San Joaquin County and Delta Water Quality Coalition

Lead Agency:
San Joaquin County Resource Conservation District

April 1, 2009

Chris Jimmerson
Karen Larsen
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Dear Chris,

The San Joaquin County and Delta Water Quality Coalition is submitting an update to the Management Plan which was originally submitted on September 30, 2008. The Management Plan update is being submitted to inform the Regional Board of progress made on the management of exceedances within the Coalition region. Included in the document are updates of exceedances of water quality trigger limits, a compilation of past outreach activities, and the plan for the next year's monitoring and outreach.

Submitted respectfully,

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Management Plan Update

San Joaquin County & Delta Water Quality Coalition

Submitted on April 1, 2009

Irrigated Lands Regulatory Program
Central Valley Regional Water Quality Control Board

09

Table of Contents

Introduction **1**

Watershed Setting **2**

History of Coalition Monitoring **4**

Overview of 2008 Monitoring 6

Beneficial Uses *6*

Water Quality Trigger Limits *8*

2004 - 2008 Exceedances *15*

2008 New Site/Constituents Requiring Management Plans *18*

Management Plan Process **20**

Prioritization of Exceedances **22**

Priority-specific Management Goals and Plans **24**

Management Plan Schedules **25**

Management Plan Development Timelines 25

Management Plan Performance Goals and Schedules 26

Management Plan Sampling Schedule *26*

Management Practice Identification, Evaluation, and Outreach *29*

Management Practice Performance Goals 35

SJCDWQC Management Practice Performance Goal *35*

Water Quality Management Practice Performance Goal #1 ..... *35*

Water Quality Management Practice Performance Goal #2 ..... *36*

Water Quality Management Practice Performance Goal #3: *37*

Water Quality Management Practice Performance Goal #4: *38*

Water Quality Management Practice Performance Goal #5: *38*

Water Quality Management Practice Performance Goal #6: *39*

Water Quality Management Practice Performance Goal #7 ..... *40*

Summary of Coalition Outreach Activities **41**

High priority Site Subwatersheds **47**

I. Duck Creek **47**

Management Plan Constituents 47

Priority A *47*

Priority D *47*

Priority E *47*

Description of Duck Creek Site Subwatershed 47

Subwatershed Monitoring History 49

Exceedance History 54
2007 and 2008 Management Plan Monitoring Results 55
Load Calculations 55
Source Identification 56
Priority A Constituents *56*
Priority E Constituents *68*
2009 Management Plan Monitoring 68
Outreach 69
Evaluation 69
II. Lone Tree Creek @ Jack Tone Rd 70
Management Plan Constituents 70
Priority A *70*
Priority C *70*
Priority D *70*
Priority E *70*
Description of Lone Tree Creek Site Subwatershed 70
Subwatershed Monitoring History 73
Exceedance History 82
2007 and 2008 Management Plan Monitoring Results 86
Load Calculations 86
Source Identification 88
Priority A Constituents *88*
Diazinon *97*
Priority C Constituents *102*
Priority D Constituents *119*
Priority E Constituents *120*
2009 Management Plan Monitoring 120
Outreach 120
Evaluation 121
III. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd 122
Management Plan Constituents 122
Priority A *122*
Priority C *122*
Priority D *122*
Priority E *122*
Description of Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed 122

Subwatershed Monitoring History 124
Exceedance History 129
2007 and 2008 Management Plan Monitoring Results 132
Load Calculations 132
Source Identification 134
Priority A Constituents *134*
Priority C constituents *144*
Priority D Constituents *162*
Priority E Constituents *162*
2009 Management Plan Monitoring 162
Outreach 163
Evaluation 163

