brennan Rd	Chlorpyrifos	27-Feb-06	0	0.018	0
Lone Tree Creek @ Brennan Rd	*Copper*	*15-Jul-08*	*33.05*	*3.8*	*3556.33*
Lone Tree Creek @ Brennan Rd	*Copper*	*12-Aug-08*	*12.43*	*3.3*	*1161.54*
Lone Tree Creek @ Brennan Rd	*Copper*	*16-Sep-08*	*12.07*	*2.9*	*991.18*
Lone Tree Creek @ Valley Home Rd	*Copper*	*13-May-08*	*10.83*	*4.6*	*1410.70*
Lone Tree Creek @ Valley Home Rd	*Copper*	*10-Jun-08*	*7.94*	*5.7*	*1281.57*
Lone Tree Creek @ Valley Home Rd	*Copper*	*15-Jul-08*	*9.76*	*7*	*1934.62*
Lone Tree Creek @ Valley Home Rd	*Copper*	*12-Aug-08*	*12.89*	*3.7*	*1350.52*
Lone Tree Creek @ Valley Home Rd	*Copper*	*16-Sep-08*	*8.63*	*3.8*	*928.63*

*Field Duplicate
NR – Unable to deploy instrument, discharge not recorded.
NA – Unable to calculate due to lack of information.

Source Identification

Priority A Constituents

Chlorpyrifos

In the previous years, applications occurred in as many as 10 months of the year (Table II-12, Figure II-4). Large numbers of applications have occurred in May and into July, with most applications during June. During 2004-2007, exceedances occurred in the months of January (1), February (2), July (3), and August (1). Only one of the exceedances was associated with toxicity to *Ceriodaphnia* (February 2006 at Lone Tree Creek @ Brennan Rd, Table II-6). There were only four applications of chlorpyrifos during the dormant season of 2006. Exceedances in July and August followed the largest amount of chlorpyrifos applied during each year (Figure II-2). In 2008, applications only occurred in three months of the year: May, June, and, with by far the most applications, July. Chlorpyrifos exceeded the WQTL once in 2008 during storm monitoring on January 23, 2008; normal and Management Plan Monitoring during the irrigation season found neither exceedances nor detections of chlorpyrifos. Chlorpyrifos use has decreased from 2007 to 2008 with close to 33% fewer applications and acres treated, although the pounds applied has increased by almost 20% (Table II-12). The average application rate of chlorpyrifos for the Lone Tree Creek subwatershed from 2004-2008 is 1.75 lbs AI/acre (Table II-

13). Applications were primarily to almonds, corn, and walnuts; application method was specified as both aerial and ground for all, with 14 applications unspecified (Table II-13).

Table II-12. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for August 2004 through December 2008 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
August, 2004	9	574.2	530
January, 2005	1	82.6	44
March, 2005	6	171.7	282
May, 2005	18	861.2	508
June, 2005	33	3379.7	1554.6
July, 2005	51	2256.3	1717
August, 2005	10	536.4	298
September, 2005	3	74.4	248
December, 2005	5	575.6	288.4
January, 2006	4	183.9	98
March, 2006	4	4.7	188
April, 2006	2	172.3	127
May, 2006	13	1394.6	800
June, 2006	35	2611.1	1894.1
July, 2006	35	1899.6	1382
August, 2006	7	256.7	138
September, 2006	4	256.5	253
October, 2006	3	297.6	152.4
November, 2006	2	249.0	134
January, 2007	5	447.3	240
March, 2007	1	8.1	40
April, 2007	2	24.2	110
May, 2007	24	1141.0	922
June, 2007	22	1526.8	1205
July, 2007	2	56.0	62
September, 2007	1	39.9	40
October, 2007	1	199.4	100
December, 2007	2	10.0	7.2
May, 2008	8	1520.4	432
June, 2008	12	617.1	488
July, 2008	20	2000.1	764.3
2004 Total	9	574.23	530
2005 Total	127	7937.87	4940
2006 Total	109	7325.88	5166.5
2007 Total	60	3452.7	2726.2
2008 Total	40	4137.6	1684.3
Total	**341**	**23178.93**	**14899.8**

Figure II-4. Pounds of chlorpyrifos applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008.

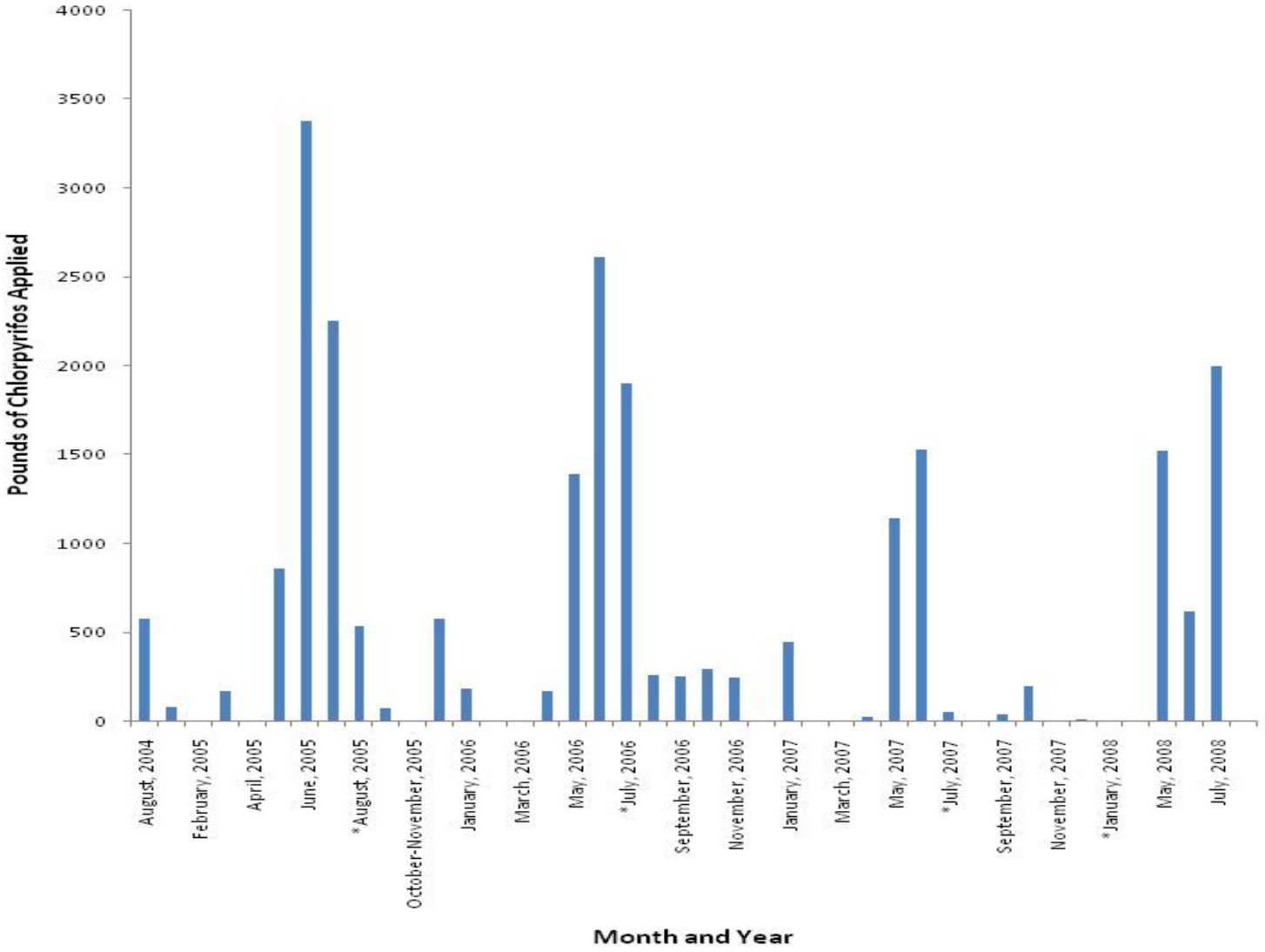
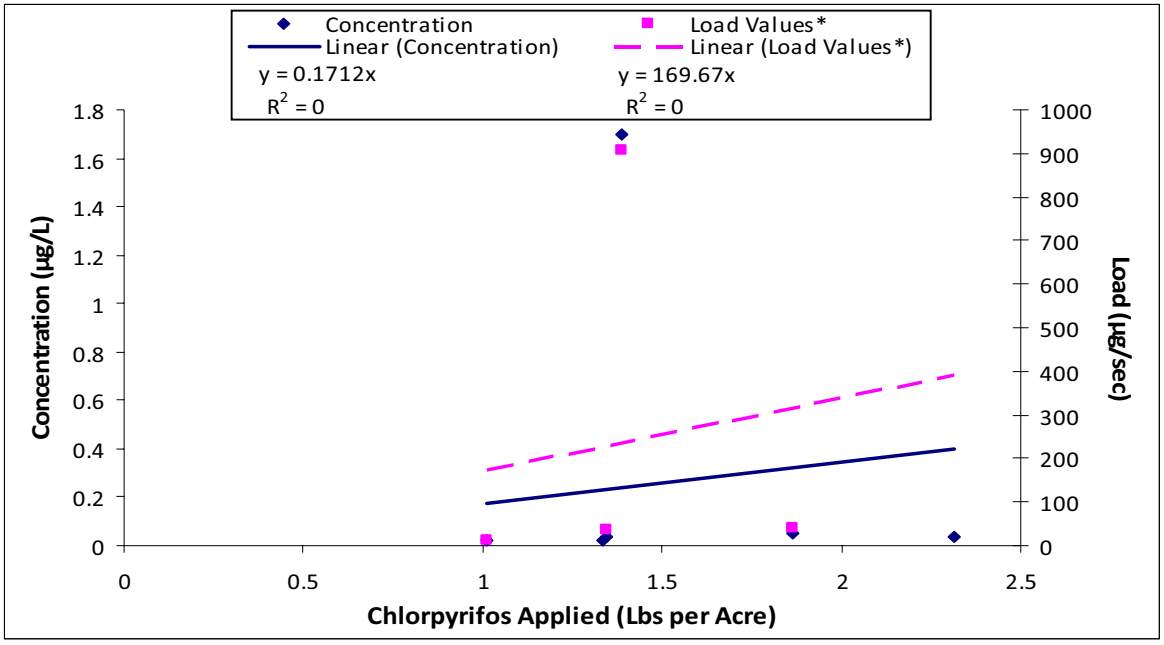


Table II-13. Average pound active ingredient (AI) per acre for chlorpyrifos based on PUR data from 2004-2008 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	0.5007
	ALMOND	CHLORPYRIFOS 4E AG	1.8763
		LORSBAN 4E INSECTICIDE	1.2534
			2.0003
			2.2811
		LORSBAN 4E-HF	0.3988
			1.9939
		LORSBAN-4E	0.9292
			1.8584
			2.001
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	1.2
			1.35
			1.5
			1.8
		LORSBAN 4E-HF	0.0299
			0.0312
			0.0374
			0.0399
			0.0498
			0.9969
			3.3231
		NUFOS 15G	1.5
			15
	CORN FOR/FOD	LORSBAN 15G GRANULAR INSECTICIDE	1.2
	NECTARINE	LORSBAN 4E INSECTICIDE	1.6669
	PEACH	LORSBAN 4E INSECTICIDE	1.1906
	WALNUT	LORSBAN 4E-HF	1.9939
		NUFOS 4E	2.0335
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	2.0178
		LORSBAN 4E INSECTICIDE	1.0001
			2.0003
		LORSBAN 4E-HF	0.133
			0.9969
			1.9938
			1.9939
			2.2154
			2.3457
		LORSBAN-4E	1.8584
Average pounds chlorpyrifos applied per acre (2004-2008)			**1.75**

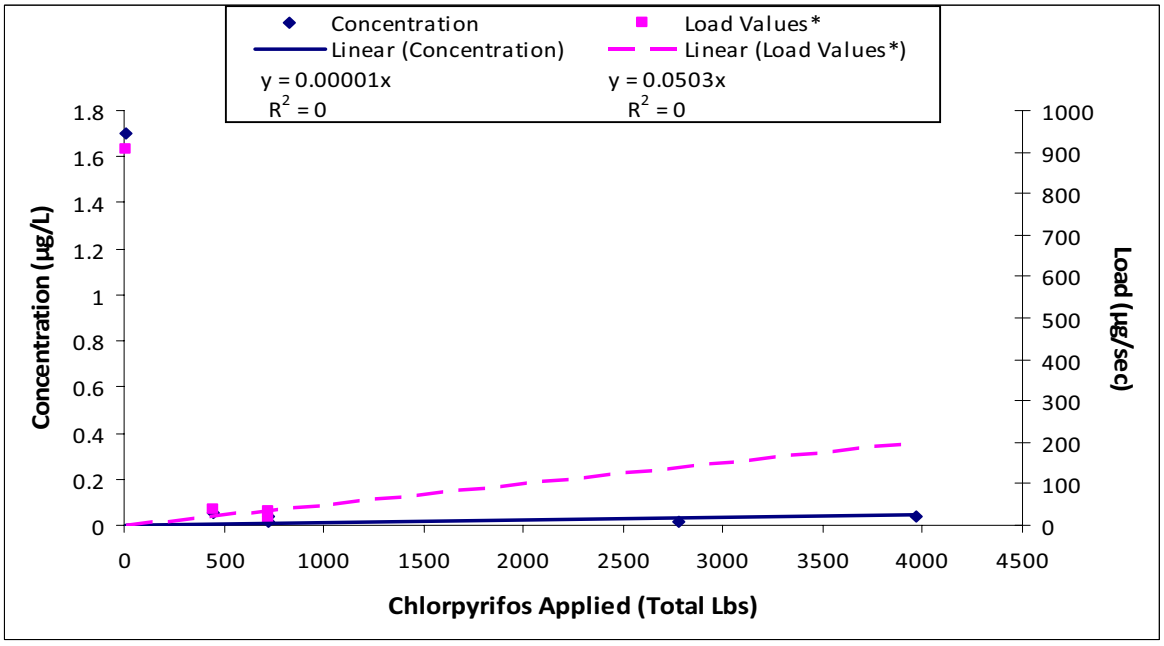
The Coalition performed an analysis of chlorpyrifos applications and concentrations and loads of chlorpyrifos in the water (all detections). A linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure II-5), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure II-6). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI was summed and divided by the summed acreage. The intercept for all analyses was set at zero as there should be no chlorpyrifos in the water if there are no applications. However, this assumes that applications more than four weeks prior to sampling would not contribute chlorpyrifos to the water body. For purposes of this analysis, it is assumed that applications prior to four weeks before sampling would not contribute substantially to loads measured four weeks later.

Figure II-5. Chlorpyrifos exceedance concentrations and loads compared to application rates (average lbs per acre) for the Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 4 weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for some exceedance dates.

Figure II-6. Chlorpyrifos exceedance concentrations and loads compared to application rates (total lbs across all acres) for the the Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 4 weeks of exceedance dates. If no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for some exceedance dates.

The slope of the regression line is non-significant indicating no relationship between application rate and concentration/load of chlorpyrifos in the water (Figures II-5, II-6). It appears that in general, the amount of chlorpyrifos in the water is small with the exception of two large exceedances. This conclusion is in contrast to the one provided in the original analysis where exceedances were attributed to watershed-wide applications.

To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Table II-14, II-15, and Figures II-7, II-8). Over all years, there were 40 sections associated with exceedances; each section had between 1 and 5 applications in the four weeks prior to sampling. Generally, these applications were associated with different parcels within the section. No section was associated with all exceedances.

Table II-14. Lone Tree Creek @ Jack Tone Rd. All TRS that had more than one application associated with an exceedance for chlorpyrifos in 2005-2008. Table summarizes the number of applications associated with an exceedance per date and TRS.

TRS*	Date of associated exceedance					
	7/19/2005	8/16/2005	7/18/2006	2/11/2007	7/10/2007	1/23/2008
1S8E13	1		1			
1S8E14		1				
1S8E15		1				
1S8E17	3					
1S8E18		1				
1S8E20			2			
1S8E22	1	3				
1S8E23		2	1		1	
1S8E24	1		3		1	
1S8E25	2		3			
1S8E26		1				
1S8E27		2				
1S8E28		1				
1S8E29	1	1	1		1	
1S8E30				2		
1S8E31	2	1				
1S8E33		2	1			
1S8E34	1	2				
1S8E35	4	3	3	1	1	
1S8E36				1		
1S9E15		2				
1S9E16		1				
1S9E18			1			
1S9E21		2	1			
1S9E22	1					
1S9E25					1	
1S9E26	2		1		2	
1S9E27			1			

TRS*	Date of associated exceedance					
	7/19/2005	8/16/2005	7/18/2006	2/11/2007	7/10/2007	1/23/2008
1S9E30	1		3			
1S9E32	2					
1S9E33			2			
1S9E34	3		5		1	
1S9E35	3		2			
1S9E36			1			
2S8E2	1	2	5			
2S8E3	1	1	1			
2S9E1	1	2	1		1	
2S9E2	3		2	1		2
2S9E5	2	1	3			
2S9E6	5	1	1			

Table II-15. Lone Tree Creek @ Jack Tone Rd. TRS with chlorpyrifos applications in month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance date is not included in this table, there were no relevant chlorpyrifos applications.

TRS*	Exceedance Date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
2S9E2	12/12/2007	5.00	3
	12/12/2007	5.00	4.2

Figure II-7. Lone Tree Creek @ Jack Tone Rd TRS' that have had applications co-occurring with a chlorpyrifos exceedance.

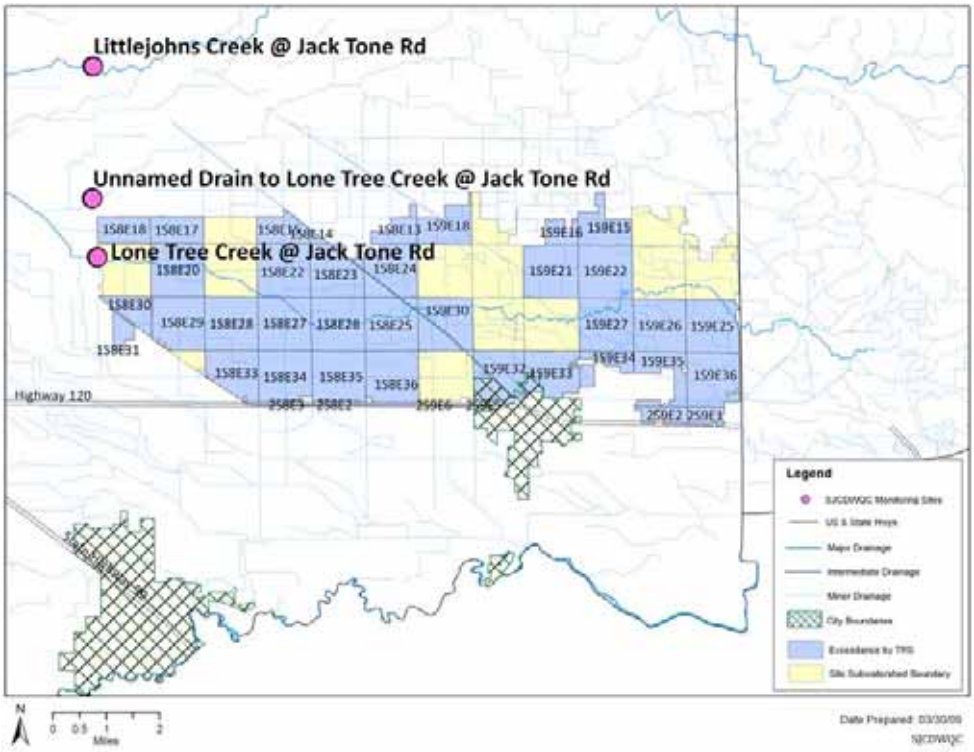
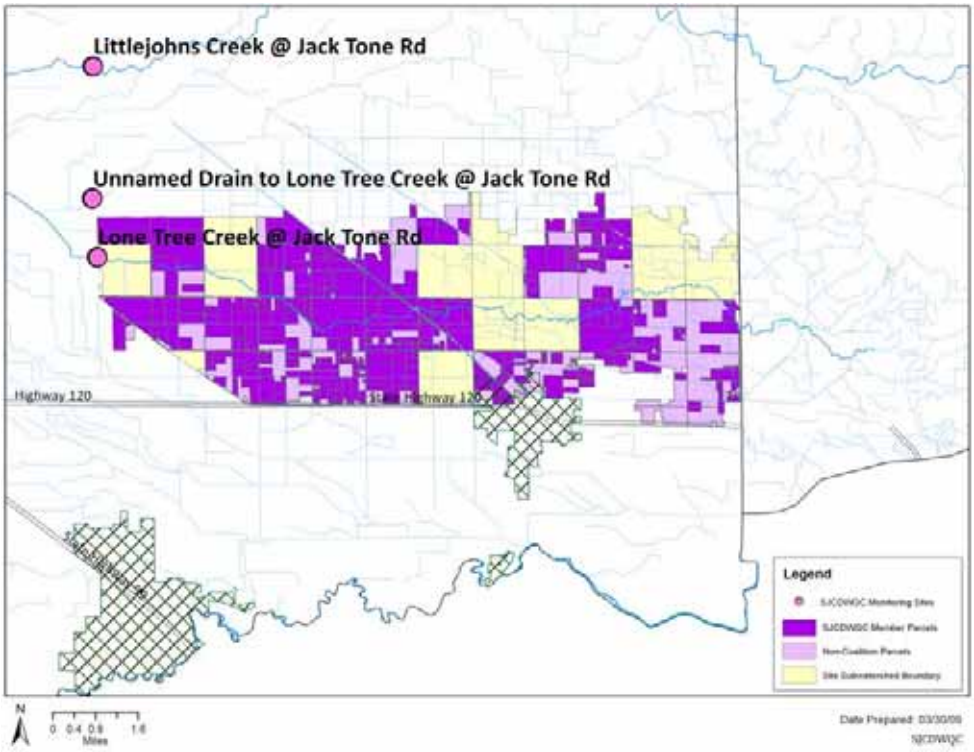


Figure II-8. Lone Tree Creek @ Jack Tone Rd member APNs relative to TRS with applications co-occurring with chlorpyrifos exceedances.



The analyses conducted by the Coalition suggest that management of chlorpyrifos in this watershed should be a combination of providing information on a watershed wide basis to encourage growers to review their operation to determine if irrigation return flows and storm water discharges are managed properly and focusing on specific parcels. The exceedance in 2008 was associated with two applications in a single section suggesting that only one or two parcels were responsible. Additionally, the elevated concentration in the sample (1.7 µg/L) suggests that surface runoff was the method of transport of chlorpyrifos to Lone Tree Creek.

Diazinon

The two exceedances that occurred in this watershed were both during storm monitoring on February 11, 2007 and January 23, 2008, making diazinon a new priority constituent as of 2008 sampling. Applications of diazinon in this watershed typically occur for dormant sprays during December, January, and February with January receiving the most and largest applications; diazinon has also been applied in this watershed once in March 2007 and once in July 2008 (Table II-16, Figure II-9). Application rates were relatively low in 2007 and 2008 compared to 2005 and 2006, with a more than 50% reduction in number of applications, pounds applied, and acres treated. Almonds were the primary commodity receiving applications, along with one relatively small walnut orchard (Table II-17).

Table II-16. Number of diazinon applications, total pounds applied, and total acres treated by month for August 2004 through December 2008 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month	Number of Diazinon Applications	Pounds Applied	Acres Treated
December, 2004	6	37.8	22.25
January, 2005	21	1239.5	836
February, 2005	5	99.1	57.5
December, 2005	7	145.6	72.5
January, 2006	21	977.0	693
February, 2006	1	59.5	40
December, 2006	10	156.1	101.5
January, 2007	1	19.8	10
February, 2007	4	42.4	25
March, 2007	1	1.5	1
December, 2007	5	5.3	4.25
January, 2008	8	586.3	391
July, 2008	1	2.0	10
2004 Total	6	37.8	22.25
2005 Total	33	1484.3	966
2006 Total	32	1192.6	834.5
2007 Total	11	69.0	40.25
2008 Total	9	588.3	401
Total	**91**	**3372.0**	**2264**

Figure II-9. Pounds of diazinon applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008.

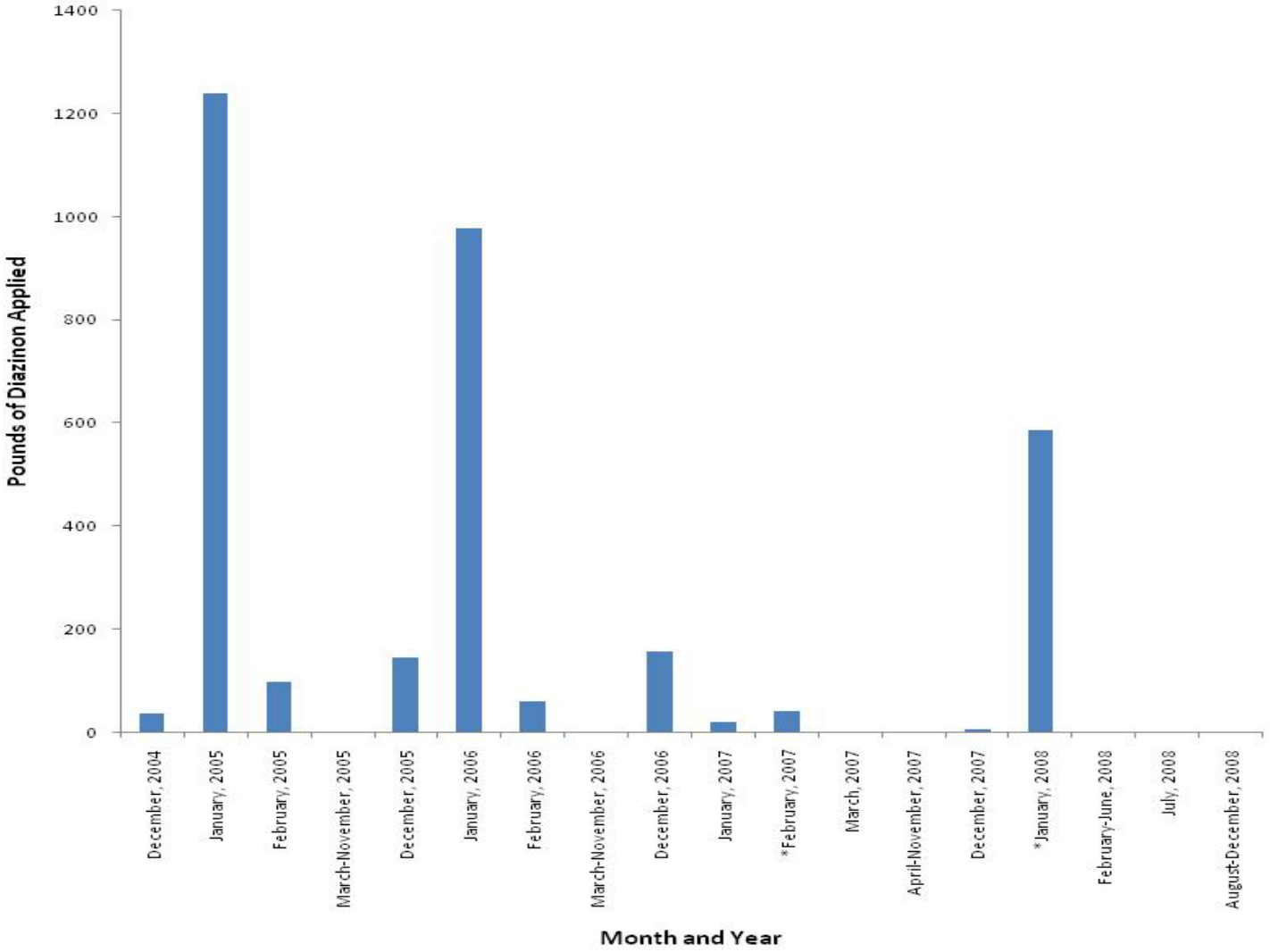


Table II-17. Average pound active ingredient (AI) per acre for diazinon based on PUR data from 2004-2008 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
DIAZINON	ALMOND	DIAZINON AG 500	1.4883
			1.4888
		DIAZOL AG 500	1.5875
			1.8597
			1.9844
	WALNUT	PROKIL DIAZINON 4EC	1.066
Average pounds diazinon applied per acre (2004-2008)			**1.58**

Diazinon only exceeded the WQTL twice and therefore only two points can be plotted on the graph. Consequently, there are no regression data to establish whether individual growers or a large number of applications is responsible for the exceedances.

To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Table II-18, II-19, II-20 and Figures II-10, II-11). There were seven sections associated with exceedances, each section had between one and three applications in the month prior to sampling. No parcel was associated with both exceedances (Table II-18).

Table II-18. Lone Tree Creek @ Jack Tone Road site subwatershed. All TRS that had more than one application associated with an exceedance for diazinon in 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Diazinon Applications per Date of Exceedance	
	2/11/2007	1/23/2008
1S8E27		3
1S8E28		2
1S8E33		2
1S8E35	3	
1S9E31	1	
1S9E34	1	
2S9E6		1

*Bolded TRS are members of the Coalition.

Table II-19. Lone Tree Creek @ Jack Tone Road site subwatershed. TRS with diazinon applications in month prior to each exceedance date in 2007. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant diazinon applications.

TRS*	Exceedance Date		
	2/11/2007		
	Application Date	Pounds Applied	Acres Treated
1S8E35	2/6/2007	6.4	6
	2/6/2007	9.92	5
	2/6/2007	13.02	7
1S9E31	2/6/2007	13.02	7
1S9E34	1/12/2007	19.84	10

*Bolded TRS are members of the Coalition.

Table II-20. Lone Tree Creek @ Jack Tone Road site subwatershed. TRS with diazinon applications in month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant diazinon applications.

TRS*	Exceedance Date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
1S8E27	1/14/2008	47.63	32
	1/14/2008	58.06	39
	1/14/2008	89.30	60
1S8E28	1/14/2008	29.77	20
	1/14/2008	119.06	80
1S8E33	1/14/2008	65.49	44
	1/14/2008	107.16	72
2S9E6	1/16/2008	69.85	44

*Bolded TRS are members of the Coalition.

Figure II-10. Lone Tree Creek @ Jack Tone Rd TRS' that have had applications co-occurring with a diazinon exceedance.

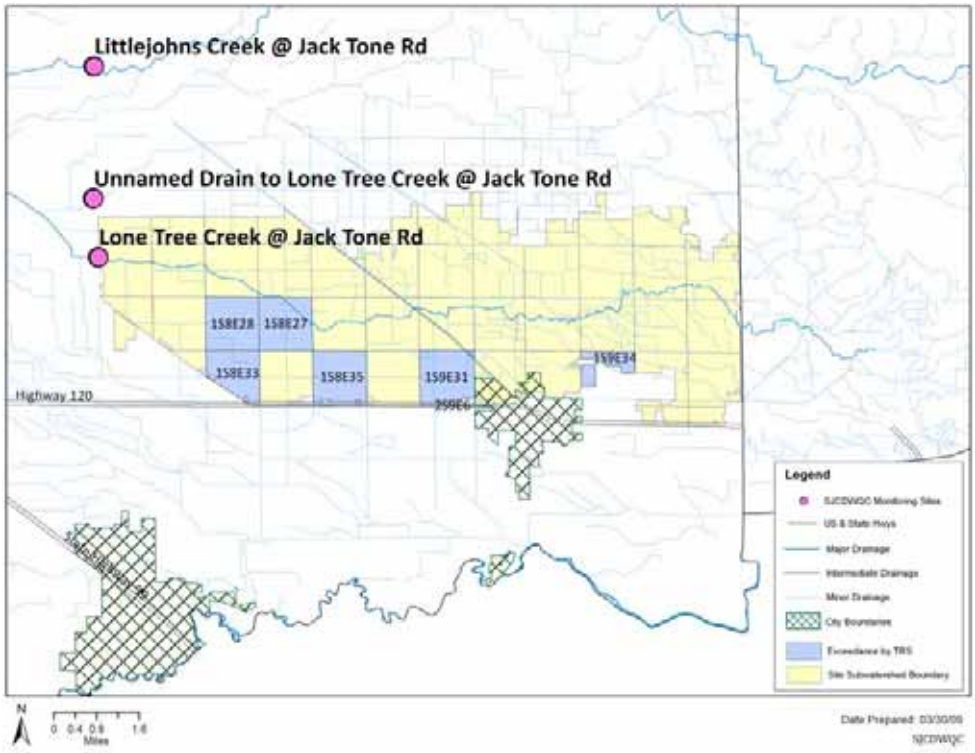
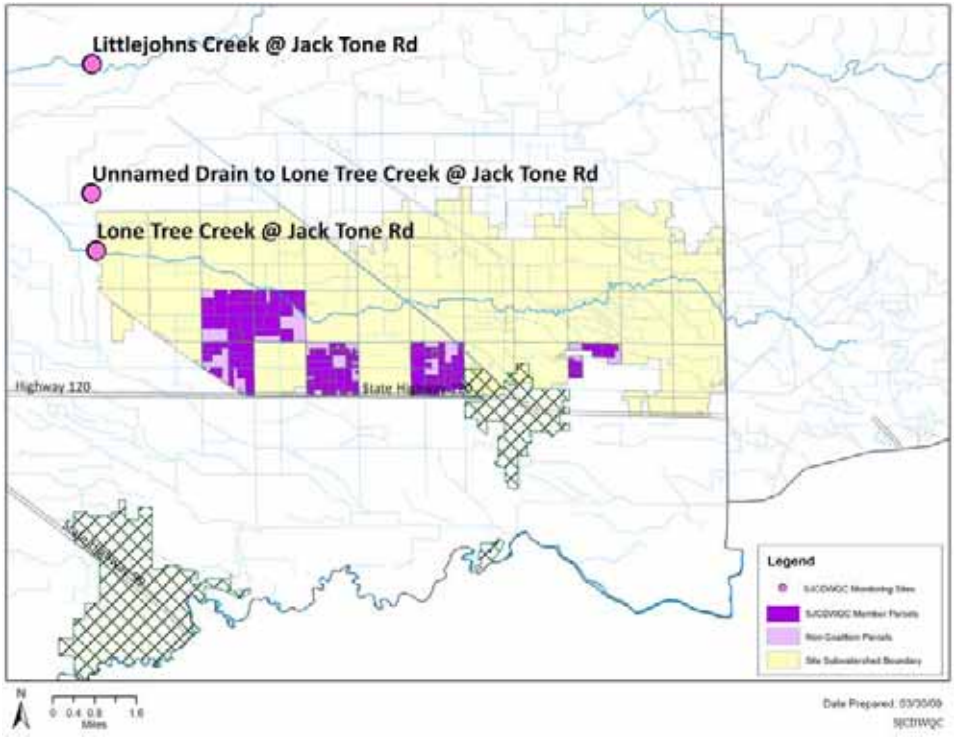


Figure II-11. Lone Tree Creek @ Jack Tone Rd member APNs relative to TRS with applications co-occurring with diazinon exceedances.



The analyses conducted by the Coalition suggest that the diazinon originated from a small number of acres in the subwatershed. Management of diazinon in this watershed should focus on providing information to the growers to review their operation to determine if storm water discharges are managed properly. One exceedance in 2007 was slightly over the WQTL while the 2008 exceedance was double the WQTL. It is difficult to determine if these concentrations are the result of storm water runoff or drift, or both. Almond and walnut growers should be targeted for outreach especially prior to the dormant spray season.

Priority C Constituents

Copper

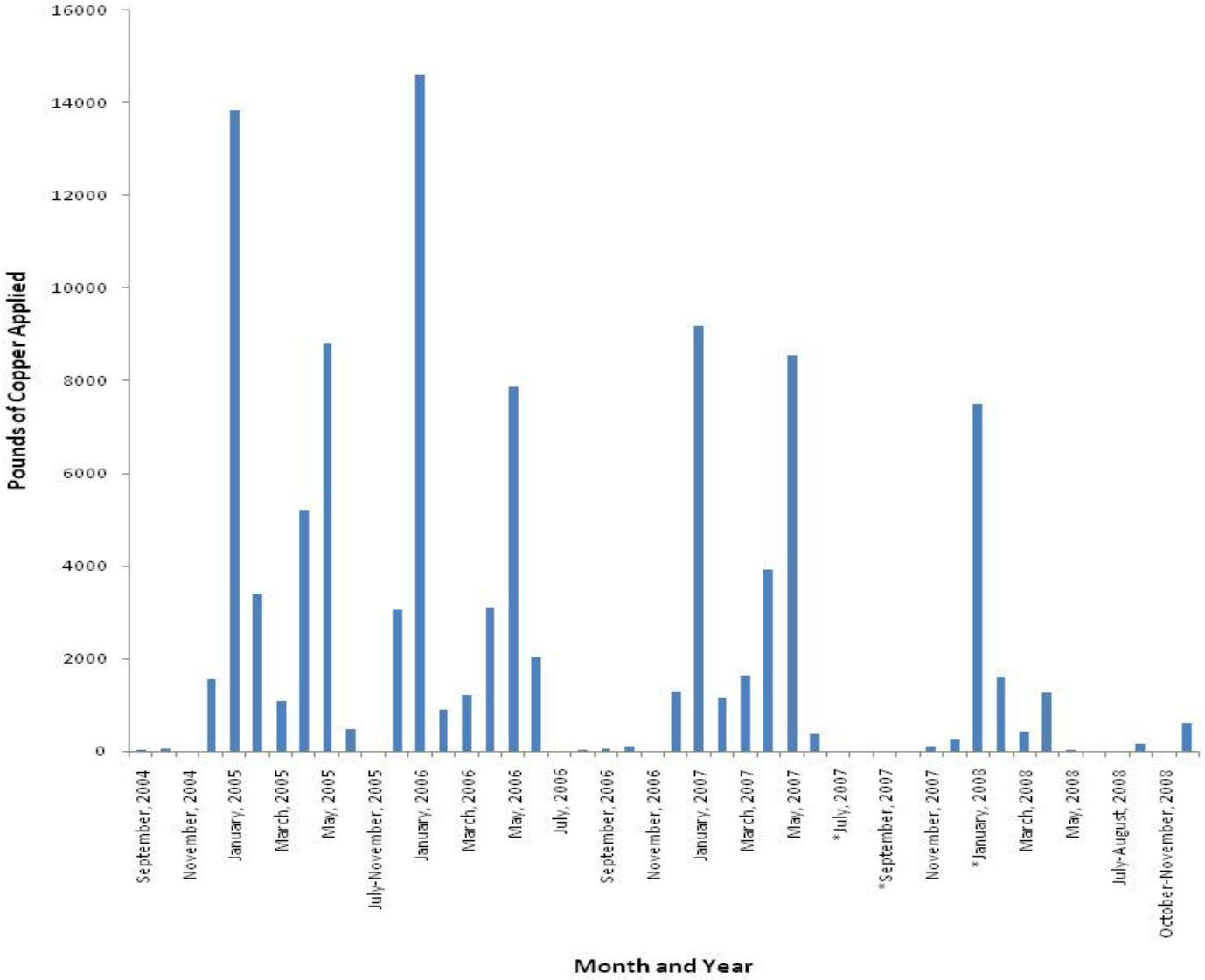
Copper is one of the most heavily applied constituents in the Coalition region. Across all years, copper had been applied in every month except July. There are fewer applications from the summer through the fall, with the bulk of the applications occurring in the winter and spring (Table II-21, Figure II-12). The greatest number of pounds AI were applied in January with the second greatest month of application being May (Figure II-12). The large number of applications is spread across the entire site subwatershed with applications in almost every section (Figures II-13, II-14). Within each of the sections, almost every parcel received at least one application.

Table II-21. Number of copper applications, total pounds applied, and total acres treated by month for August 2004 through December 2008 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month	Number of Copper Applications	Pounds Applied	Acres Treated
September, 2004	1	24.6	16
October, 2004	1	39.3	16
December, 2004	14	1541.2	350.25
January, 2005	58	13853.5	2612.25
February, 2005	47	3403.9	1352.5
March, 2005	22	1067.6	563
April, 2005	40	5211.3	1361.6
May, 2005	29	8815.5	1051
June, 2005	2	469.7	105
December, 2005	19	3062.7	612.5
January, 2006	83	14605.8	3122
February, 2006	28	895.5	608.5
March, 2006	30	1216.2	1006.5
April, 2006	32	3103.7	1202.6
May, 2006	22	7863.4	1062.5
June, 2006	6	2029.5	205
August, 2006	1	32.3	9
September, 2006	1	53.9	35
October, 2006	2	100.1	65
December, 2006	19	1290.5	282.5
January, 2007	56	9196.5	2229

Month	Number of Copper Applications	Pounds Applied	Acres Treated
February, 2007	21	1165.7	640
March, 2007	11	1635.0	401
April, 2007	37	3913.3	1041
May, 2007	15	8541.7	869
June, 2007	1	366.3	37
November, 2007	2	98.7	25
December, 2007	10	268.5	49.45
January, 2008	42	7500.5	1860.75
February, 2008	20	1593.9	582.25
March, 2008	8	410.0	184
April, 2008	17	1255.8	397.7
May, 2008	1	27.7	9
September, 2008	2	159.9	42
December, 2008	3	608.3	116
2004 Total	16	1605.2	382.25
2005 Total	217	35884.2	7657.85
2006 Total	224	16585.2	7598.6
2007 Total	153	25185.6	5291.45
2008 Total	93	11556.1	3191.7
Total	**703**	**90816.3**	**24121.85**

Figure II-12. Pounds of copper applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008.



To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Table II-22, II-23, II-24, and II-25). There were 47 sections associated with normal and Management Plan Monitoring exceedances. Exceedances were associated with applications in nine to 30 sections, and each section had between one and eight applications in the months prior to sampling. One section (1S8E33) was associated with all exceedances during normal monitoring. Section 1S8E33 had applications to almonds, walnuts, nectarines, and peaches in December, January, February, March, April, May and August. The application method was specified as ground for all applications with two exceptions: aerial application was used for an almond orchard on February 5, 2008 and a rice field on May 16, 2008. Overall, applications were made to almonds, walnuts, cherries, alfalfa, grapes, tomatoes, apricots, nectarines, peaches, plums, and rice. By far, the largest number of applications was made on almonds during the winter dormant season.

Table II-22. Lone Tree Creek @ Jack Tone Road site subwatershed. All TRS that had more than one application associated with an exceedance for copper in 2006-2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Date of associated exceedance					
	8/15/2006	2/11/2007	2/28/2007	7/10/2007	8/7/2007	1/23/2008
1S8E13		1	1			1
1S8E15				1		
1S8E19						1
1S8E20				5		
1S8E21				1		
1S8E22				1		
1S8E25		1	1			
1S8E26		1	1	1		1
1S8E27		1	5	1		5
1S8E28		6	8			4
1S8E29	1	2	2	1		
1S8E30		3	3	1		2
1S8E31		4	4			1
1S8E32		2	2	1		1
1S8E33	2	4	6	2	1	4
1S8E34		3	3			1
1S8E35		5	5	5		
1S8E36		1	2			
1S9E13	2	1	1	1	1	
1S9E14	2			3	3	
1S9E15	1			3	2	
1S9E16	2			1	1	
1S9E17	1			1	1	
1S9E18		2	2			
1S9E20			1			
1S9E21	1					

TRS*	Date of associated exceedance					
	8/15/2006	2/11/2007	2/28/2007	7/10/2007	8/7/2007	1/23/2008
1S9E22	3			3	3	
1S9E23	1					
1S9E24	2			3	3	
1S9E25	4			1	1	
1S9E30		1	1			1
1S9E31		6	6	1		2
1S9E32		1	1			
1S9E33		1	1			1
1S9E34		5	5	1		4
1S9E35		3	3			1
1S9E36	1					2
2S8E1		4	5	1		
2S8E2		3	4	2		
2S8E3		1	1	3		1
2S8E4		3	3	1		1
2S9E1		7	7			5
2S9E2		6	6	2		6
2S9E5		3	3			2
2S9E6	1	3	3	2		4

*Bolded TRS are members of the Coalition

Table II-23. Lone Tree Creek @ Valley Home Road site subwatershed. All TRS that had more than one application associated with an exceedance for copper in 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Copper Applications per Date of Exceedance
	7/15/2008
1S10E20	2
1S10E29	4

*Bolded TRS are members of the Coalition

Table II-24. Lone Tree Creek @ Jack Tone Rd site subwatershed. TRS with copper applications in three months prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant copper applications.