List of Tables

Table 1. Sample sites and years monitored. 5
Table 2. Management plan sample sites that drain directly into the major rivers of the SJCDWQC region and the beneficial use for each of the major river reaches. 7
Table 3. Water Quality Trigger Limits (WQTLs) for constituents and parameters measured during Coalition monitoring (updated on September 16, 2008). 9
Table 4. SJCDWQC exceedance tally based on results through December 2008. 16
Table 5. SJCDWQC exceedance tally based 2008 storm, irrigation, and fall sampling events. 17
Table 6. Proposed schedule for addressing each site subwatershed with a detailed, focused management plan approach. 25
Table 7. Management Plan sampling results (2008). A = additional sampling; U = upstream sampling. 27
Table 8. 2009 Management Plan sampling schedule (including storm sampling 2010). 28
Table 9. A list of site subwatershed tiers and corresponding level of actions for 2009. Some site subwatersheds are in both Tier 1 and Tier 2 for different constituents. 31
Table 10. Management Plan sourcing, outreach and evaluation schedule. 32
Table 11. Management Plan tracking schedule. 34
Table 12. Management Plan implementation schedule. 34
Table 13. SJCDWQC grower notification of exceedances and management practices relevant to the 2008 monitoring seasons. 41
Table 14. SJCDWQC management practice outreach and education to growers relevant to the 2008 monitoring seasons. 42
Table 15. SJCDWQC management practice tracking and implementation relevant to the 2008 monitoring seasons. 45
Table 16. Status of general surveys within the SJCDWQC region. 45
Table 17. SJCDWQC collaborations and special studies to address water quality issues during the 2008 monitoring seasons. 45
Table I-1. Duck Creek @ Highway 4 sampling events per season and year. An irrigation season sampling event encompasses normal monitoring and any associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall event encompasses normal monitoring 49
Table I-2. Duck Creek @ Highway 4. Number of analyses run per constituent in each sampling season (only environmental samples and field analyses listed). 50
Table I-3. Duck Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled. 52
Table I-4. Duck Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month, and analyte sampled. 52
Table I-5. Coordinates of the Duck Creek site subwatershed sampling locations. 52
Table I-6. All exceedances experienced in samples collected from locations within the Duck Creek site subwatershed between August 2004 and December 2008 (sorted by season and date). 54
Table I-7. Duck 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 from the 2007-2008 irrigation seasons. Exceedance values are in bold. 55
Table I-8. Chlorpyrifos loads calculated from concentration and discharge measured on each detection and exceedance date for the Duck Creek @ Hwy 4 and Duck Creek @ Drais Rd monitoring sites. 56
Table I-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2006 - 2008 in the Duck Creek @ Hwy 4 site subwatershed. 57
Table I-10. Average pound active ingredient (AI) per acre for chlorpyrifos based on PUR data from 2004-2008 within the Duck Creek @ Hwy 4 subwatershed. 59

Table I-11. Duck Creek @ Hwy 4 site subwatershed. All TRS that had more than one application associated with an exceedance for chlorpyrifos 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. 62
Table I-12. Duck Creek @ Drais Rd site subwatershed. All TRS that had more than one application associated with an exceedance for chlorpyrifos in 2008. Table shows which exceedance the application was associated with and number of applications associated with an exceedance for a given TRS. 63
Table I-13. Duck Creek @ Highway 4 site subwatershed. TRS with chlorpyrifos applications in month prior to each exceedance date for 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant chlorpyrifos applications. 64
Table I-14. Duck Creek @ Drais Road upstream site subwatershed. TRS with chlorpyrifos applications in month prior to each exceedance date for 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant chlorpyrifos applications. 65
Table II-1. 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 season event encompasses normal monitoring. 73
Table II-2. Lone Tree Creek @ Brennan Rd sampling events per season and year. An irrigation season encompasses normal monitoring and associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall season event encompasses normal monitoring. 74
Table II-3. Lone Tree Creek @ Jack Tone Rd. Number of analyses performed per constituent in each sampling season (only environmental samples listed). 75
Table II-4. Lone Tree Creek @ Brennan Rd. Number of analyses performed per constituent in each sampling season (only environmental samples listed). 78
Table II-5. Lone Tree Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled. 78
Table II-6. Lone Tree Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month and analyte sampled. 79
Table II-7. Coordinates of the Lone Tree Creek site subwatershed sampling locations. 79
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). 83
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). 85
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. 86
Table II-11. Lone Tree Creek site subwatershed. Instantaneous load calculations for chlorpyrifos, copper, diazinon, and diuron (sorted by site, analyte and date). 87
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. 89
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. 91
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. 94

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. 95
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. 97
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. 99
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. 99
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. 100
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. 100
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. 102
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. 105
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. 106
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. 106
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. 108
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. 112
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. 117
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. 117
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. 124
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). 125

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. 127
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. 127
Table III-5. Coordinates of the Unnamed Drain to Lone Tree Creek site subwwatershed sampling locations. 127
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). 130
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). 131
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. 132
Table III-9. Unnamed Drain to Lone Tree Creek site subwatershed. Instantaneous load calculations for chlorpyrifos and diuron (sorted by site, analyte, and date). 133
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. 135
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. 137
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. 140
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. 142
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. 144
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. 149
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. 150
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. 153
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. 155
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. 155
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. 157

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. 160
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 160
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. 160