TRS*	Exceedance Date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
1S8E13	1/3/2008	188.78	36
1S8E19	1/12/2008	32.28	10
1S8E26	1/14/2008	112.98	35
1S8E27	1/14/2008	24.21	7.5
	1/14/2008	197.12	32
	1/14/2008	240.24	39
	1/14/2008	369.60	60

TRS*	Exceedance Date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
	1/18/2008	40.35	12
1S8E28	11/28/2007	35.53	9
	11/28/2007	63.17	16
	1/14/2008	123.20	20
	1/14/2008	492.80	80
1S8E30	1/10/2008	419.64	130
	1/12/2008	80.70	25
1S8E31	1/15/2008	206.59	64
1S8E32	1/12/2008	167.86	52
1S8E33	12/13/2007	106.55	22
	1/14/2008	271.04	44
	1/14/2008	443.52	72
	1/16/2008	135.52	22
1S8E34	1/14/2008	242.10	75
1S9E30	1/18/2008	12.11	4
1S9E31	1/18/2008	51.38	16.25
	1/19/2008	62.93	15
1S9E33	1/2/2008	457.19	95
1S9E34	1/3/2008	81.84	17
	1/4/2008	46.02	153
	1/17/2008	29.37	7
	1/19/2008	41.95	10
1S9E35	1/17/2008	177.54	50
1S9E36	12/28/2007	33.56	8
	12/29/2007	33.56	8
2S8E3	1/19/2008	29.05	9
2S8E4	1/17/2008	73.68	20
2S9E1	12/10/2007	4.20	1
	12/21/2007	3.15	0.75
	12/21/2007	4.20	1
2S9E2	12/12/2007	38.50	3
	12/12/2007	38.50	4.2
	1/2/2008	94.39	18
	1/17/2008	99.63	15
	1/18/2008	94.39	18
	1/18/2008	650.23	124
2S9E5	1/7/2008	31.46	6
	1/7/2008	36.71	7
2S9E6	1/7/2008	388.04	74
	1/16/2008	142.03	44
	1/17/2008	62.93	15
	1/17/2008	209.82	65

*Bolded TRS are members of the Coalition

Table II-25. Lone Tree Creek @ Valley Home Rd site subwatershed. TRS with copper applications in three months prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant copper applications.

TRS*	Exceedance Date		
	7/15/2008		
	Application Date	Pounds Applied	Acres Treated
1S10E20	5/16/2008	178.20	18
	5/16/2008	336.60	34
1S10E29	5/16/2008	0.28	1
	5/16/2008	1.50	1
	6/13/2008	0.28	1
	6/13/2008	1.50	1

*Bolded TRS are members of the Coalition

Figure II-13. Lone Tree Creek @ Jack Tone Rd and Lone Tree Creek @ Valley Home (US), TRS that have had applications co-occurring with a copper exceedance.

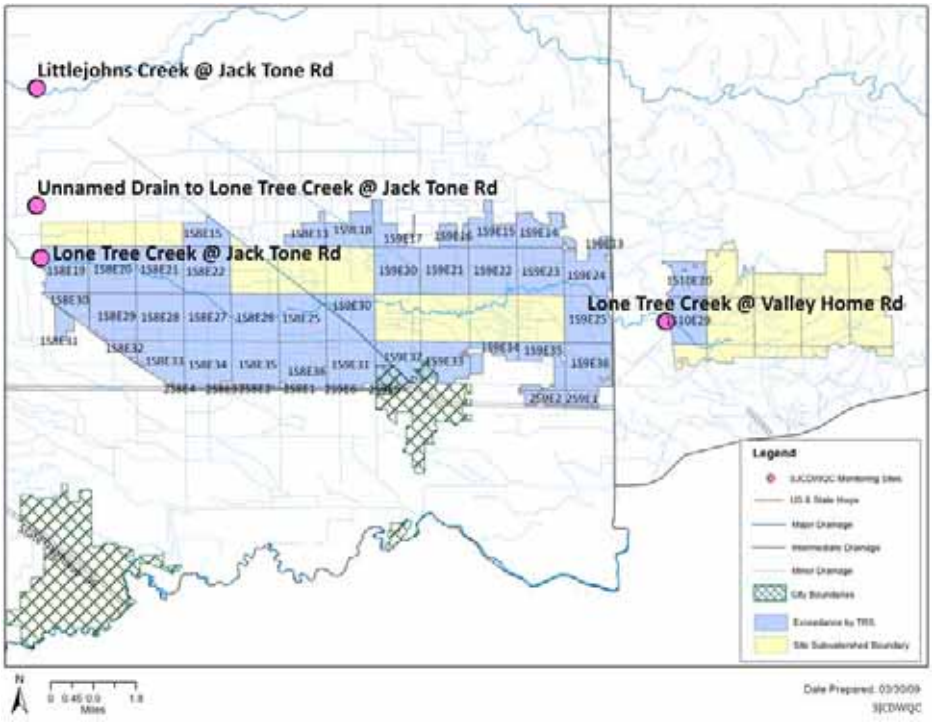
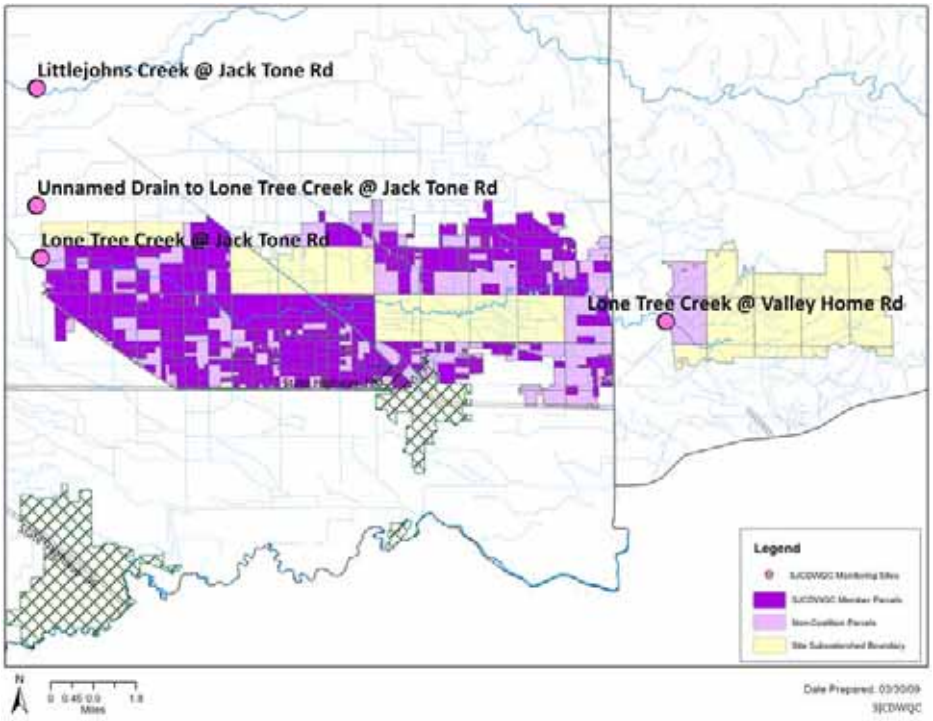


Figure II-14. Lone Tree Creek @ Jack Tone Rd and Lone Tree Creek @ Valley Home (US), member APNs relative to TRS with applications co-occurring with Copper exceedances.



Similar to the analysis performed for chlorpyrifos, a linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure II-15), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure II-16). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI was summed and divided by the summed acreage. Four products with copper as the active ingredient were included in the analysis. The small sample size precluded a rigorous statistical treatment. The intercept was not set to zero as there could be natural copper in the system that would serve as a baseline value. Unlike the chlorpyrifos analysis, copper applications were included in the analysis if they occurred within twelve weeks of the detection. Copper does not degrade and could remain in place until moved to a surface water body. It is unclear if the twelve week window is sufficient, but summing applications from a longer window dilutes out the effects of recent applications. Statistically, using longer than twelve weeks for applications also makes the points in the regression analysis non-independent as the same applications contribute to the average pounds AI per acre for several detections. For the analysis reported below, some interdependence was allowed for data points that were temporally close because the same application in the previous few months could contribute to both detections.

As was the case for the other sites in the San Joaquin Valley, there was a statistically significant negative relationship between copper concentration and copper application rate. The negative relationship suggests that a few parcels are responsible for the exceedances. There was no relationship between the concentration or load and the total pounds applied in the watershed, again suggesting that the exceedances were a function of discharges from a few parcels. Consequently, management of this problem should focus on parcels with the potential to discharge directly to the creek.

Figure II-15. Copper exceedance concentrations and loads compared to application rates (average lbs per acre) for the Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 12 weeks of exceedance dates. If no associated PUR data with an exceedance date, the date is not included on graph.

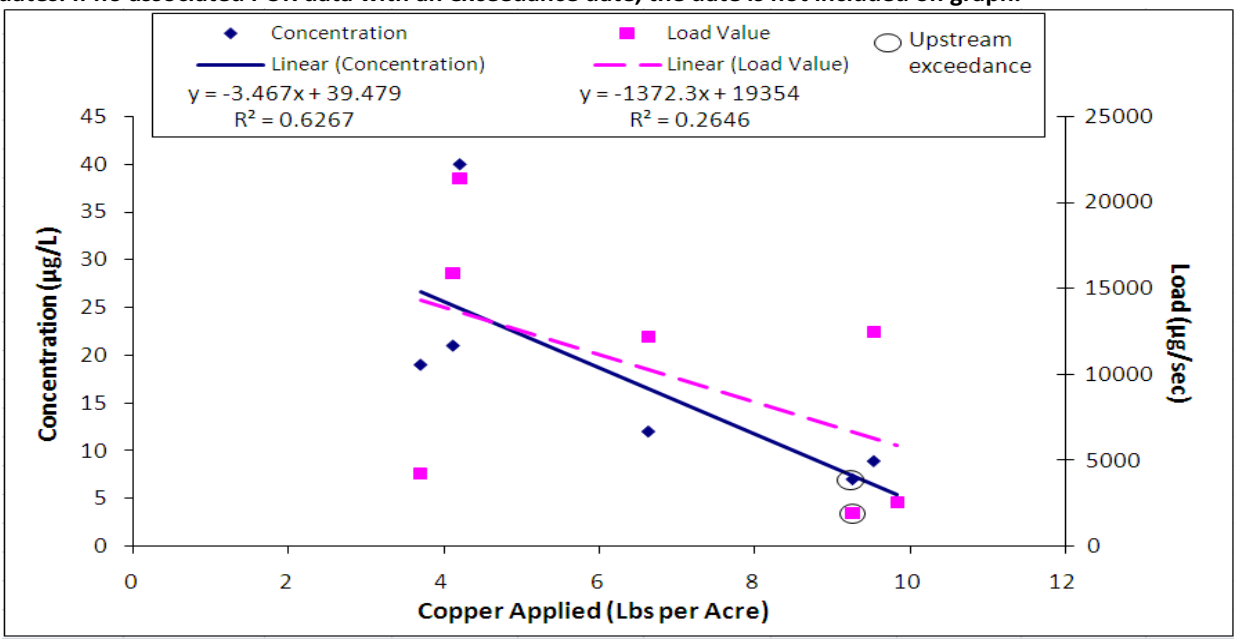
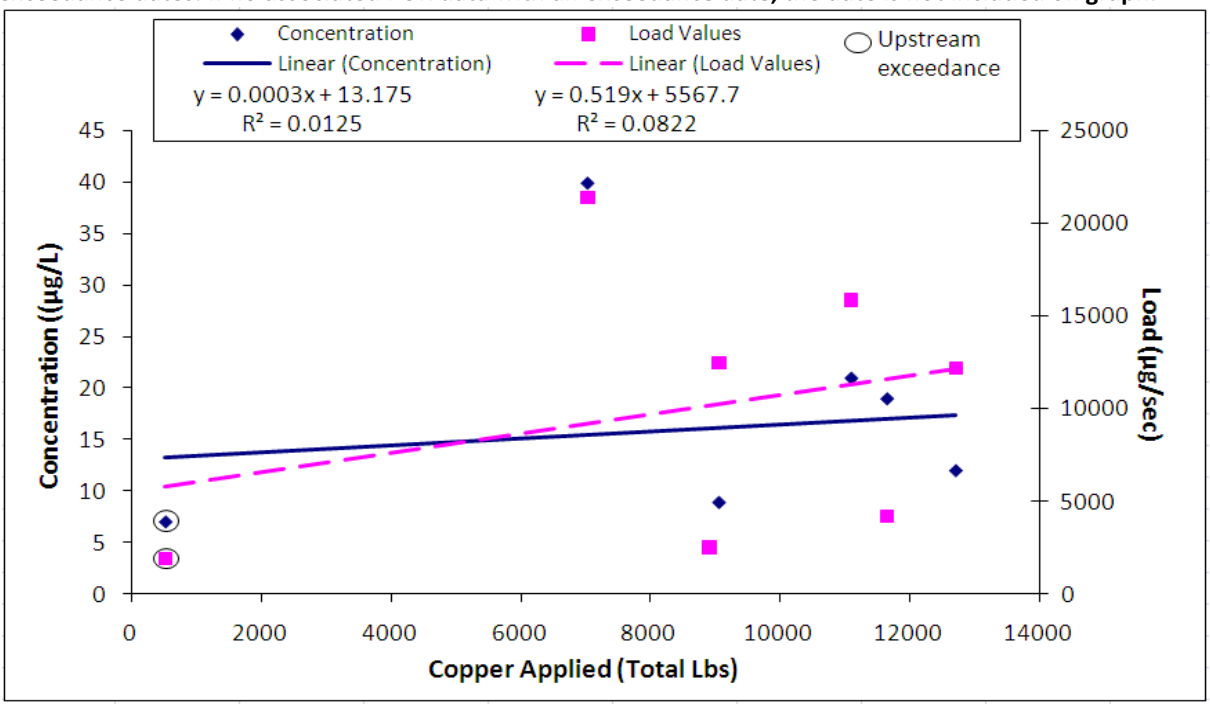


Figure II-16. Copper exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 12 weeks of exceedance dates. If no associated PUR data with an exceedance date, the date is not included on graph.



Copper is measured as total copper and it is unknown which fraction represents the majority of the detectable copper. The Coalition has been measuring total and dissolved metals since

October with no exceedances of the dissolved WQTL. Once it is apparent which form is the dominant form in Lone Tree Creek, it should be able to more accurately assess which management practices would be effective for copper.

Diuron

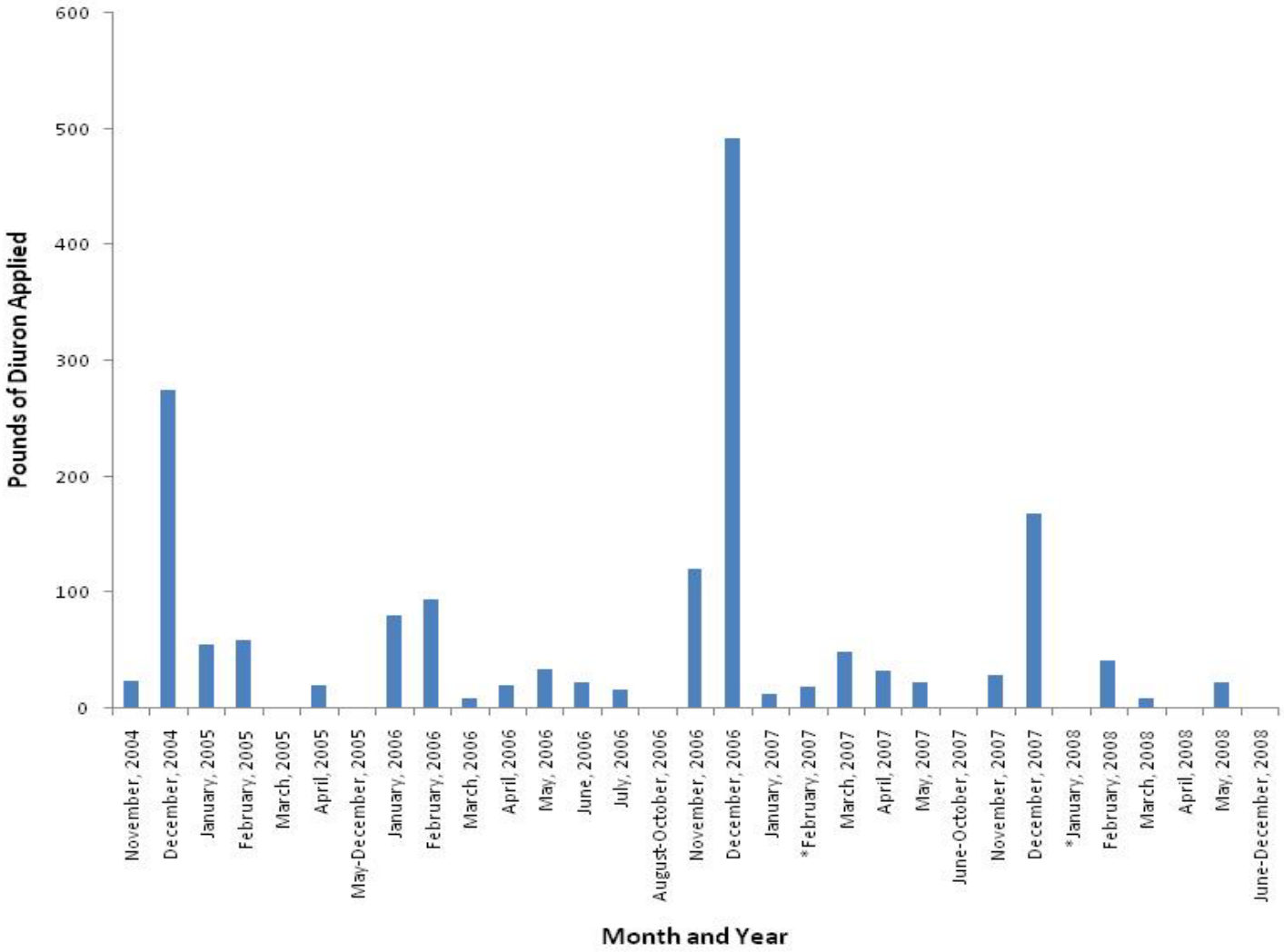
Diuron is a soluble herbicide applied throughout the year. Applications have occurred in every month of the year except August, September, and October, although the majority of the applications occur in the period between November and February. The largest amount AI was applied in December with the second greatest month of application being January (Table II-26, Figure II-17). The large number of applications is spread across the entire site subwatershed with applications in almost every section (Figures II-20 and II-21).

Table II-26. Number of diuron applications, total pounds applied, and total acres treated by month for August 2004 through December 2008 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month	Number of Diuron Applications	Pounds Applied	Acres Treated
November, 2004	2	24.4	39.1
December, 2004	9	274.8	286.33
January, 2005	5	55.5	124
February, 2005	4	58.7	93
April, 2005	1	19.6	7
January, 2006	4	80.7	151
February, 2006	7	93.6	95.5
March, 2006	1	8.2	8.33
April, 2006	1	19.6	47
May, 2006	2	33.6	40.4
June, 2006	2	23.1	47.5
July, 2006	1	16.4	16.67
November, 2006	3	120.9	124
December, 2006	8	492.7	337
January, 2007	1	13.0	13
February, 2007	2	18.8	19
March, 2007	3	48.8	99
April, 2007	1	33.2	17
May, 2007	3	22.2	24
November, 2007	2	29.3	172
December, 2007	3	168.5	89.33
February, 2008	2	40.8	20.93
March, 2008	1	8.2	8.33
May, 2008	2	22.3	22.67
2004 Total	11	299.1	325.4
2005 Total	10	133.7	224
2006 Total	29	888.7	867.4
2007 Total	10	136.0	172
2008 Total	5	71.3	54.93

Month	Number of Diuron Applications	Pounds Applied	Acres Treated
Total	60	1457.5	1588.8

Figure II-17. Pounds of diuron applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008.



A linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure II-18), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure II-19). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI was summed and divided by the summed acreage. Because there are only three exceedances, the relationship is tenuous at best.

The regression of concentration and pounds applied (AI) per acre indicated no relationship with only .05% of the variation in concentration accounted for by the application rate (Figure II-10). Based on the method used to analyze the data, the average amount of copper applied per acre does not predict the concentration in the water. The lack of a relationship may be a result of the small sample size or may indicate that several parcels contribute a disproportionate amount of copper to the creek. However because there are numerous parcels associated with each detection of copper (see below), isolating sources will be difficult.

For the two exceedances that occurred in February 2007, all applications associated with the two exceedances occurred prior to the first exceedance on February 11. No applications were reported in the period between the first exceedance and the second exceedance on February 28. Consequently the applications for both exceedances are identical and it was not possible to perform a linear regression analysis similar to those performed for copper and chlorpyrifos.

Figure II-18. Diuron exceedance concentrations and loads compared to application rates (average lbs per acre) for the Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 4 weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.

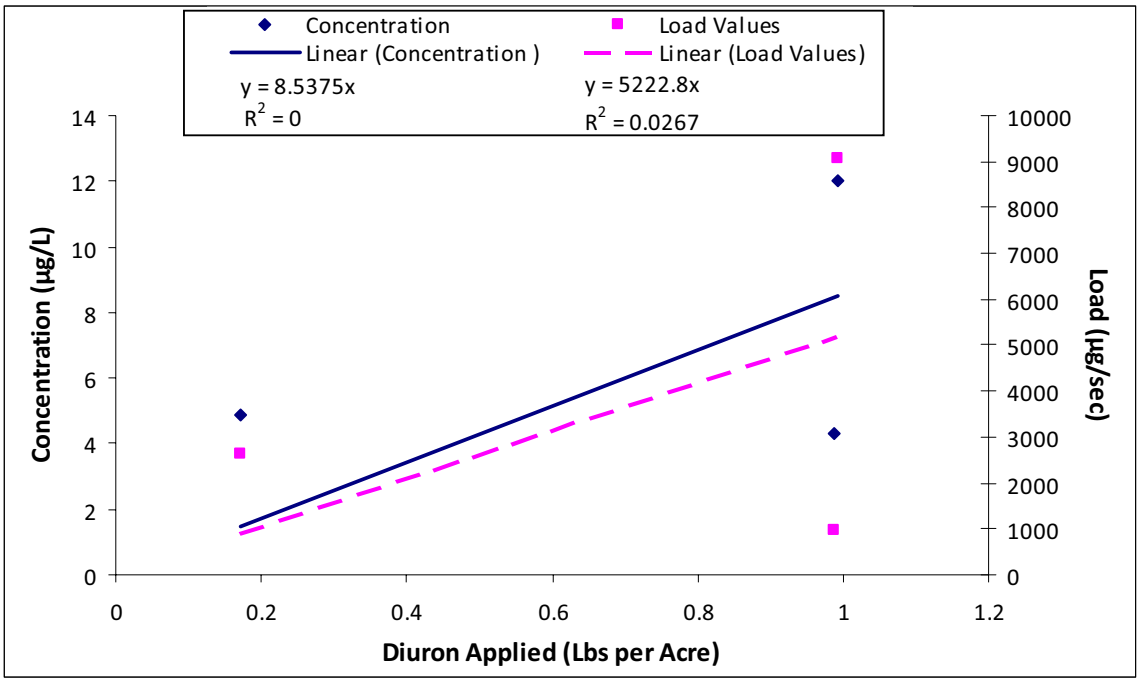
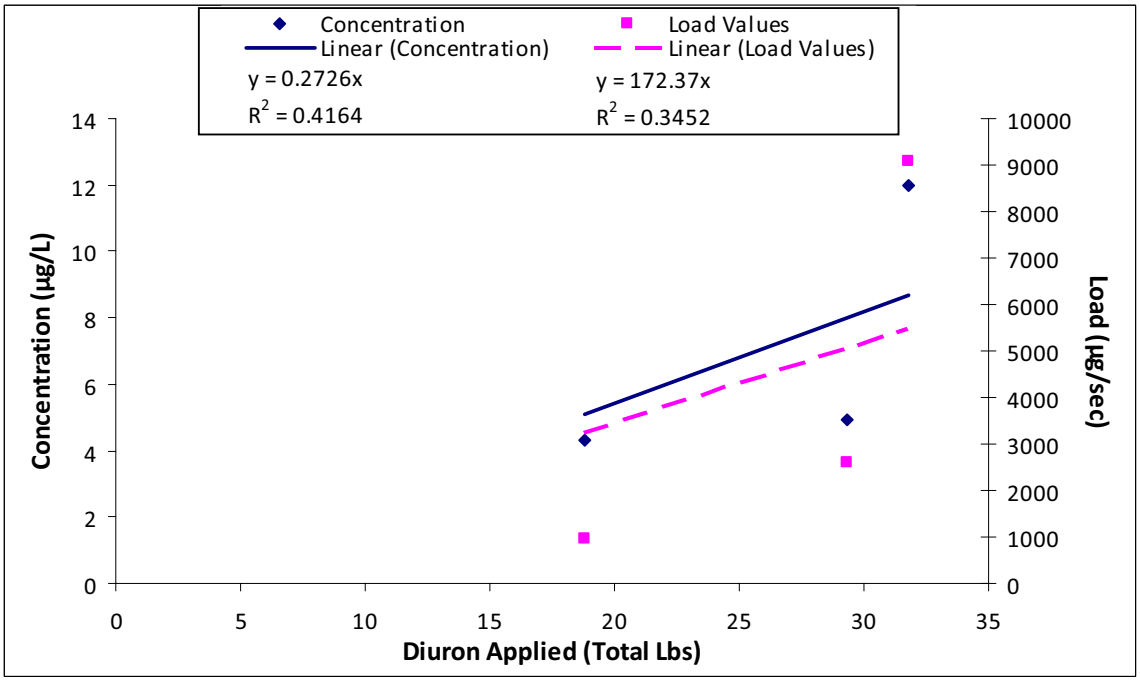


Figure II-19. Diuron exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 4 weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



To determine if there were specific parcels associated with the two exceedances the Coalition identified the sections associated with each exceedance (Table II-27, II-28 and Figures II-20, II-21). Only three sections were associated with exceedances and only three applications in three sections were made within the four weeks prior to the first exceedance and only two applications four weeks prior to the second exceedance. Applications were made to alfalfa two months prior to sampling in four sections. Applications made in the four weeks prior to sampling were made to grapes (1S8E21) and walnuts (1S8E35 and 2S8E2). The application method was not specified but other applications to grapes and walnuts in the region were made by ground. Only one section, 1S8E21, is located directly adjacent to Lone Tree Creek and is the more likely source of the exceedances. At this location, only 12.9 lbs AI was applied to 13 acres suggesting that the high solubility of diuron (K_{oc} = 480) facilitates movement of the product off site to the creek. In 2008, five applications were reported, two of which were to TRS 1S8E35 and 2S8E2, but there was no reported application to TRS 1S8E21; only applications to TRS 1S8E35 were associated with the one exceedance in 2008.

Table II-27. Lone Tree Creek @ Jack Tone Road. All TRS that had more than one application associated with an exceedance for diuron in 2006, 2007, and 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Diuron Applications per Date of Exceedance		
	2/11/2007	2/28/2007	1/23/2008
1S8E21	1		
1S8E35	1	1	2
2S8E2	1	1	

*Bolded TRS are members of the Coalition

Table II-28. Lone Tree Creek @ Jack Tone Road. TRS with diuron applications one month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant diuron applications.

TRS*	Exceedance Date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
1S8E35	11/3/2007	9.78	86
	11/3/2007	19.56	86

Figure II-20. Lone Tree Creek TRS' that have had applications co-occurring with a diuron exceedance.

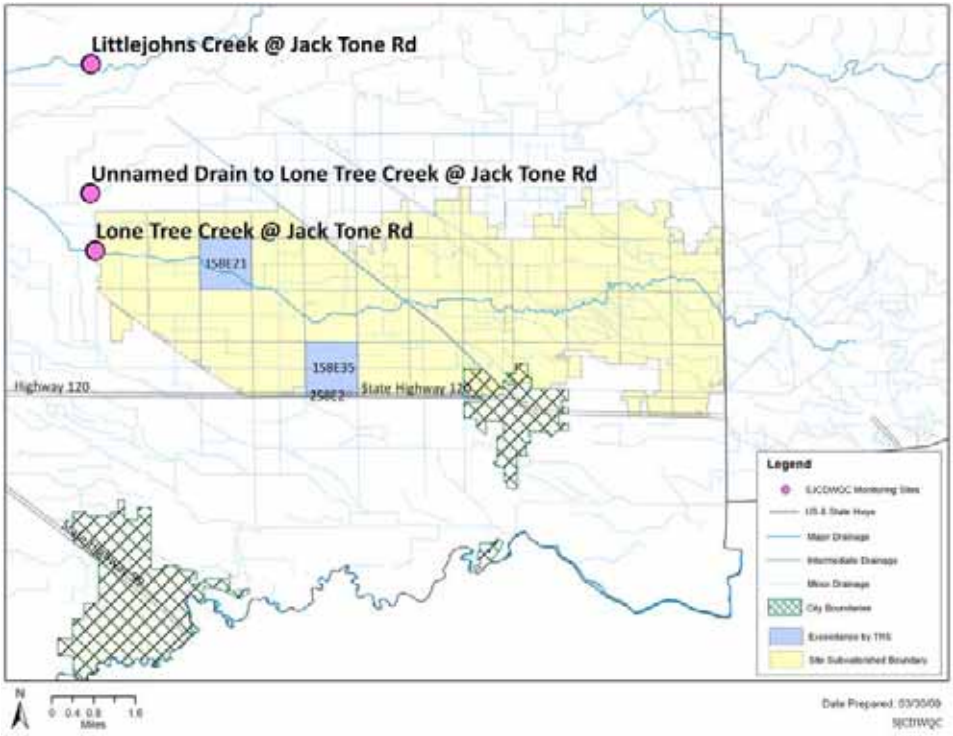
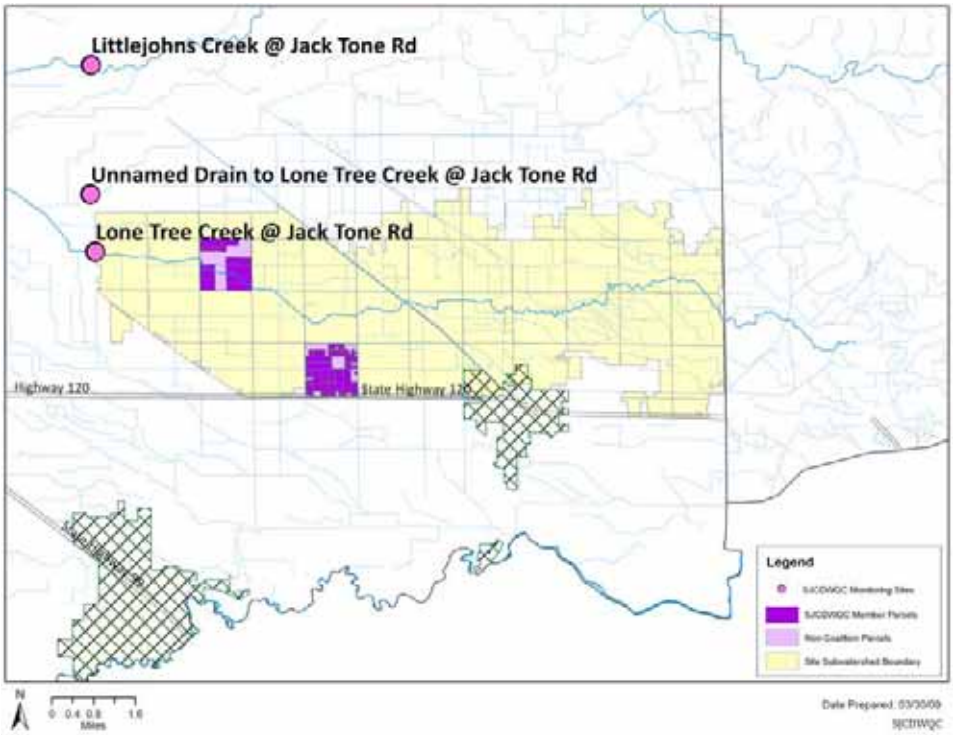


Figure II-21 . Lone Tree Creek member APNs relative to TRS with applications co-occurring with diuron exceedances.



Although not a formal statistical analysis, the few applications and the proximity to Lone Tree Creek suggest that the exceedances were a result of an application to grapes on January 18 approximately three weeks prior to the first exceedance and six weeks prior to the second exceedance. The analyses conducted by the Coalition suggest that management of diuron in this watershed should focus on targeting specific growers in the two sections with applications to encourage the retention of water on the fields. Further outreach should be targeted to alfalfa, grape, and walnut growers especially prior to the dormant spray season. As with chlorpyrifos and copper outreach, diuron outreach could focus on management practices that keep water on the field rather than allowing discharge to surface waters. The few growers involved in the exceedances should facilitate contacts although the extremely high solubility of the product will make its management difficult.

Ceriodaphnia toxicity

Ceriodaphnia toxicity occurred in February 2006 and January 2008. Both toxicities were associated with an exceedance of the chlorpyrifos WQTL.

The Coalition's strategy for eliminating *Ceriodaphnia* toxicity will involve focusing on chlorpyrifos. If chlorpyrifos can be prevented from entering storm water during the winter rainy season, the Coalition believes that *Ceriodaphnia* toxicity can also be reduced or eliminated.

Priority D Constituents

Selenastrum toxicity

Selenastrum toxicity occurred in January, April and May of 2008. The January exceedance was associated with an exceedance of the diuron WQTL. No exceedances or herbicides occurred during April or May, but applications of copper were common prior to sampling in both months.

The Coalition's strategy for eliminating *Selenastrum* toxicity will involve focusing on copper and diuron. If these two constituents can be prevented from entering storm water during the winter rainy season, the Coalition believes that *Selenastrum* toxicity can also be reduced or eliminated. If the Coalition finds that diuron and copper exceedances are eliminated and *Selenastrum* toxicity persists, additional herbicides will be targeted for outreach and management.

Pimephales promelas toxicity

A single sample collected in January 2008 was toxic to *Pimephales*. As was true in previous instances of toxicity to *Pimephales*, analysis of the monitoring data suggested that ammonia was the cause of the toxicity. Elevated concentration of ammonia accompanied by an elevated level of *E. coli* indicate that a discharge from a dairy upstream was the source of the toxicity. The Coalition will not institute any additional outreach for *Pimephales* toxicity.

Hyalella azteca toxicity

Toxicity to *Hyalella* occurred once in May 2005 and once in April 2006—since then there have been no experiences of sediment toxicity.

Priority E Constituents

DO, pH, and *E. coli* WQTLs were exceeded during 2008. The Coalition will not address the management of these constituents until they are determined to be a higher priority by the Coalition and the Regional Board.

Ammonia

As discussed in the SAMRs, ammonia exceedances have been associated with toxicity to *Pimephales* and have been attributed to discharges from dairies in the site subwatershed. The Coalition will not implement management practices to manage ammonia.

2009 Management Plan Monitoring

The Lone Tree Creek site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. This subwatershed will not be rotated into the SJCDWQC monitoring program until 2015. Therefore the Coalition will conduct Management Plan Monitoring during the 2009 irrigation season for the following constituents: copper (dissolved and total)(July –September), chlorpyrifos (July, August), *Selenastrum* toxicity (April and May). In addition, the Coalition will collect samples from Lone Tree Creek @ Jack Tone Rd during the first and second storm monitoring events for *Selenastrum* toxicity, copper (dissolved and total), chlorpyrifos, diazinon and diuron.

Outreach

The Coalition outreach includes grower meetings and mailing/distribution of information. The Coalition conducts three types of meetings: general grower meetings on a county level, grower group meetings (groups may be specified by crop, chemical use or seasonal practices) and individual contacts. All outreach conducted in the 2008 is documented in the Summary of Coalition Outreach Activities section of the Management Plan.

Growers were notified of exceedances and meetings in January, February, July, and October 2008, and February 2009. In October 2008, a publication of Best Management Practices information, developed by the Center for Urban/Rural Environmental Stewardship (CURES), will go out to all members with 15 or more acres enrolled in the program. The handbooks were originally designed for the Westside Coalition and contain information on farming practices such as sediment basins, polyacrylamide (PAM), enzyme treatments, tail water return systems, vegetative ditches, irrigation scheduling and others (Appendix I). These documents are summaries of technical reports developed by the California Water Institute, Ducks Unlimited, California Department of Pesticide Regulation and others. Growers from the subwatershed attended meetings held in January, February, March, April, May, July, October, November, and

December 2008. The meetings variously addressed all exceedances or focused on chlorpyrifos and copper management practices.

Evaluation

This subwatershed is one of the thee priority subwatersheds within the SJCDWQC and therefore the Coalition is focusing its resources on identifying the sources of agricultural discharge within this subwatershed that could lead to water quality impairments, extending outreach to individual Coalition members and setting evaluation goals. Members will be contacted individually based on their proximity to the waterway, number of applications co-occurring with WQTL exceedances and amount of acres farmed.

The Coalition's strategy for the Lone Tree Creek subwatershed was to first conduct a grower group meeting this summer (June 15 and 16, 2008) and speak with individual growers who attended the meeting about current irrigation and dormant spray practices. The Coalition developed a checklist that growers can complete during the meetings. The goal is to have a documentation tool to allow the Coalition to keep track of specific management practices as they pertain to water quality impairments within that particular subwatershed.

III. UNNAMED DRAIN TO LONE TREE CREEK @ JACK TONE RD

Management Plan Constituents

Priority A

- Chlorpyrifos

Priority C

- Copper
- Diuron
- Simazine
- *Ceriodaphnia dubia* water column toxicity

Priority D

- *Hyalella azteca* sediment toxicity
- *Selenastrum capricornutum* water column toxicity

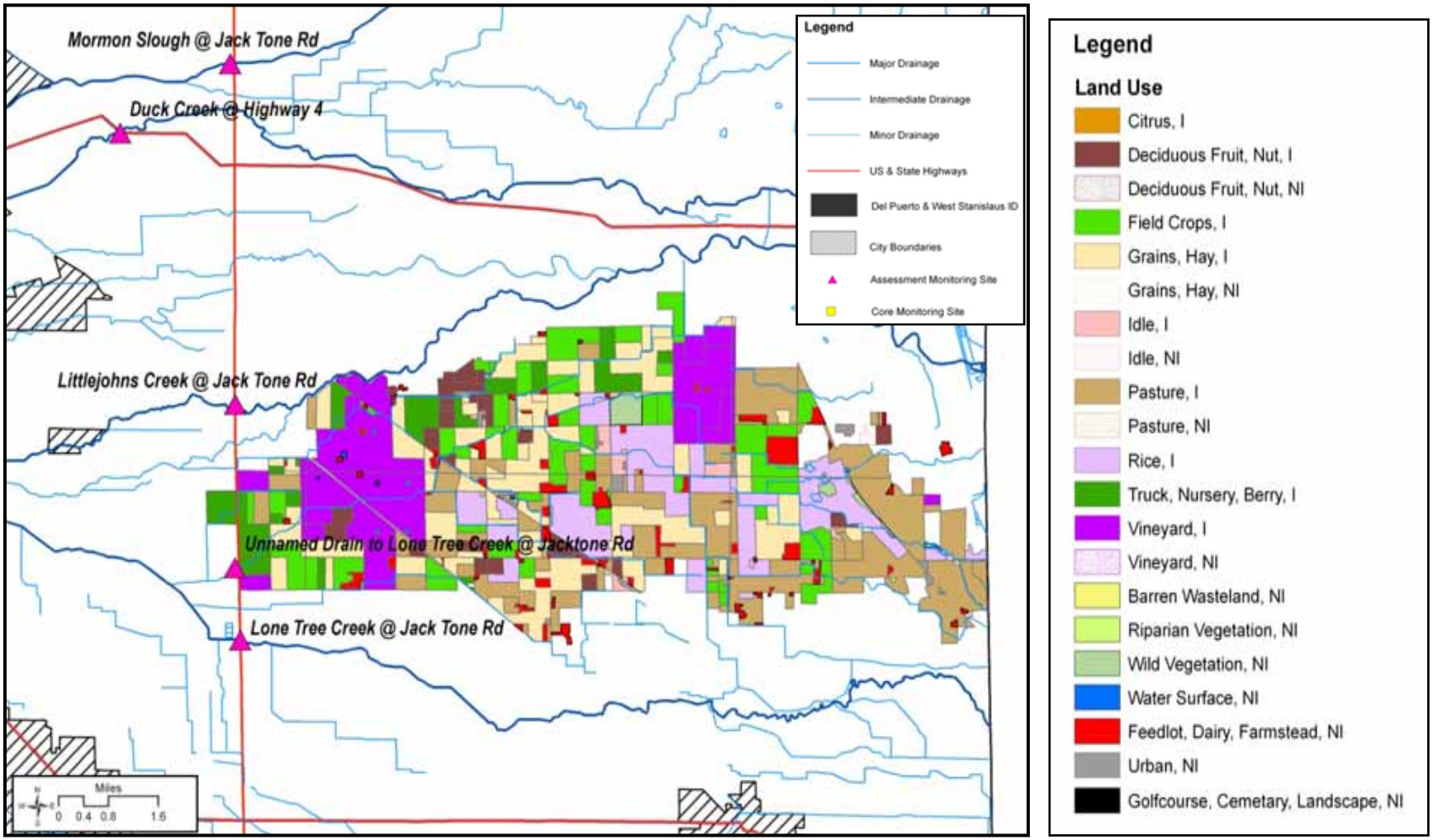
Priority E

- Dissolved Oxygen
- Lead
- pH
- Specific Conductivity
- Total Dissolved Solids
- *E. coli*

Description of Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed

Unnamed Drain to Lone Tree Creek @ Jack Tone Road (23,051 irrigated acres) site subwatershed is located to the north of the Lone Tree Creek site subwatershed and south of Littlejohns Creek. The drain forms in the eastern portion of San Joaquin County and flows west eventually joining with Lone Tree Creek just west of Jack Tone Road. Unlike most of the SJCDWQC area, rice is a major crop in the site subwatershed. Agriculture in the site subwatershed also consists of deciduous orchards, field crops and grains. Figure III-1 provides the land use within this site subwatershed area.

Figure III-1. Site subwatershed map of land use for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sample site. The highlighted points mark current sampling sites.



Subwatershed Monitoring History

Monitoring was initiated at Unnamed Drain to Lone Tree Creek (also called Temple Creek locally) during the irrigation season of 2006 and has continued through the irrigation season of 2008 (Table III-1). Specific information on the analysis conducted across each of the monitoring seasons is provided below (Table III-2). Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and included additional sampling at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during July and September for chlorpyrifos (Table III-3). Upstream Management Plan Monitoring occurred in the 2008 irrigation season in July and September for chlorpyrifos at Unnamed Drain to Lone Tree Creek @ Wagner Road (Table III-4). This location was based on a review of PUR data indicating likely upstream sources. The upstream monitoring site was selected to divide the watershed into smaller areas which allows an analysis of the contribution of each portion of the watershed to the load measured at the Jack Tone Road site. Table III-5 and Figure III-2 show the locations of all sampling locations within the Unnamed Drain to Lone Tree Creek site subwatershed. Exceedances of field and physical parameters, *E. coli*, pesticides, and water column and sediment toxicity have occurred at this site (Tables III-6 and III-7). A summary and discussion of these exceedances are provided in the next section.

The Unnamed Drain to Lone Tree Creek is not considered impaired in the current Basin Plan; however the Lone Tree Creek is listed as impaired for ammonia, biological oxygen demand and electrical conductivity. The potential source is listed as dairies.

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd will be an Assessment Monitoring location under the new MRPP and the first monitoring rotation will occur in 2017-2018. Until that time, the Coalition will continue to conduct Management Plan Monitoring for at this site.

Table III-1. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sampling events per season and year. An irrigation season sampling event encompasses normal monitoring and associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall event emcompassess normal monitoring.

	2004	2005		2006		2007		2008		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Events Sampled	NA	NA	NA	NA	4	2	6	1	6	NA
Events Not Sampled	NA	NA	NA	NA	1 (site dry)	0	0	0	0	NA
Total	NA	NA	NA	NA	5	2	6	1	6	NA

Table III-2. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Number of analyses run per constituent in each sampling season (only environmental samples listed).

Method	Constituent	2006	2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Field and Physical Parameters							
NA	pH	4	4	9	4	10	
NA	Specific Conductivity	4	4	9	4	10	
NA	Dissolved Oxygen	3	4	9	4	10	
EPA 160.1	Dissolved Solids	4	2	6	1	6	
EPA 180.1	Turbidity	4	2	6	1	6	
SM 9223 B	E. coli	4	2	6	1	6	
EPA 110.2	Color	4	2	6	1	6	
EPA 415.1	Total Organic Carbon	4	2	6	1	6	
EPA 405.1	Biological Oxygen Demand	1	2	2			
Carbamates							
EPA 8321A	Aldicarb	4	2	6	1	6	
EPA 8321A	Carbaryl	4	2	6	1	6	
EPA 8321A	Carbofuran	4	2	6	1	6	
EPA 8321A	Methiocarb	4	2	6	1	6	
EPA 8321A	Methomyl	4	2	6	1	6	
EPA 8321A	Oxamyl	4	2	6	1	6	
Organochlorines							
EPA 8081A	DDD	4	2	6	1	6	
EPA 8081A	DDE	4	2	6	1	6	
EPA 8081A	DDT	4	2	6	1	6	
EPA 8081A	Dicofol	4	2	6	1	6	
EPA 8081A	Dieldrin	4	2	6	1	6	
EPA 8081A	Endrin	4	2	6	1	6	
EPA 8081A	Methoxychlor	4	2	6	1	6	
Organophosphates							
EPA 8141A	Azinphos methyl	4	2	6	1	6	
EPA 8141A	Chlorpyrifos	4	2	8	1	6	
EPA 8141A	Diazinon	4	2	6	1	6	
EPA 8141A	Dimethoate	4	2	6	1	6	
EPA 8141A	Disulfoton	4	2	6	1	6	
EPA 8141A	Malathion	4	2	6	1	6	
EPA 8141A	Methamidophos	4	2	6	1	6	
EPA 8141A	Methidathion	4	2	6	1	6	
EPA 8141A	Parathion, Methyl	4	2	6	1	6	
EPA 8141A	Phorate	4	2	6	1	6	
EPA 8141A	Phosmet	4	2	6	1	6	
Pyrethroids							
EPA 8081A	Bifenthrin	4	2	6	1	6	
EPA 8081A	Cypermethrin	4	2	6	1	6	
EPA 8081A	Cyhalothrin, lambda	4	2	6	1	6	
EPA 8081A	Permethrin	4	2	6	1	6	
EPA 8081A	Cyfluthrin	4	2	6	1	6	
EPA 8081A	Esfenvalerate/ Fenvalerate	4	2	6	1	6	
Triazines							
EPA 619	Atrazine	4	2	6	1	6	
EPA 619	Cyanazine	4	2	6	1	6	
EPA 8321A	Diuron	4	2	6	1	6	

Method	Constituent	2006	2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 574M	Glyphosate	4	2	6	1	6	
EPA 8321A	Linuron	4	2	6	1	6	
EPA 8141A	Molinate	4	2	6	1	6	
EPA 549.2M	Paraquat dichloride	4	2	6	1	6	
EPA 619	Simazine	4	2	6	1	6	
EPA 8141A	Thiobencarb	4	2	6	1	6	
Metals (Total)							
EPA 200.8	Arsenic					6	
EPA 200.8	Boron					6	
EPA 200.8	Cadmium					6	
EPA 200.8	Copper					6	
EPA 200.8	Lead					6	
EPA 200.8	Nickel					6	
EPA 200.8	Selenium					6	
EPA 200.8	Zinc					6	
Nutrients							
EPA 350.2	Ammonia as N					6	
EPA 130.2	Hardness as CaCO3					6	
EPA 300.0	Nitrate as N					6	
EPA 354.1	Nitrite as N					6	
EPA 351.3	Nitrogen, Total Kjeldahl					6	
EPA 365.2	OrthoPhosphate as P					6	
EPA 365.2	Phosphate as P					6	
Toxicity							
EPA 821-02-012	*Ceriodaphnia dubia*	4	3	6	2	7	
EPA 821-02-012	*Pimephales promelas*	4	2	6	1	6	
EPA 821-02-013	*Selenastrum capricornutum*	4	4	6	1	7	
EPA 600/R-99-064	*Hyalella azteca*	1	1	2	2	2	

Table III-3. Unnamed Drain to Lone Tree Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	30-Jul-07	A	**X**
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	25-Sep-07	A	**X**

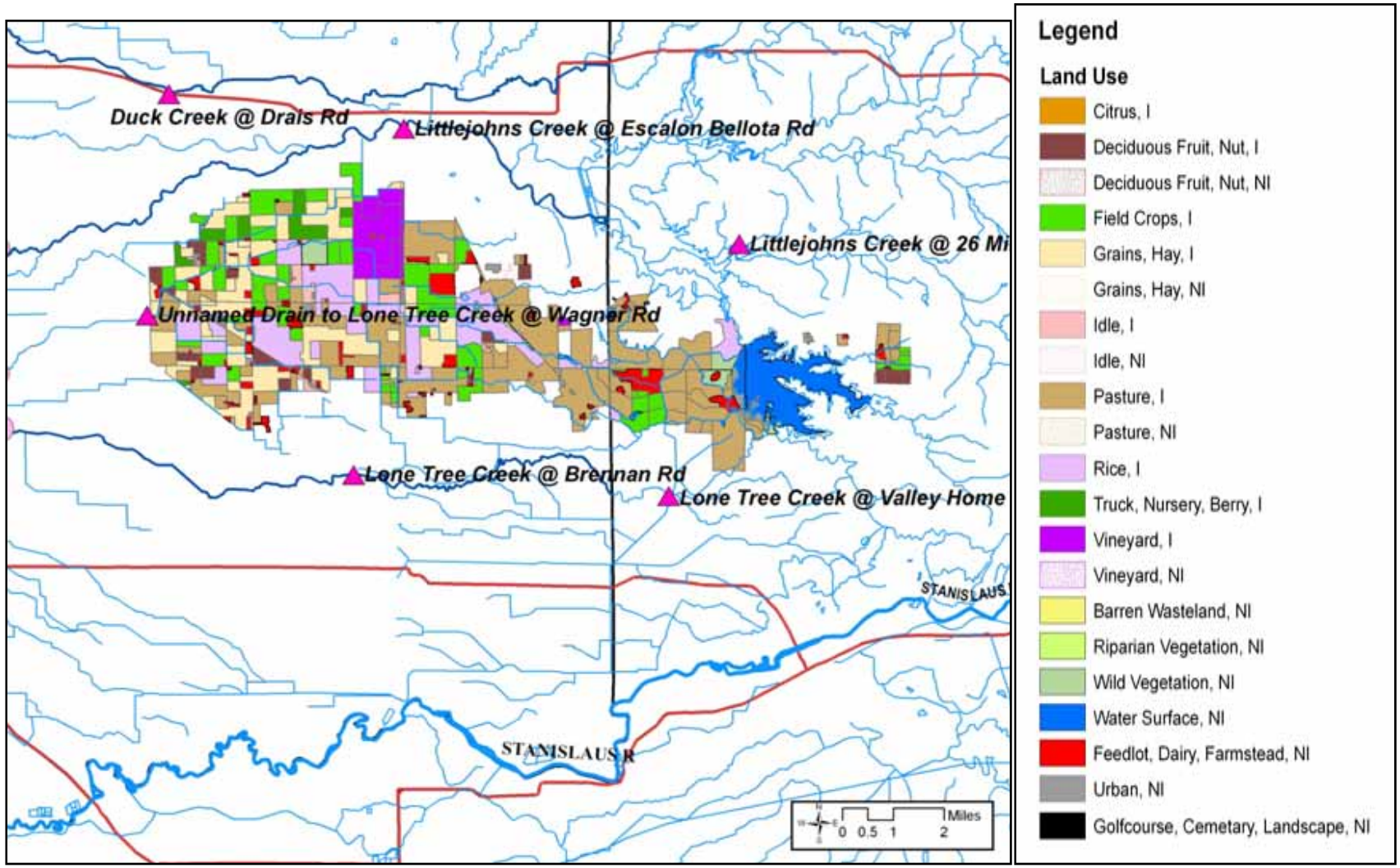
Table III-4. Unnamed Drain to Lone Tree Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Wagner Rd	15-Jul-08	U	**X**
Unnamed Drain to Lone Tree Creek @ Wagner Rd	16-Sep-08	U	**X**

Table III-5. Coordinates of the Unnamed Drain to Lone Tree Creek site subwwatershed sampling locations.

Station Name	Station Code	Target Lat	Target Long
Unnamed Drain to Lone Tree Creek @ Wagner Rd	531UDLTWR	37.8709	-121.0911
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.8536	-121.1457

Figure III-2. Unnamed Drain to Lone Tree Creek @ Wagner Rodd site subwatershed map of land use for the upstream Management Plan Monitoring site.



Exceedance History

During Coalition monitoring, exceedances of water quality trigger limits for field and physical parameters, *E. coli,* pesticides, and water column and sediment toxicity have occurred within the Unnamed Drain to Lone Tree Creek site subwatershed. During the irrigation season of 2008, exceedances included dissolved oxygen (3), pH (1), *E. coli* (4), chlorpyrifos (5), thiobencarb (1), copper (5), lead (2), and carbofuran (1). There were two instances of water column toxicity to *Ceriodaphnia* and one instance of water column toxicity to *Selenastrum*. One sediment sample tested toxic to *Hyalella azteca*. Samples collected over the entire three years of monitoring at the Unnamed Drain to Lone Tree Creek sample site resulted in five exceedances of DO, one of pH, two of EC, one of TDS, nine of *E. coli*, one of DDE, five of copper, two of lead, one of carbofuran, eleven of chlorpyrifos, three of diuron, one of methidathion, two of simazine, and three of thiobencarb. Toxicity has occurred four times to *Ceriodaphnia dubia* and five times to *Selenastrum capricornutum*. Sediment toxicity to *Hyalella azteca* occurred four times. All exceedances are listed in Tables III-6 and III-7 by season and date and are based on water quality trigger limits (WQTL) listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Tables III-6 and III-7 for those analytes with two or more exceedances over the last three years.

Table III-6. Field, bacteria, inorganic and legacy pesticides (low priority) experienced in samples collected from locations within the Unnamed Drain to Lone Tree Creek @ Jack Tone Creek site subwatershed between April 2006 and September 2008 (sorted by season and date).

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Dissolved Solids, mg/L	E. coli, MPN/100 mL	DDE(p,p')[1], µg/L
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	20-Jun-06	4.8					0.004
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	18-Jul-06	6				2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	22-May-07			905	620		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	10-Jul-07					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7-Aug-07					250	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Apr-08					250	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	13-May-08	5.61	6.17			460	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Jul-08					690	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	12-Aug-08					260	
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Irrigation*	*16-Sep-08*	*6.6*					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	16-Sep-08	6.7					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	11-Feb-07					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	28-Feb-07					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	6-Mar-07			841			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	23-Jan-08					>2400	
Constituent Priority			**E**	**E**	**E**	**E**	**E**	

[1]Montitoring for this analyte was not initiated until May of 2006.

Table III-7. Metals, pesticides and toxicity exceedances (high priority) experienced in samples collected from locations within the Unnamed Drain to Lone Tree Creek @ Jack Tone Creek site subwatershed between April 2006 and September 2008 (sorted by season and date).

Station Name	Season	Sample Date	Copper[2], µg/L	Lead[2], µg/L	Carbofuran, µg/L	Chlorpyrifos, µg/L	Diuron[1], µg/L	Methidathion[1], µg/L	Simazine[1], µg/L	Thiobencarb[1], µg/L	*Ceriodaphnia dubia*, Survival (%)	*Hyalella azteca*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	20-Jun-06								0.12			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	18-Jul-06				0.031							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	19-Sep-06				0.045							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	12-Jun-07								0.57			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	10-Jul-07				0.034							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9-Aug-07										57	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	25-Sep-07				0.017							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Apr-08	23 (8.4)	6.1 (2.7)									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	13-May-08	7.8 (6.5)		0.6	0.41							1126514
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	10-Jun-08				0.12				0.12			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	15-Jul-08	6.9 (5.7)			0.028							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	12-Aug-08	6.8 (5.9)										
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	13-Aug-08										82	
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Irrigation*	*16-Sep-08*				*0.14*							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	16-Sep-08	6.5 (4.3)	1.3 (1)		0.12					0		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	23-Sep-08									65		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	11-Feb-07				0.048	19	1.1	7		0		475000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	21-Feb-07											926000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	28-Feb-07					29						55300
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	7-Mar-07											504000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	23-Jan-08				0.045	7.7		6.4		0		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	18-Mar-08										54	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	9-Apr-08										21	
Constituent Priority			**C**	**E**		**A**	**C**		**C**	**NP[3]**	**C**	**D**	**D**

[1]Montitoring for this analyte was not initiated until May of 2006.
[2]Water quality trigger for each sample is based on hardness and is shown in parenthesis.
[3]NP – not prioritized; thiobencarb is a pesticide applied only to rice and is therefore reported to the Regional Board and the Rice Coalition to manage.

2007 and 2008 Management Plan Monitoring Results

Management Plan Monitoring was implemented at the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd monitoring site for chlorpyrifos. Additional monitoring occurred in 2007 and upstream monitoring at Unnamed Drain to Lone Tree Creek @ Wagner Road occurred in 2008 during the months in which exceedances of priority constituents or toxicity were detected during the previous year (Tables III-3, III-4). This additional monitoring was designed to increase the temporal and spatial coverage of monitoring during the months when exceedances had occurred in the past, in particular as they co-occurred with applications of relevant pesticides in the site subwatershed. Management Plan Monitoring (MPM) occurred for chlorpyrifos in July and September of both years. Table III-8 includes monitoring results for chlorpyrifos from all sampling events during the 2007 and 2008 irrigation seasons. During 2007, chlorpyrifos was detected in samples collected in July and September. The normal monitoring sample in July 2007 contained 0.034 µg/L of chlorpyrifos and the Management Plan sample collected later that month had a concentration of 0.014 µg/L. In September 2007, the normal monitoring sample did not contain chlorpyrifos above the detection limit however the MPM sample (collected two weeks later) contained 0.017 µg/L. There were no other detections of chlorpyrifos at this site in 2007. In 2008, chlorpyrifos exceeded the WQTL in the months of May, June, July, and September (Table III-8). Normal monitoring discovered exceedances in the months previously listed as well as a detection in August very close to the WQTL. Upstream Management Plan Monitoring recovered no detection in July but a chlorpyrifos exceedance in September.

Table III-8. Unnamed Drain to Lone Tree Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos and metals from the 2007-2008 irrigation seasons. Exceedance values are in bold.

	Month	April	May	June	July	August	Septmeber
2007 NM (@ Jack Tone Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	<0.00259	<0.00259	<0.00259	**0.034**	<0.003	<0.003
2007 MPM A (@ Jack Tone Rd)	Date	NA	NA	NA	7/30/07	NA	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	0.014	NA	**0.017**
2008 NM (@ Jack Tone Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	<0.003	**0.41**	**0.12**	**0.028**	0.014	**0.12**
2008 MPM US (@ Wagner Rd)	Date	NA	NA	NA	7/15/08	NA	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	**0.14**

NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed based on the following formula (Table III-9):

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/L X 1000 or µg/L).

The load values for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table III-9. Unnamed Drain to Lone Tree Creek site subwatershed. Instantaneous load calculations for chlorpyrifos and diuron (sorted by site, analyte, and date).

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	18-Jul-06	40.64	0.031	35.67
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Aug-06	17.86	0.011	5.56
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	19-Sep-06	10.41	0.045	13.27
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11-Feb-07	27.09	0.048	36.82
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	10-Jul-07	21.51	0.034	20.71
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	30-Jul-07	32.45	0.014	12.86
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	25-Sep-07	15.92	0.017	7.66
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	23-Jan-08	12.18	0.079	27.25
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	23-Jan-08	12.18	0.045	15.52
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	13-May-08	21.52	0.41	249.85
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	10-Jun-08	15.85	0.12	53.86
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Jul-08	17.55	0.028	13.91
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12-Aug-08	11.11	0.014	4.40
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	16-Sep-08	18.38	0.12	62.46
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	16-Sep-08	18.38	0.12	62.46
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	15-Apr-08	4.67	23	3041.53
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	13-May-08	21.52	7.8	4753.18
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	10-Jun-08	15.85	4.8	2154.36
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	15-Jul-08	17.55	6.9	3429.05
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	12-Aug-08	11.11	6.8	2139.29
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	16-Sep-08	18.38	6.2	3226.89
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Copper	16-Sep-08	18.38	6.5	3383.03
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	11-Feb-07	27.09	19	14575.0
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	28-Feb-07	7.49	29	6150.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	10-Apr-07	3.56	1.6	161.29
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	22-May-07	0.00	1.5	0.00
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	23-Jan-08	12.18	7.7	2655.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Diuron	23-Jan-08	12.18	7.8	2690.23
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	15-Apr-08	4.67	0.72	95.21
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	13-May-08	21.52	0.54	329.07
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	10-Jun-08	15.85	0.29	130.16
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	11-Feb-07	27.09	7	5369.75
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	28-Feb-07	7.49	2.4	509.03
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	10-Apr-07	3.56	0.08	8.06
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	22-May-07	0.00	3.4	0.00
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	23-Jan-08	12.18	8.4	2897.17
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Simazine	23-Jan-08	12.18	6.4	2207.37

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	15-Apr-08	4.67	1	132.24
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Chlorpyrifos*	*16-Sep-08*	*30.90*	*0.14*	*122.50*

*field duplicate

Source Identification

Priority A Constituents

Chlorpyrifos

The WQTL for chlorpyrifos (0.015 µg/L) was exceeded at this site during the months of January (2008), February (2007), May (2008), June (2008), July (2006, 2007, 2008) and September (2006, 2007, 2008) (Table III-7). To identify potential sources of chlorpyrifos, the Coalition uses Pesticide Use Reports (PURs) to examine the amount and timing of pesticide applications and the types of crops to which the active ingredients are applied relative to exceedance dates. In the years 2004-2006, July and August appear to be the peak application months with a total of 1,963 pounds of product applied in these two months in 2005, and 1,378 pounds applied in these two months in 2006, which for both years accounts for over 90% of the total pounds applied in the entire year (Table III-10, Figure III-3). In 2008, May and July appear to be the peak application months with a total of 2,291 pounds of product applied in these two months. The amount of chlorpyrifos applied and the number of applications in this subwatershed has decreased annually since 2005 (Table III-10, Figure III-3). The average application rate of chlorpyrifos for the Unnamed Drain to Lone Tree Creek subwatershed from 2004-2007 is 1.36 lbs AI/acre. The average application rate in 2008 is 1.37 lbs AI/acre. The highest application rates are associated with apples, almonds, corn and walnuts, while the lowest application rates are associated with alfalfa (Table III-11).

Table III-10. Number of applications, pounds applied and acres treated for each month and year of application in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.

Month	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2005	10	305.1	542
May, 2005	22	1321.3	795.3
June, 2005	19	3876.6	1764.5
July, 2005	34	1839.5	1517
August, 2005	4	123.3	161
September, 2005	2	57.4	70
December, 2005	1	199.4	100
March, 2006	1	50.0	25
April, 2006	6	168.4	382
May, 2006	28	2168.0	1297.3
June, 2006	25	2515.2	1747.5
July, 2006	15	1037.5	673.5
August, 2006	6	340.6	290
September, 2006	6	294.1	295
November, 2006	1	185.8	100
March, 2007	5	172.4	209
April, 2007	6	303.8	325
May, 2007	23	2208.2	1558
June, 2007	11	741.1	637
July, 2007	2	71.5	57
August, 2007	1	80.0	37
October, 2007	1	199.4	100
March, 2008	6	206.0	338
April, 2008	2	182.3	157
May, 2008	17	1568.8	972.5
June, 2008	2	208.4	231
July, 2008	14	722.6	437
2005 Total	92	7722.6	4949.8
2006 Total	88	6759.7	4810.3
2007 Total	49	3776.3	2923
2008 Total	41	2888.1	2135.5
Total	**270**	**21146.7**	**14818.6**

Figure III-3. Pounds of chlorpyrifos added to TRS within the Unnamed Drain to Lone Tree Creek site subwatershed by month for 2005-2008. Asterisk (*) denotes months in which chlorpyrifos exceedances were detected at the site.

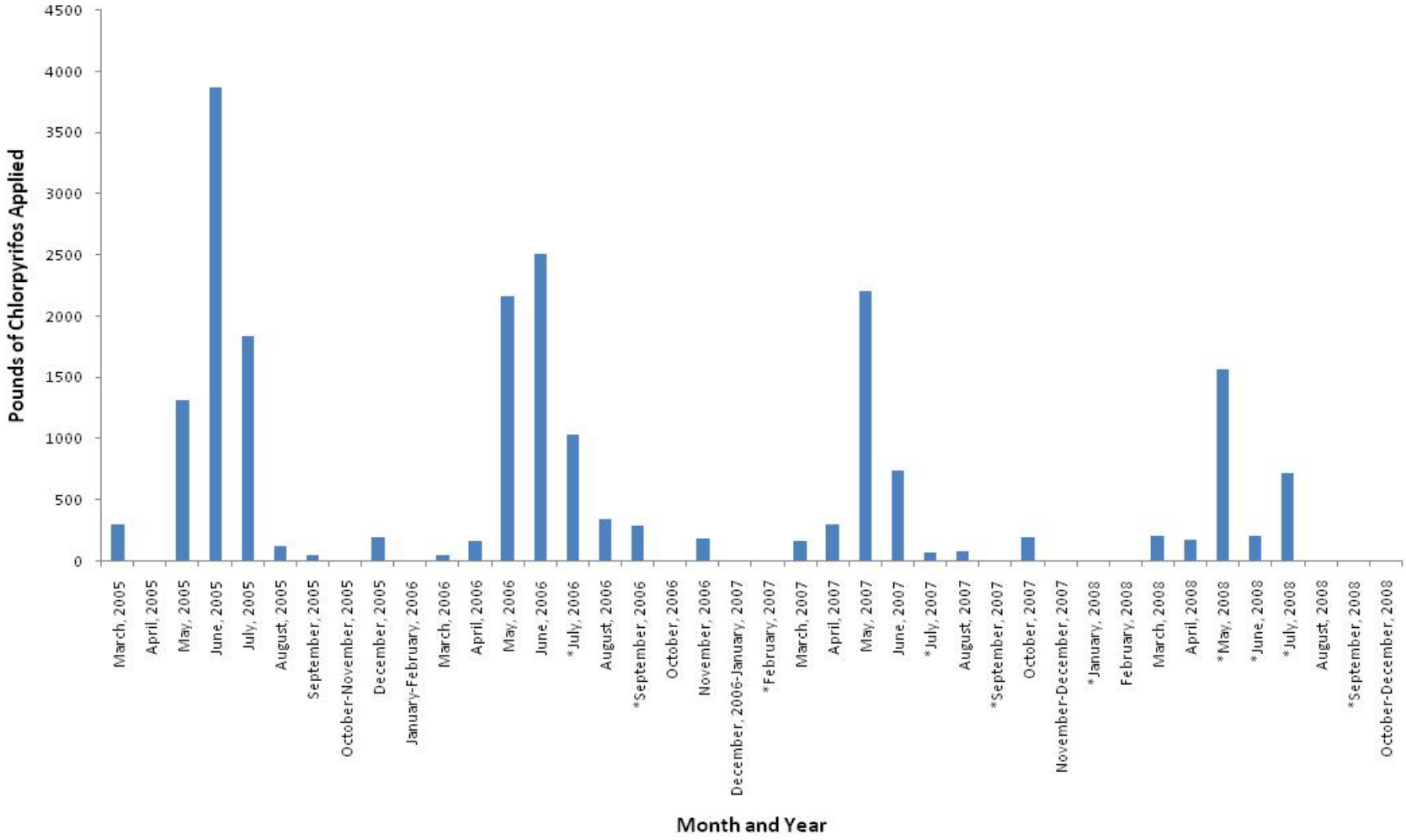


Table III-11. Average pound active ingredient (AI) per acre for chlorpyrifos based on PUR data from 2006-2008 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	0.5007
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	0.3757
		LORSBAN 4E-HF	0.1559
			0.2829
			0.495
			0.4985
	ALMOND	LORSBAN 4E-HF	1.9939
		LORSBAN-4E	1.8584
			2.001
	APPLE	LORSBAN-4E	2.001
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	1.2
			1.35
		LORSBAN 4E-HF	0.9969
		NUFOS 15G	1.35
	CORN FOR/FOD	LORSBAN 15G GRANULAR INSECTICIDE	1.1842
			1.2
			1.2273
		LORSBAN-4E	0.3065
		NUFOS 4E	1.0168
	GRAPES, WINE	LORSBAN 4E-HF	1.9939
	WALNUT	LORSBAN 4E INSECTICIDE	0.5007
			2.0003
		LORSBAN 4E-HF	1.9938
			1.9939
		LORSBAN-4E	2.001
			2.0023
			2.0071
			2.0124
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	1.01
			2.0201
		LORSBAN 4E-HF	1.9938
			1.9939
		LORSBAN-4E	1.8584
Average pounds chlorpyrifos applied per acre (2004-2008)			1.38

The Coalition performed an analysis of chlorpyrifos applications within four weeks of an exceedance and concentrations/loads of chlorpyrifos in the water (all exceedances). A linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure III-4), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure III-5). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI was summed and divided by the summed acreage. The intercept for all analyses was set at zero as there

should be no chlorpyrifos in the water if there are no applications. However, this assumes that applications more than four weeks prior to sampling would not contribute chlorpyrifos to the water body. For purposes of this analysis, it is assumed that applications prior to four weeks before sampling would not contribute substantially to loads measured four weeks later.

The regression of concentration on pounds AI applied per acre indicated a positive but non-significant relationship. The relationship between load and pounds AI applied was also non-significant. The largest residual occurs for a sample collected in May 2008. In the month prior to the sampling event, numerous applications were made across several sections in the watershed. The lack of a significant relationship suggests that a few parcels are responsible for the exceedances and management should focus on growers located adjacent to the drain.

Figure III-4. Chlorpyrifos exceedance concentrations and loads compared to application rates (average lbs per acre) for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 4 weeks of exceedance dates. If no PUR data associated with an exceedance date, date not included on graph.

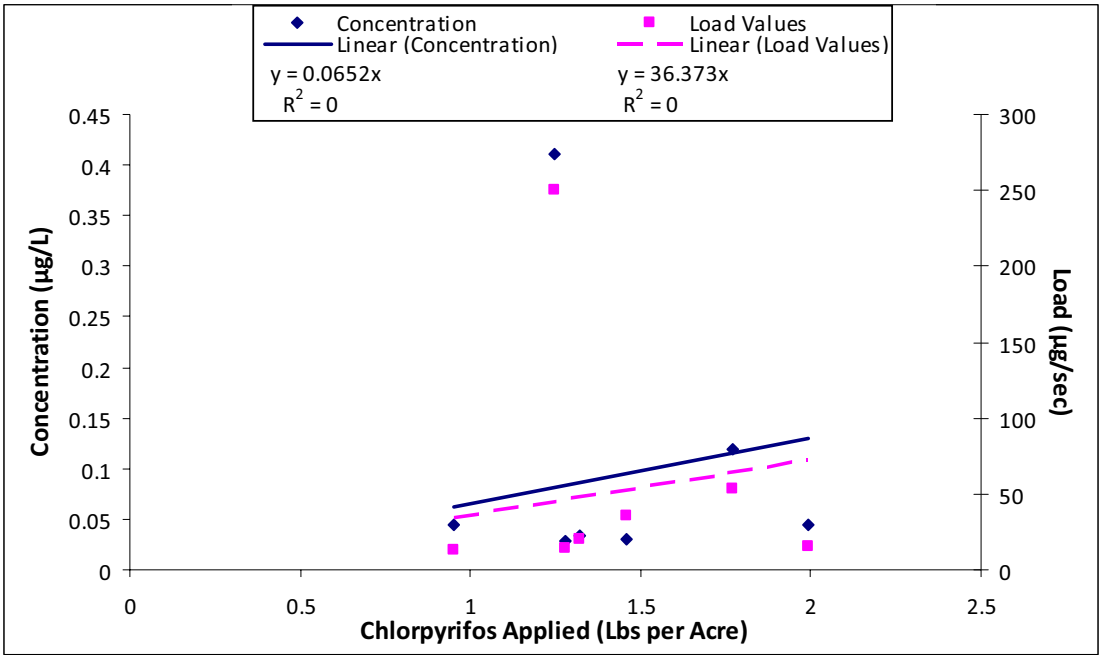
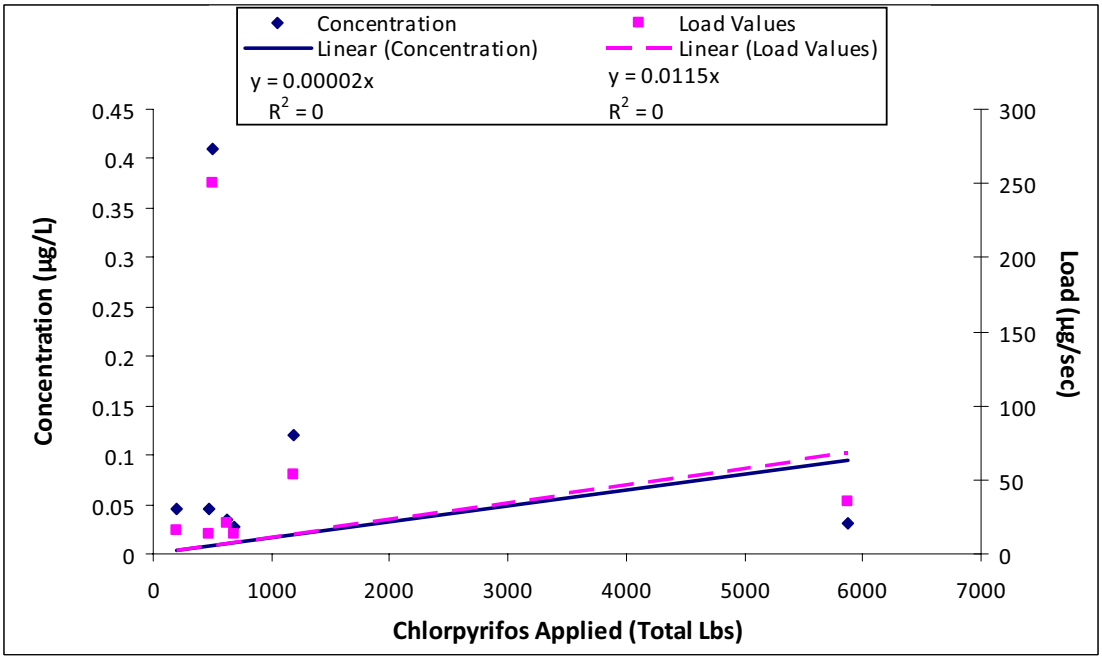


Figure III-5. Chlorpyrifos exceedance concentrations and loads compared to application rates (total lbs) for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 4 weeks of exceedance dates. If no PUR data associated with an exceedance date, date not included on graph.



To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Tables III-12, III-13 and Figures III-6, III-7). There were 34 sections associated with exceedances, each section had between one and four applications in the month prior to sampling. Each section was associated with from 1 to 4 exceedances; no section was associated with all exceedances. Coalition members own a majority of the land in the watershed.

Table III-12. Unnamed Drain to Lone Tree Creek @ Jack Tone Road site subwatershed. All TRS that had more than one application associated with an exceedance for chlorpyrifos in 2006, 2007, and 2008. Table includes which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Chlorpyrifos Applications per Date of Exceedance						
	7/18/2006	9/19/2006	7/10/2007	1/23/2008	5/13/2008	6/10/2008	7/15/2008
1N8E25						1	
1N8E26	1						
1N8E27	1						
1N8E32		2					
1N8E34	1						4
1N8E35	1						2
1N8E36			1				
1N9E19	1		2		1	4	
1N9E29					1		1
1N9E30					1	1	
1N9E35	1						
1S7E12	3	1					
1S8E1		2					
1S8E10	1				1		
1S8E11	1				1		
1S8E13	1						1
1S8E14					1		
1S8E15				1			
1S8E2	1						
1S8E23	1	1	2				1
1S8E24	3		2			3	
1S8E3	2						
1S8E6	1						
1S8E7							1
1S8E8		1					
1S8E9	1						1
1S9E10	1					1	
1S9E12	1	1					
1S9E18	1						
1S9E2						1	
1S9E21	1						1
1S9E3						1	
1S9E7	1						

TRS*	Chlorpyrifos Applications per Date of Exceedance						
	7/18/2006	9/19/2006	7/10/2007	1/23/2008	5/13/2008	6/10/2008	7/15/2008
1S9E9		1					

*Bolded TRS are members of the Coalition

Table III-13. Unnamed Drain to Lone Tree Creek @ Jack Tone Road site subwatershed. TRS with chlorpyrifos applications in month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant chlorpyrifos applications.

TRS*	Exceedance date											
	1/23/2008			5/13/2008			6/10/2008			7/15/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
1S8E15	10/24/2007	199.39	100									
1N9E19				4/19/2008	112.50	95	5/14/2008 5/14/2008 5/15/2008 5/19/2008	15.52 305.35 65.23 66.01	31 152.5 32.5 33			
1N9E29				5/9/2008	67.50	55				7/11/2008	80.04	40
1N9E30				5/8/2008	50.02	25	5/16/2008	76.01	38			
1S8E10				5/2/2008	78.00	65						
1S8E11				5/2/2008	42.00	35						
1S8E14				5/2/2008	151.20	126						
1S8E24							5/28/2008 5/28/2008 5/29/2008	33.60 44.40 24.00	28 37 20			
1S9E10							5/16/2008	66.90	36			
1S9E2							5/16/2008	165.40	89			
1S9E3							5/16/2008	282.47	152			
1N8E25							5/14/2008	35.22	17.5			
1S8E13										7/12/2008	72.04	36
1S8E23										6/18/2008	184.80	154
1S8E7										7/8/2008	36.05	72
1S8E9										7/13/2008	39.88	20
1S9E21										7/6/2008	37.20	31
1N8E34										7/9/2008 7/10/2008 7/10/2008	29.91 39.88 79.75	15 20 40
1N8E35										6/30/2008 7/13/2008	23.60 29.91	77 15

*Bolded TRS are members of the Coalition

Figure III-6. Unnamed Drain to Lone Tree Creek TRS' that have had applications co-occurring with a chlorpyrifos exceedance.

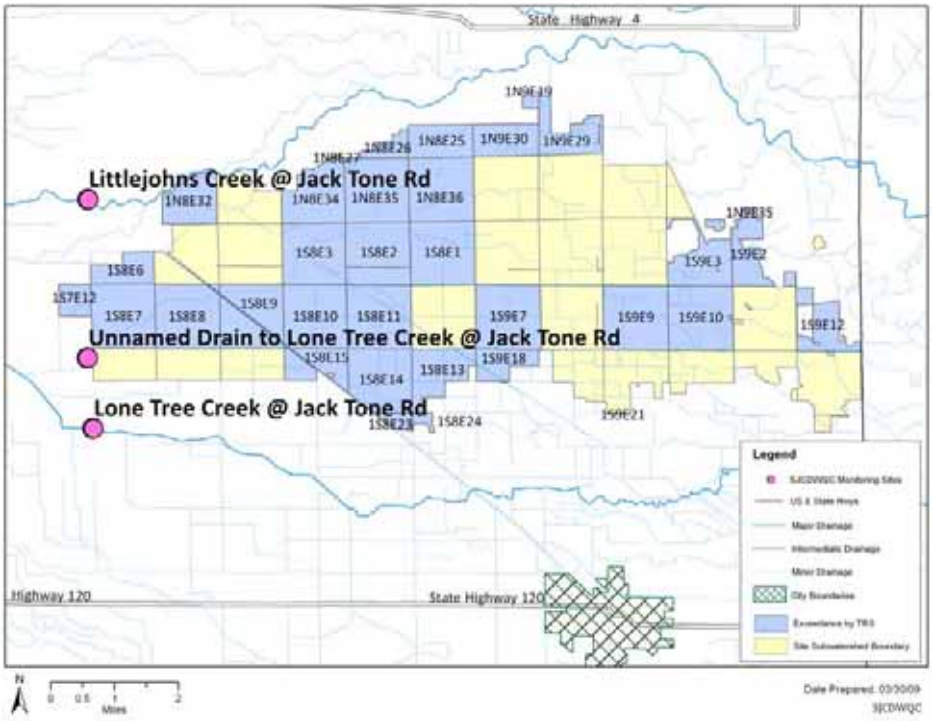
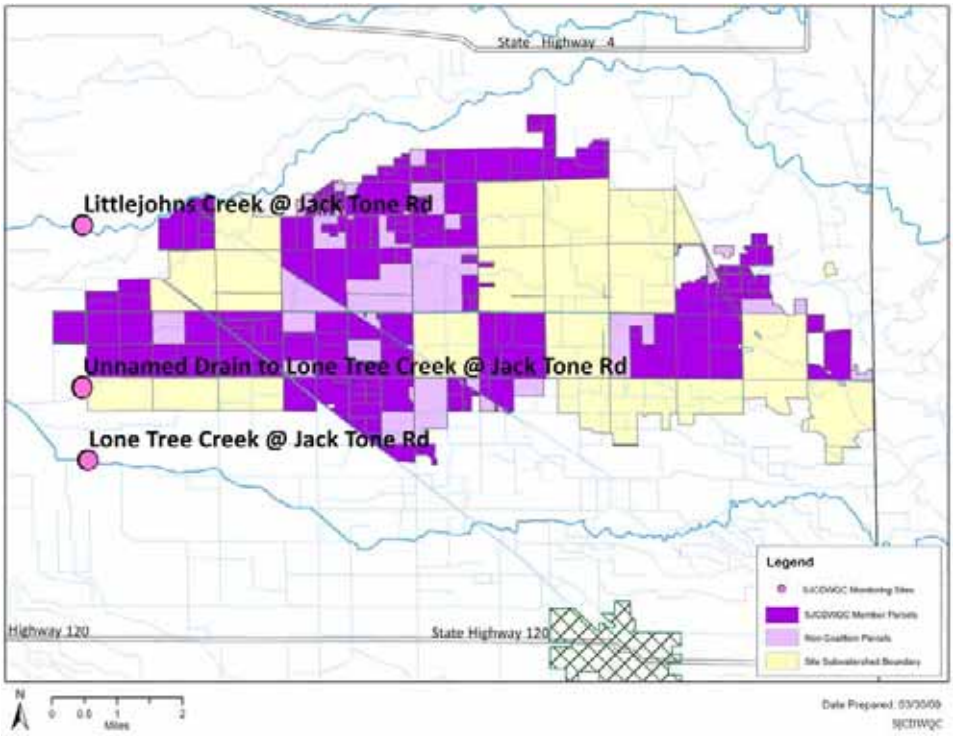


Figure III-7. Unnamed Drain to Lone Tree Creek member APNs relative to TRS with applications co-occurring with chlorpyrifos exceedances.



Priority C constituents

Copper

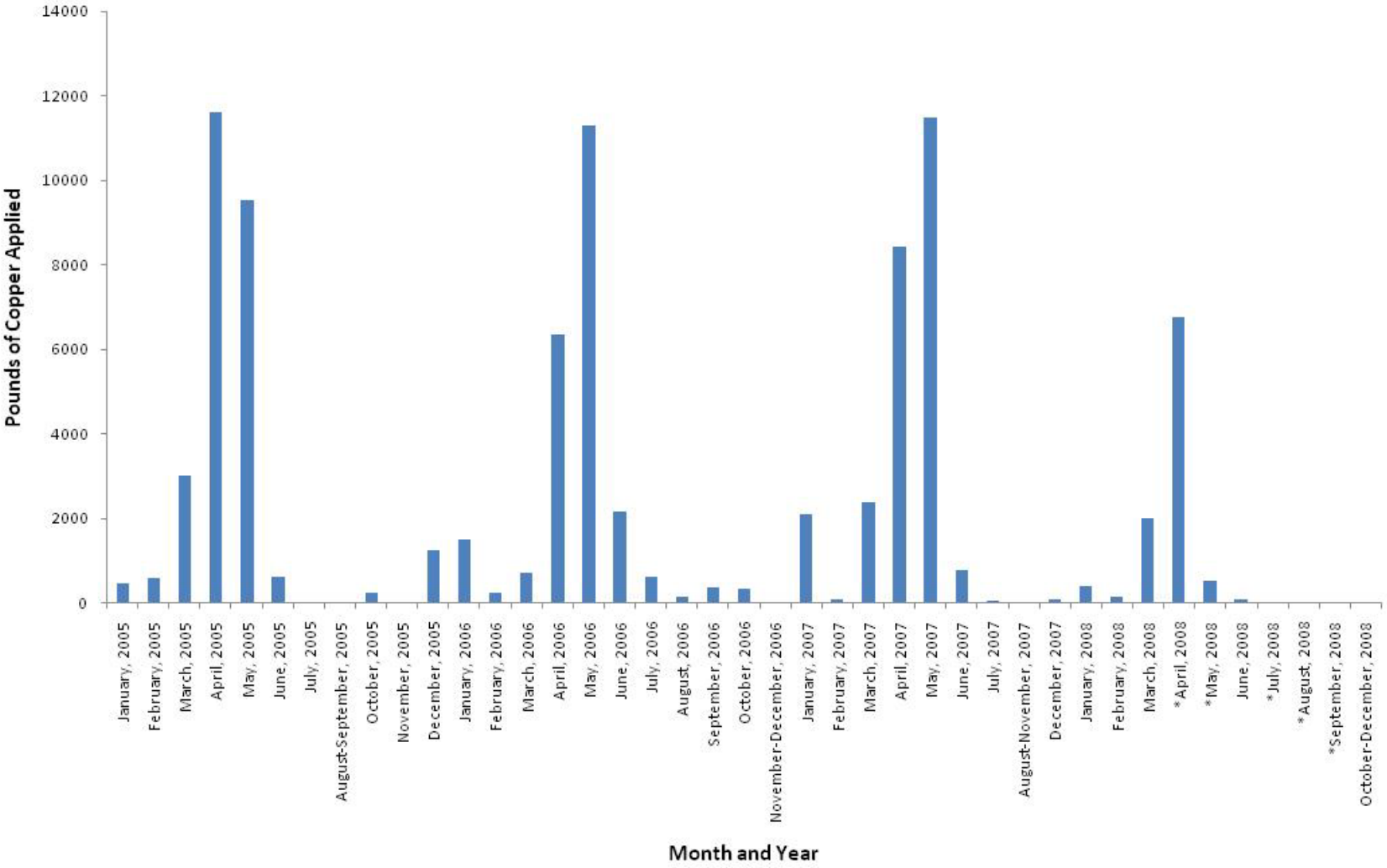
The WQTL for copper was exceeded at this site in every month but June during the 2008 irrigation season. The number of applications decreased in 2008 compared to 2007; however, while the pounds applied in 2008 was approximately one third of the pounds applied in 2007, the acres treated in 2008 was only approximately half of the acres treated in 2007 (Table III-14, Figure III-8).

Table III-14. Number of applications, pounds applied and acres treated for each month and year of application in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.

Month	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2005	3	454.9	108
February, 2005	4	591.0	179
March, 2005	22	3009.3	837.19
April, 2005	37	11618.1	2604.8
May, 2005	27	9516.0	1258.3
June, 2005	7	602.5	243.3
July, 2005	1	17.8	59.9
October, 2005	3	229.6	187
December, 2005	3	1234.0	84
January, 2006	5	1491.3	265
February, 2006	5	234.3	200.5
March, 2006	17	724.3	578.5
April, 2006	30	6351.9	1623.44
May, 2006	35	11276.6	1678
June, 2006	10	2167.0	569
July, 2006	6	609.8	396
August, 2006	3	152.0	106
September, 2006	6	351.4	235.5
October, 2006	5	338.8	217
January, 2007	6	2082.8	541
February, 2007	2	93.5	97
March, 2007	14	2380.3	560
April, 2007	38	8422.1	1675
May, 2007	22	11473.6	1402
June, 2007	3	759.4	141
July, 2007	1	56.5	70
December, 2007	1	77.0	8
January, 2008	2	406.9	88
February, 2008	3	140.9	114.25
March, 2008	13	1986.2	481.59
April, 2008	28	6760.2	1236
May, 2008	2	523.6	85
June, 2008	1	86.0	70

Month	Number of Copper Applications	Pounds Applied	Acres Treated
2005 Total	107	27273.1	5561.49
2006 Total	122	23697.4	5868.94
2007 Total	87	25345.1	4494
2008 Total	49	9903.8	2074.84
Total	**365**	**86219.4**	**17999.27**

Figure III-8. Pounds of copper added to TRS within the Unnamed Drain to Lone Tree Creek site subwatershed by month for 2005-2008. Asterisk (*) denotes months in which chlorpyrifos exceedances were detected at the site.



Similar to the analysis performed for chlorpyrifos, a linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure III-9), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure III-10). Applications made within 12 weeks of the sampling were included. To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI was summed and divided by the summed acreage. Four products with copper as the active ingredient were included in the analysis. The intercept was not set to zero for reasons discussed above. Copper does not degrade and could remain in place until moved to a surface water body. It is unclear if the twelve week window is sufficient, but summing applications from a longer window dilutes out the effects of recent applications. Statistically, using longer than twelve weeks for applications also makes the points in the regression analysis non-independent as the same applications contribute to the average pounds AI per acre for several detections. For the analysis reported below, some interdependence was allowed for data points that were temporally close because the same application in the previous few months could contribute to both detections.

The regression of concentration and pounds applied (AI) per acre indicated no relationship with a small portion of the variation in concentration accounted for by the application rate (Figure III-10). Based on the method used to analyze the data, the average amount of copper applied per acre does not predict the concentration in the water and therefore it is unlikely that the detections of copper in Unnamed Drain to Lone Tree Creek are a function of accumulated applications across the site subwatershed. There may be several parcels that contribute a disproportionate amount of copper to the creek, however because there are numerous parcels associated with each detection of copper (see below), isolating sources will be difficult. Interestingly, load was significantly positively related to pounds AI applied per acre and total pounds applied (Figures III-9, III-10). Approximately 40% of the variation in load was accounted for by variation in application rate, and almost 70% of the variation in load was accounted for by variation in total pounds applied.

Figure III-9. Copper exceedance concentrations and loads compared to application rates (average lbs per acre) for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 12 weeks of exceedance dates. If no PUR data associated with an exceedance date, date not included on graph.

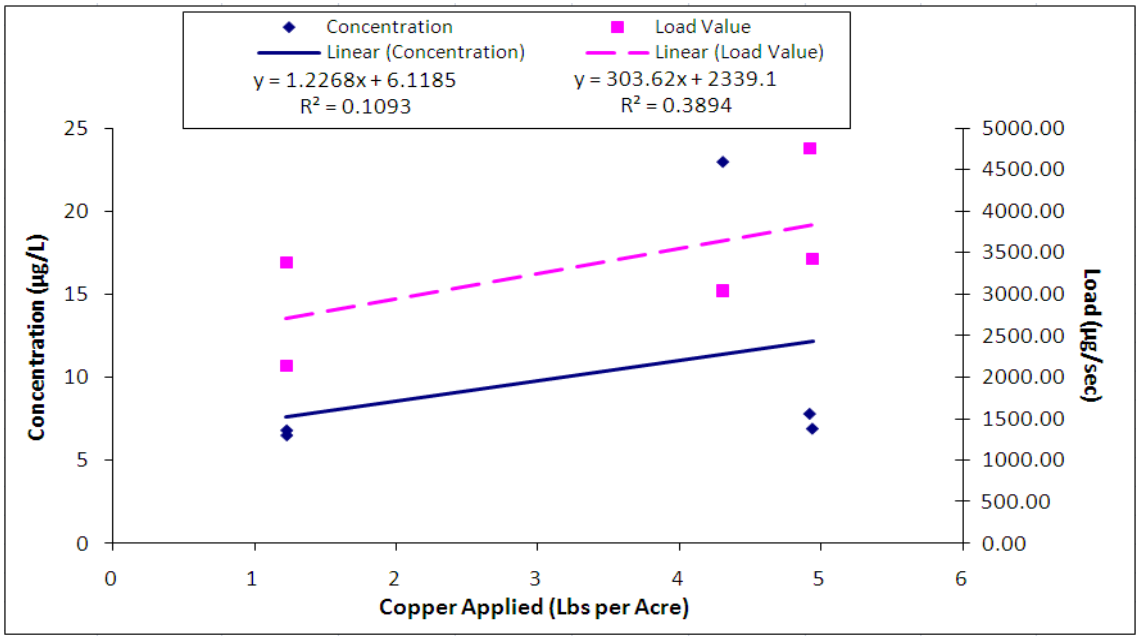
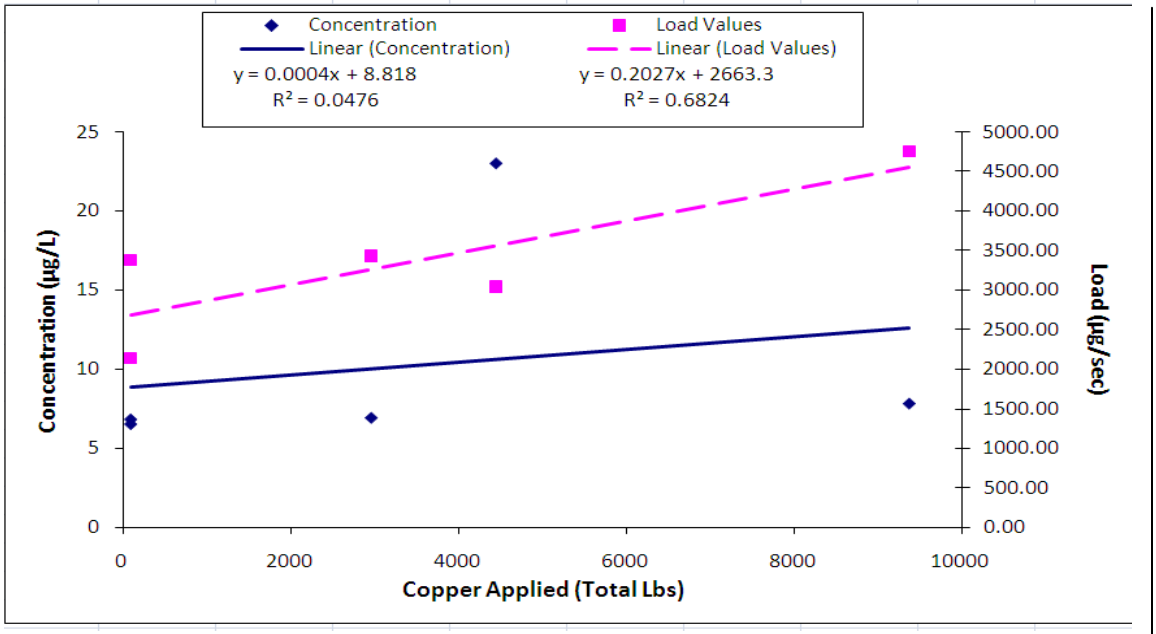


Figure III-10. Copper exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed for applications within 12 weeks of exceedance dates. If no PUR data associated with an exceedance date, date not included on graph.



To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Tables III-15, III-16 and Figures III-11, III-12). There were 13 sections associated with exceedances, each section

had between one and 13 applications in the month prior to sampling. Each section was associated with from 1 to 3 exceedances, with the exception of section 1S7E12, which was associated with four exceedances; no section was associated with all exceedances. In 2008, exceedances in April, May and June were associated with numerous applications while exceedances in August and September were associated with one application.

Table III-15. Unnamed Drain to Lone Tree Creek @ Jack Tone Road site subwatershed. All TRS that had more than one application associated with an exceedance for copper in 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Date of associated exceedance				
	4/15/2008	5/13/2008	7/15/2008	8/12/2008	9/16/2008
1N8E25	5	8	2		
1N8E34	2	2	2		
1N8E35			1		
1N9E19	8	13	4		
1N9E30	3	4	1		
1S7E12	2	2		1	1
1S8E11	1	1			
1S8E12	1	1			
1S8E8	1	1			
1S8E9	1	1			
1S9E13	1	1			
1S9E18	1	1			
1S9E24	2	2			

*Bolded TRS are members of the Coalition

Table III-16. Unnamed Drain to Lone Tree Creek @ Jack Tone Road site subwatershed . TRS with copper applications in month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant copper applications.

TRS*	Exceedance Date														
	4/15/2008			5/13/2008			7/15/2008			8/12/2008			9/16/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
1N8E25	03/15/08	64.56	20	03/15/08	64.56	20	04/27/08	32.28	20						
	03/25/08	64.56	20	03/25/08	64.56	20	04/30/08	92.40	15						
	03/26/08	61.60	10	03/26/08	61.60	10									
	03/26/08	64.56	20	03/26/08	64.56	20									
	04/08/08	107.80	17.5	04/08/08	107.80	17.5									
				04/19/08	64.56	20									
				04/27/08	32.28	20									
				04/30/08	92.40	15									
1N8E34	03/15/08	32.28	10	03/15/08	32.28	10	04/26/08	41.96	26						
	03/26/08	32.28	10	03/26/08	32.28	10	04/28/08	83.93	26						
				04/26/08	41.96	26									
				04/28/08	83.93	26									
1N8E35				04/26/08	24.40	19.5	04/26/08	24.40	19.5						
1N9E30	03/17/08	123.20	20	03/17/08	123.20	20	04/22/08	234.08	38						
	03/29/08	352.97	57.3	03/29/08	352.97	57.3									
	04/03/08	234.08	38	04/03/08	234.08	38									
				04/21/08	474.32	77									
				04/22/08	234.08	38									
1S7E12	04/06/08	73.76	40	04/06/08	73.76	40	06/23/08	85.96	70	06/23/08	85.96	70	06/23/08	85.96	70
1S8E11	02/24/08	76.14	90	02/24/08	76.14	90									
1S8E12	03/18/08	96.85	79.39	03/18/08	96.85	79.39									
1S8E8	03/18/08	73.07	59.9	03/18/08	73.07	59.9									
1S8E9	03/18/08	96.25	25	03/18/08	96.25	25									
1S9E13	02/06/08	52.46	16.25												
1S9E18	02/26/08	12.32	8	02/26/08	12.32	8									
1S9E24	04/05/08	30.71	6	04/05/08	30.71	6									
	04/05/08	40.94	8	04/05/08	40.94	8									
1N9E19	03/26/08	708.40	115	03/26/08	708.40	115	04/29/08	1309.00	212.5						
	03/27/08	215.60	35	03/27/08	215.60	35	04/30/08	523.60	85						
	04/01/08	190.96	31	04/01/08	190.96	31	05/05/08	184.80	30						

TRS*	Exceedance Date														
	4/15/2008			5/13/2008			7/15/2008			8/12/2008			9/16/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
	04/01/08	277.20	45	04/01/08	277.20	45	05/05/08	338.80	55						
	04/02/08	203.28	33	04/02/08	203.28	33									
	04/03/08	154.00	25	04/03/08	154.00	25									
	04/07/08	693.00	112.5	04/07/08	693.00	112.5									
	04/12/08	231.00	37.5	04/12/08	231.00	37.5									
				04/16/08	354.20	57.5									
				04/16/08	535.92	87									
				04/17/08	184.80	30									
				04/17/08	203.28	33									
				04/18/08	190.96	31									
				04/29/08	1309.00	212.5									
				04/30/08	523.60	85									
				05/05/08	184.80	30									
				05/05/08	338.80	55									

*Bolded TRS are members of the Coalition

Figure III-11. Unnamed Drain to Lone Tree Creek TRS' that have had applications co-occurring with a copper exceedance.

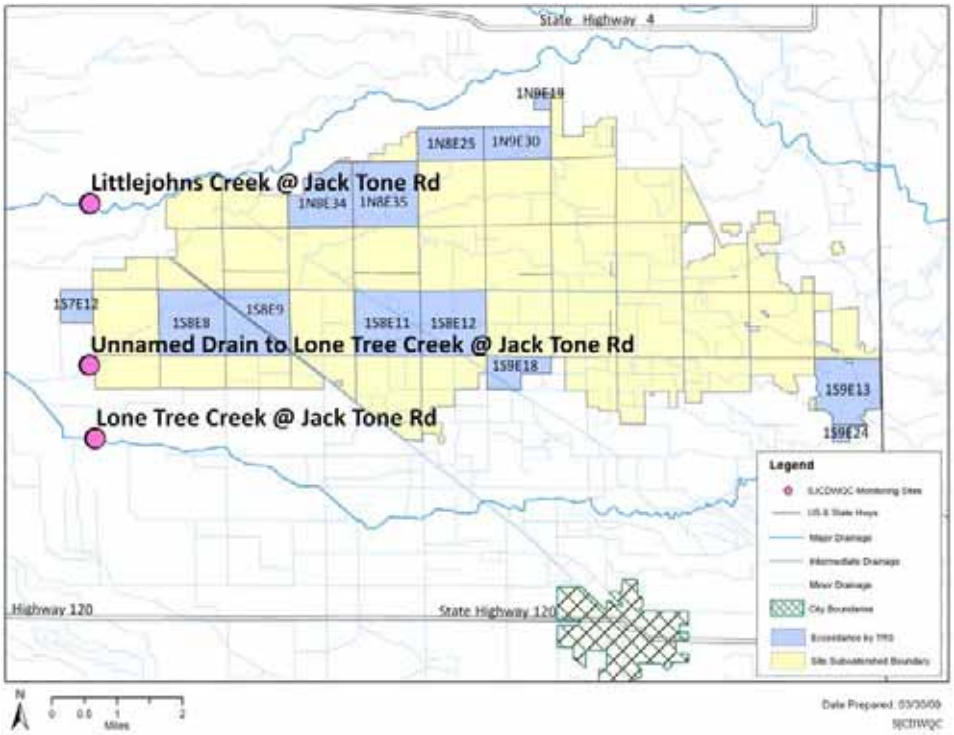
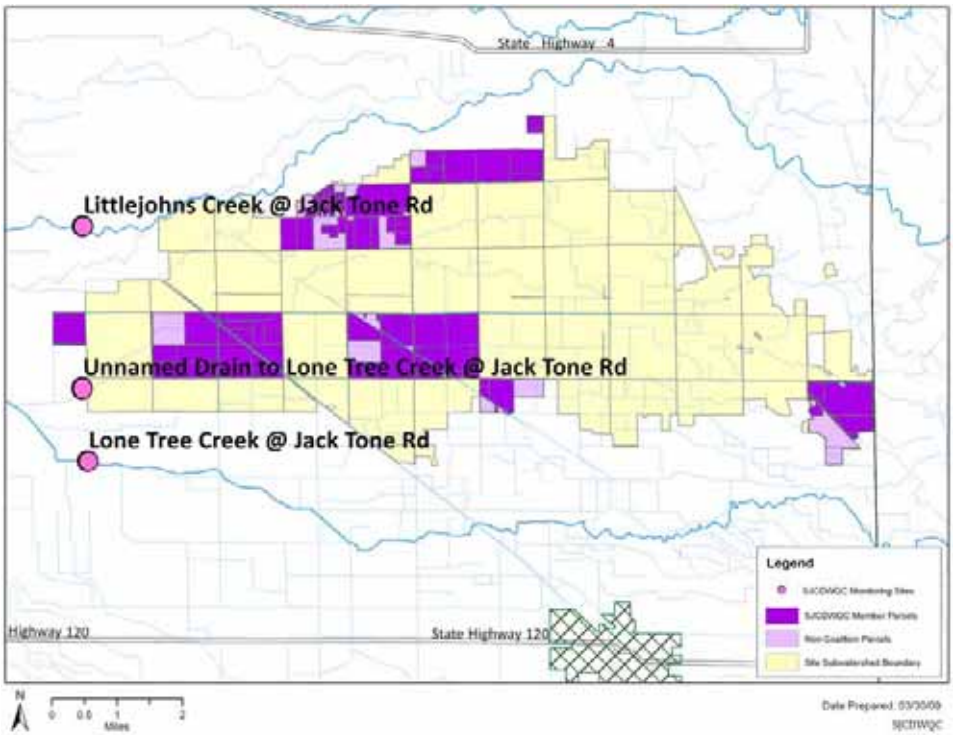


Figure III-12. Unnamed Drain to Lone Tree Creek member APNs relative to TRS with applications co-occurring with copper exceedances.



The analyses conducted by the Coalition suggest that management of copper in this watershed should focus on providing information on a watershed wide basis and focus on those growers making applications late in the summer that appear to be associated with exceedances. It is unknown how many of the orchards are on drip or microspray but these irrigation practices could lower runoff and reduce the amount of copper reaching the creek.

Diuron

There was a single exceedance of diuron in January 2008. There were relatively fewer applications and fewer acres treated in 2008 relative to 2006 and 2007 (Table III-17, Figure III-13). Only three applications occurred in two sections (Tables III-18, III-19) suggesting the exceedances were a function of movement off one or two parcels (Figures III-14, III-15). A linear regression analysis was attempted but only three data points were available to perform the analysis. As a result, no conclusions could be made from the analysis.

Table III-17. Number of diuron applications, total pounds applied, and total acres treated by month for January 2006 through December 2008 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month	Number of Diuron Applications	Pounds Applied	Acres Treated
January, 2006	5	124.6	140
February, 2006	20	841.1	1197.43
March, 2006	1	66.5	80
April, 2006	1	15.0	9.4
May, 2006	2	24.8	46
July, 2006	1	8.9	20
August, 2006	1	29.2	15
October, 2006	6	126.8	171.3
November, 2006	8	503.6	212.9
December, 2006	11	665.8	462
January, 2007	1	13.1	33
February, 2007	10	701.9	1380
March, 2007	2	32.7	20
April, 2007	2	48.4	77
May, 2007	1	3.4	5
November, 2007	6	207.3	141.2
December, 2007	4	336.3	224
January, 2008	1	7.8	10
February, 2008	1	7.8	23
March, 2008	4	53.2	134.5
April, 2008	1	12.5	6.4
July, 2008	1	12.0	7.5
November, 2008	5	174.0	135.4
December, 2008	3	305.1	208
2006 Total	56	2406.3	2354.03
2007 Total	26	1343.0	1880.2
2008 Total	16	572.4	524.8
Total	**98**	**4321.7**	**4759.03**

Figure III-13. Pounds of diuron applied within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2006 through 2008.

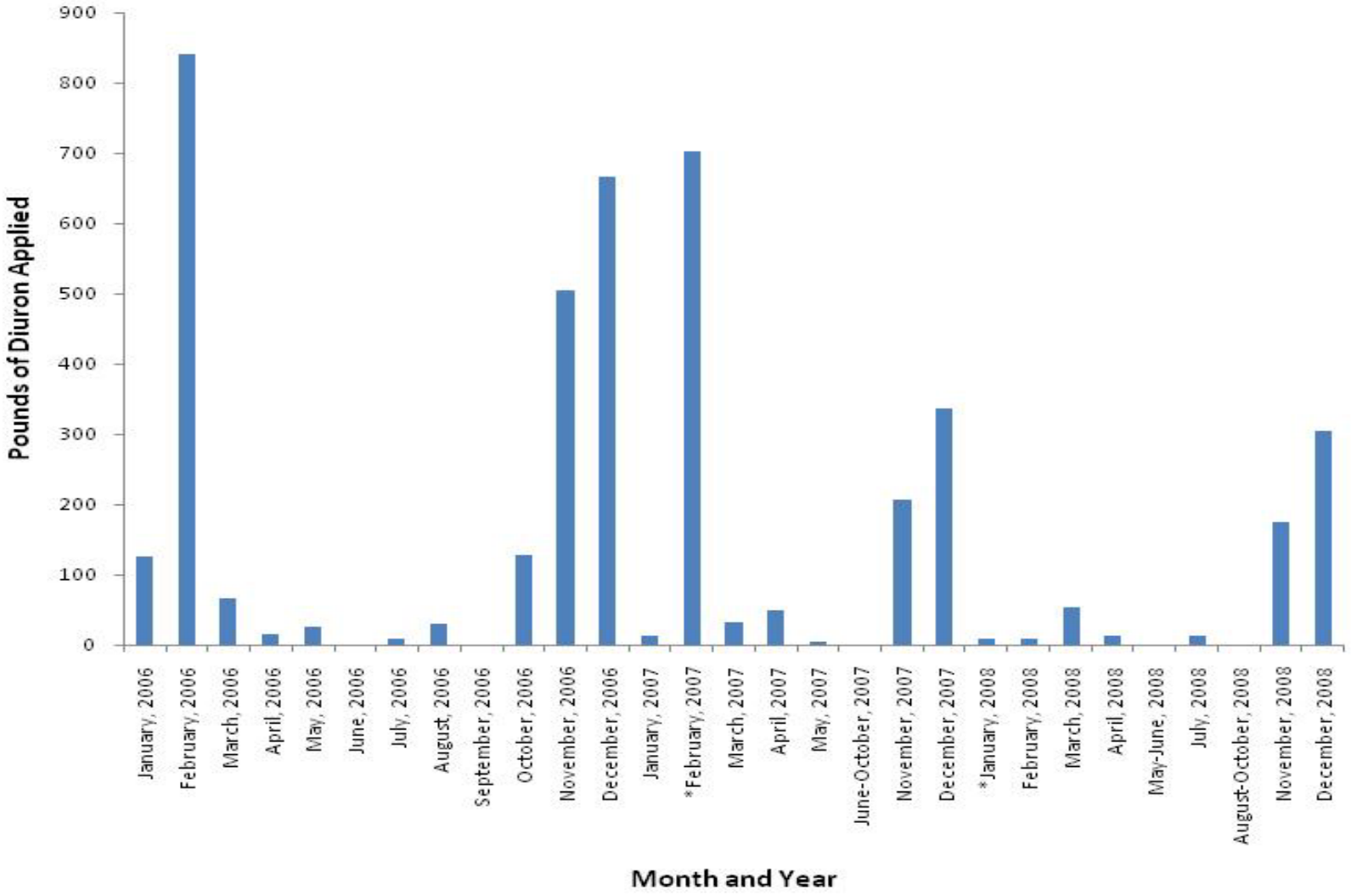


Table III-18. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. All TRS that had more than one application associated with an exceedance for diuron in 2007 and 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Diuron Applications per Date of Exceedance		
	2/11/2007	2/28/2007	1/23/2008
1N8E32	2	2	
1N9E19	1		1
1N9E31			2
1S8E4	2	2	
1S8E5	2	2	
1S8E8	2	2	
1S8E9	2	2	

*Bolded TRS are members of the Coalition

Table III-19. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. TRS with diuron applications one month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant diuron applications.

TRS*	Exceedance date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
1N9E19	12/26/2007	91.13	62
1N9E31	12/27/2007	104.04	71
	12/27/2007	109.90	75

*Bolded TRS are members of the Coalition.

Figure III-14. TRS that have had applications co-occurring with a diuron exceedance.

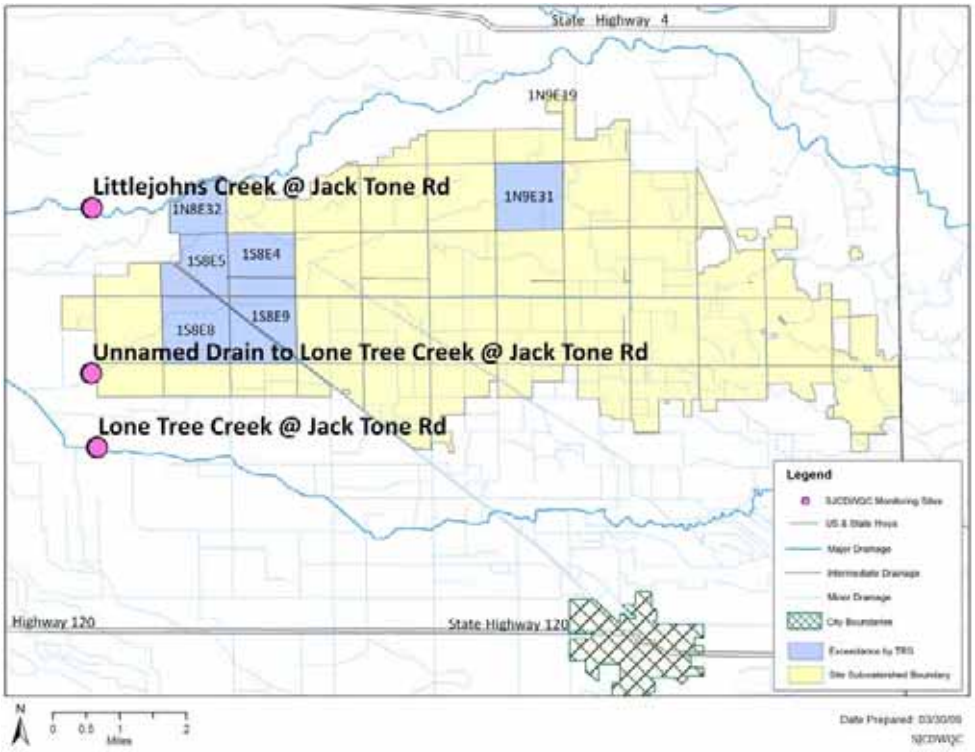
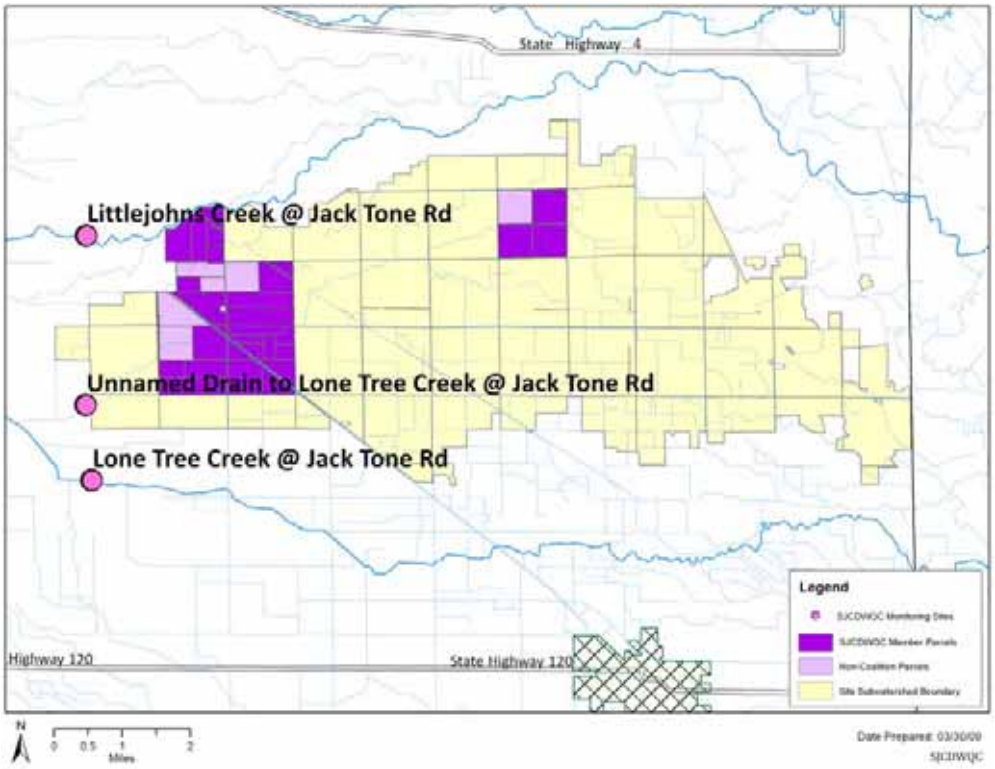


Figure III-15. Member APNs relative to TRS with applications co-occurring with diuron exceedances.



The analyses conducted by the Coalition suggest that management of diuron in this watershed should focus on providing information to the small number of growers whose applications in December 2007 and January 2008 were associated with the exceedances.

Simazine

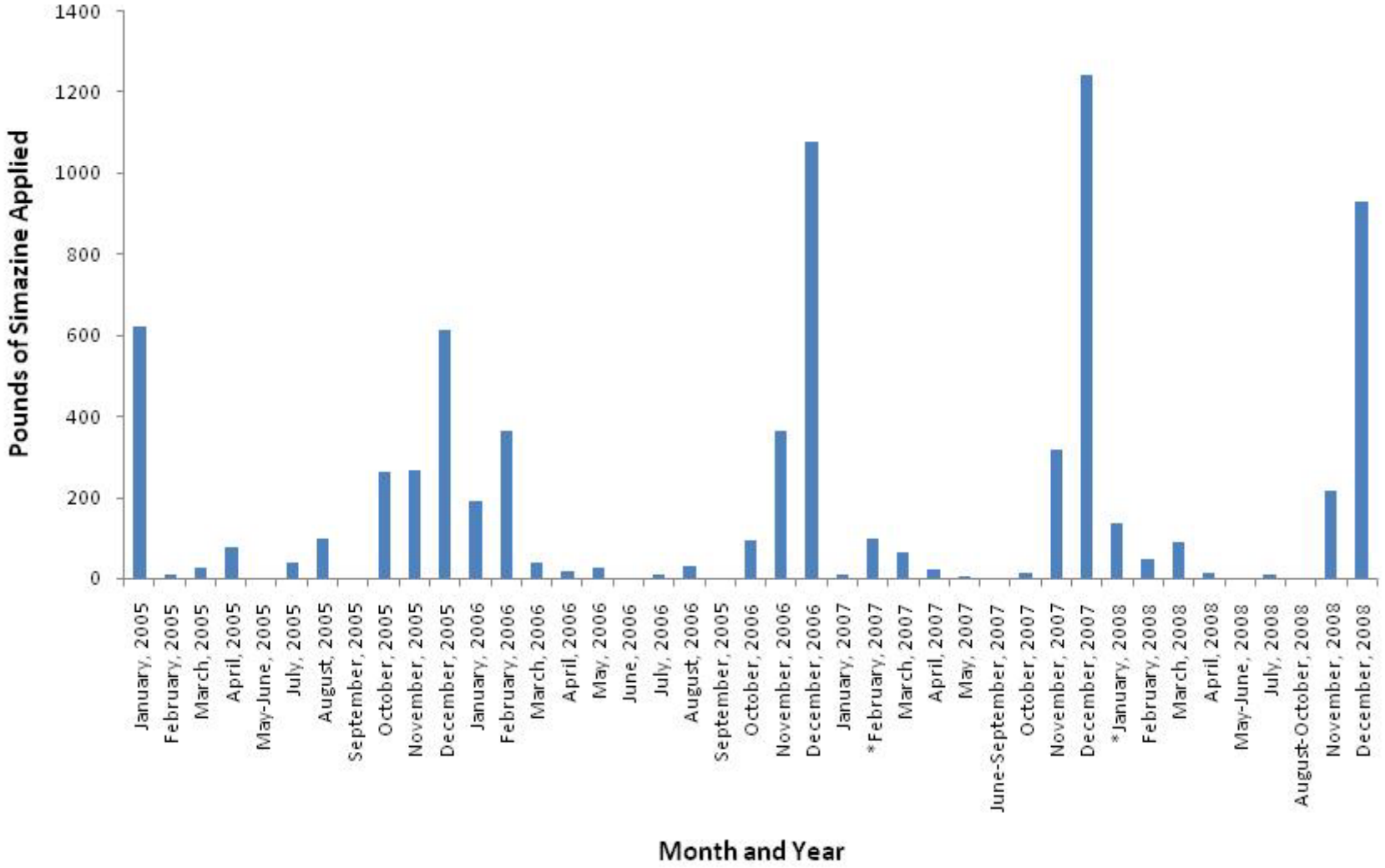
Simazine has only exceeded the WQTL (4.0 µg/L) twice, once on February 11, 2007 and again on January 23, 2008. As a result, simazine is a new priority constituent. Simazine has been applied in this watershed in every month except June and September, but is primarily applied in the winter months (Table III-20, Figure III-16). The greatest number of pounds AI applied is in December and the second greatest month of application is November (Figure III-16). The pounds of simazine applied have decreased slightly, by about 20%, from 2008 compared to 2007, however the acres treated has decreased by approximately 30% between the two years.

Table III-20. Number of simazine applications, total pounds applied, and total acres treated by month for January 2005 through December 2008 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month	Number of Simazine Applications	Pounds Applied	Acres Treated
January, 2005	7	622.2	1166
February, 2005	1	7.0	7
March, 2005	1	26.7	40
April, 2005	5	75.0	98.5
July, 2005	2	35.7	27
August, 2005	1	96.3	57.3
October, 2005	6	259.8	202
November, 2005	5	267.3	108
December, 2005	2	614.3	867
January, 2006	7	188.2	234
February, 2006	7	365.2	259.83
March, 2006	3	38.3	127
April, 2006	1	16.9	9.4
May, 2006	2	25.5	46
July, 2006	1	9.0	20
August, 2006	1	27.0	15
October, 2006	4	91.1	86.3
November, 2006	8	363.9	237.9
December, 2006	4	1076.4	976
January, 2007	1	8.0	80
February, 2007	3	96.0	176
March, 2007	3	61.3	40
April, 2007	2	19.8	27
May, 2007	1	3.5	5
October, 2007	1	11.0	28
November, 2007	7	316.7	153.2
December, 2007	6	1243.5	1044.3
January, 2008	5	136.7	183
February, 2008	3	47.8	85

Month	Number of Simazine Applications	Pounds Applied	Acres Treated
March, 2008	5	87.6	235.5
April, 2008	1	12.8	6.4
July, 2008	1	7.1	7.5
November, 2008	4	215.0	107.4
December, 2008	6	930.7	325.4
2005 Total	30	2004.2	2572.8
2006 Total	38	2201.5	2011.43
2007 Total	24	1759.8	1553.5
2008 Total	25	1437.7	950.2
Total	**117**	**7403.2**	**7087.93**

Figure III-16. Pounds of simazine applied within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2005 through 2008.



To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Table III-21, III-22, III-23 and Figures III-17, III-18). There were five sections associated with exceedances; each section had either one or two applications in the month prior to sampling. Each section was associated with only one of the two exceedances.

Table III-21. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. All TRS that had more than one application associated with an exceedance for simazine in 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS.

TRS*	Date of associated exceedance	
	2/11/2007	1/23/2008
1N8E25	2	
1N8E26		1
1N8E33	1	
1N9E32		1
1S9E1	1	

*Bolded TRS are members of the Coalition

Table III-22. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd TRS with simazine applications one month prior to each exceedance date in 2007. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant simazine applications

TRS*	Exceedance Date		
	2/11/2007		
	Application Date	Pounds Applied	Acres Treated
1N8E25	2/3/2007	55.10	101
	2/4/2007	21.82	40
1N8E33	1/18/2007	8.01	80
1S9E1	2/3/2007	19.10	35

*Bolded TRS are members of the Coalition

Table III-23. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd TRS with simazine applications one month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant simazine applications.

TRS*	Exceedance Date		
	1/23/2008		
	Application Date	Pounds Applied	Acres Treated
1N8E26	1/18/2008	22.05	20
1N9E32	12/29/2007	486.00	439

*Bolded TRS are members of the Coalition

Figure III-17.TRS that have had applications co-occurring with a simazine exceedance.

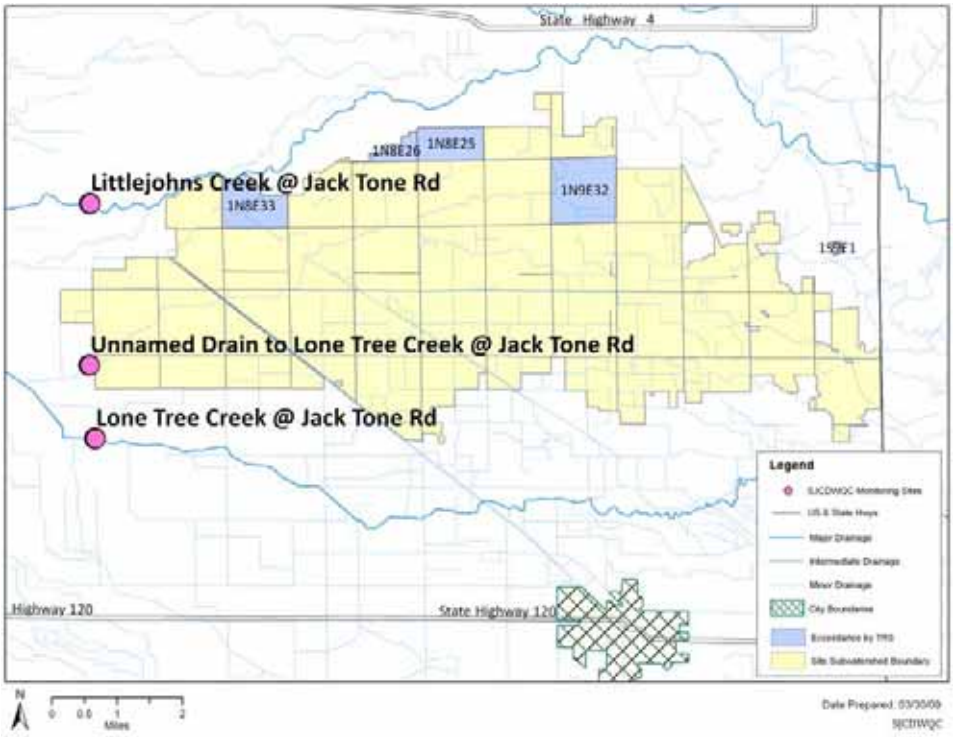
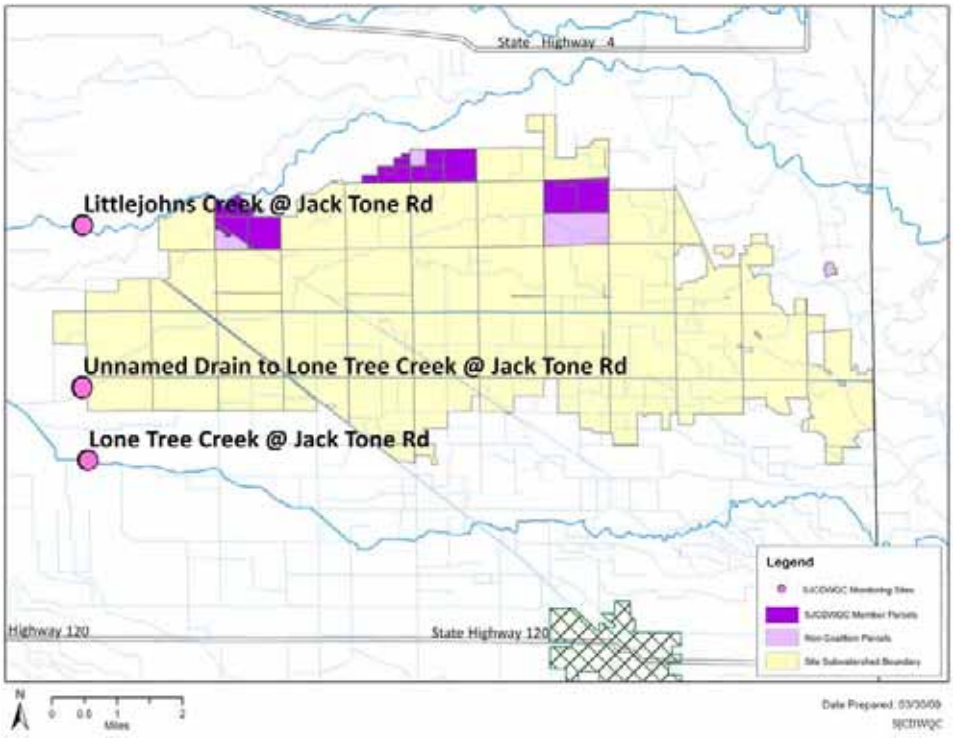


Figure III-18. Member APNs relative to TRS with applications co-occurring with simazine exceedances.



The analyses conducted by the Coalition suggest that management of simazine in this watershed should focus on providing information to the small number of growers whose applications in February 2007 and January 2008 were associated with the exceedances.

Ceriodaphnia toxicity

Prior to 2008 monitoring, there was only one occurrence of toxicity to *Ceriodaphnia* during February 2007. In 2008, toxicity was experienced once in January and twice in September. As a result, *Ceriodaphnia* is a new priority C constituent. All toxicity coincided with exceedances of the chlorpyrifos WQTL in the same month.

Priority D Constituents

Selenastrum toxicity

Selenastrum toxicity occurred once during the 2008 monitoring season; May. The toxicity was associated with an exceedance of copper. The Coalition believes that management of copper and herbicides such as diuron and simazine will eliminate the toxicity to algae.

Hyalella toxicity

There was only one occurrence of toxicity to *Hyalella* prior to the 2008 sampling season in August of 2007. Toxicity was experienced in March, April, and August during 2008 sampling.

Priority E Constituents

Lead and pH are new Priority E constituents as a result of 2008 monitoring. The following priority E constituents have been listed under the Unnamed Drain to Lone Tree Creek Management Plan: dissolved oxygen, *E. coli*, specific conductance, and dissolved solids. The Coalition continued to have exceedances of DO and *E. coli*. The Coalition will not actively manage these constituents until the Coalition and Regional Board determine that they are higher priority.

2009 Management Plan Monitoring

The Unnamed Drain to Lone Tree Creek site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. This subwatershed will not be rotated into the SJCDWQC monitoring program until 2017. Therefore the Coalition will conduct Management Plan Monitoring during the 2009 irrigation season for the following constituents: copper (total and dissolved) (April, May, July, August, September), chlorpyrifos (May, June July, September), *Selenastrum* toxicity (May) and *Ceriodaphnia* toxicity (September). In addition, samples will be collected for analysis of chlorpyrifos, diuron, simazine, *Ceriodaphnia* and *Selenastrum* toxicity during the first and/or second storm event of the 2009/2010 winter.

Outreach

Coalition outreach includes grower meetings and mailing/distribution of information. The Coalition conducts three types of meetings: general grower meetings on a county level, grower group meetings (groups may be specified by crop, chemical use or seasonal practices) and individual contacts.

Growers were notified of exceedances and meetings in January, February, July, and October 2008, and February 2009. In October 2008, a publication of Best Management Practices information, developed by the Center for Urban/Rural Environmental Stewardship (CURES), was sent all members with 15 or more acres enrolled in the program. The handbooks were originally designed for the Westside Coalition and contain information on farming practices such as sediment basins, polyacrylamide (PAM), enzyme treatments, tail water return systems, vegetative ditches, irrigation scheduling and others (Appendix I). These documents are summaries of technical reports developed by the California Water Institute, Ducks Unlimited, California Department of Pesticide Regulation and others. Growers from the subwatershed attended meetings held in January, February, March, April, May, July, October, November, and December 2008. The meetings variously addressed all exceedances or focused on chlorpyrifos and copper management practices.

Evaluation

This subwatershed is one of the three priority subwatersheds within the SJCDWQC and therefore the Coalition is focusing its resources on identifying the sources of agricultural discharge within this subwatershed that could lead to water quality impairments, extending outreach to individual Coalition members and setting evaluation goals. Members will be contacted individually based on their proximity to the waterway, number of applications co-occurring with WQTL exceedances and amount of acres farmed.

The Coalition's strategy for the Unnamed Drain subwatershed was to first conduct a grower group meeting this summer (June 15 and 16, 2008) and speak with individual growers who attended the meeting about current irrigation and dormant spray practices. The Coalition developed a checklist that growers can complete during the meetings. The goal is to have a documentation tool to allow the Coalition to keep track of specific management practices as they pertain to water quality impairments within the subwatershed.