List of Figures

Figure 1. Agriculture lands in the SJCDWQC area. 3
Figure 2. Coalition Management Plan process and associated actions. 21
Figure 3. SJCDWQC prioritization process and associated actions. 23
Figure I-1. Site subwatershed map of land use for sample site at Duck Creek @ Hwy 4. 48
Figure I-2. Site subwatershed map of land use for upstream Management Plan Monitoring site Duck Creek @ Drais Rd. 53
Figure I-3. Pounds of chlorpyrifos added to TRS within the Duck Creek @ Hwy 4 site subwatershed by month for 2006 - 2008. Asterisk (*) denotes months in which chlorpyrifos exceedances were detected at the site. 58
Figure I-4. Chlorpyrifos exceedance concentrations and loads compared to application rates (average lbs per acre) for the Duck Creek @ Hwy 4 site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph. 61
Figure I-5. Chlorpyrifos exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Duck Creek @ Hwy 4 site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph. 61
Figure I-6. Duck Creek @ Hwy 4 TRS' that have had applications co-occurring with an exceedance. 66
Figure I-7. Duck Creek @ Hwy 4 APN numbers within sections that have had applications co-occurring with an exceedance. 66
Figure I-8. Duck Creek @ Drais (US). TRS' that have had applications co-occurring with an exceedance. 67
Figure I-9. Duck Creek @ Drais (US). APN numbers within sections that have had applications co-occurring with an exceedance. 67
Figure II-1. Site subwatershed map of land use for the Lone Tree Creek @ Jack Tone Rd sample site. 72
Figure II-2. Site subwatershed map of land use for upstream Management Plan Monitoring site at Lone Tree Creek @ Brennan Rd. 80
Figure II-3. Site subwatershed map of land use for upstream Management Plan Monitoring site at Lone Tree Creek @ Valley Home Rd. 81
Figure II-4. Pounds of chlorpyrifos applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008. 90
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. 93
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. 93
Figure II-7. Lone Tree Creek @ Jack Tone Rd TRS' that have had applications co-occurring with a chlorpyrifos exceedance. 96
Figure II-8. Lone Tree Creek @ Jack Tone Rd member APNs relative to TRS with applications co-occurring with chlorpyrifos exceedances. 96
Figure II-9. Pounds of diazinon applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008. 98
Figure II-10. Lone Tree Creek @ Jack Tone Rd TRS' that have had applications co-occurring with a diazinon exceedance. 101

Figure II-11. Lone Tree Creek @ Jack Tone Rd member APNs relative to TRS with applications co-occurring with diazinon exceedances. 101
Figure II-12. Pounds of copper applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008. 104
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. 109
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. 109
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. 111
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. 111
Figure II-17. Pounds of diuron applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2008. 114
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. 116
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. 116
Figure II-20. Lone Tree Creek TRS' that have had applications co-occurring with a diuron exceedance. 118
Figure II-21 . Lone Tree Creek member APNs relative to TRS with applications co-occurring with diuron exceedances. 118
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. 123
Figure III-2. Unnamed Drain to Lone Tree Creek @ Wagner Rodd site subwatershed map of land use for the upstream Management Plan Monitoring site. 128
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. 136
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. 139
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. 139
Figure III-6. Unnamed Drain to Lone Tree Creek TRS' that have had applications co-occurring with a chlorpyrifos exceedance. 143
Figure III-7. Unnamed Drain to Lone Tree Creek member APNs relative to TRS with applications co-occurring with chlorpyrifos exceedances. 143
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. 146

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. *148*
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. *148*
Figure III-11. Unnamed Drain to Lone Tree Creek TRS' that have had applications co-occurring with a copper exceedance. *152*
Figure III-12. Unnamed Drain to Lone Tree Creek member APNs relative to TRS with applications co-occurring with copper exceedances. *152*
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. ..... *154*
Figure III-14. TRS that have had applications co-occurring with a diuron exceedance. *156*
Figure III-15. Member APNs relative to TRS with applications co-occurring with diuron exceedances. *156*
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. ..... *159*
Figure III-17.TRS that have had applications co-occurring with a simazine exceedance. *161*
Figure III-18. Member APNs relative to TRS with applications co-occurring with simazine exceedances. *161*

List of Acronyms

AI	Active Ingredient
AMR	Annual Monitoring Report
APN	Assessor Parcel Number
BMP	Best Management Practice
BU	Beneficial Use
CURES	Coalition for Urban and Rural Environmental Stewardship
CVRWQCB	Central Valley Regional Water Quality Control Board
CTR	California Toxics Rule
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DHS	(California) Department of Health Services
DO	Dissolved Oxygen
DPR	California (Department of Pesticide Regulation)
DWR	(California) Department of Water Resources
EC	Specific Conductance
EPA	Environmental Protection Agency
ILRP	Irrigated Land and Regulatory Program
IRIS	Integrated Risk Information System
K_{oc}	Organic Carbon Partitioning Coefficient
MCL	Maximum Contaminant Level
MLJ-LLC	Michael L. Johnson, LLC
MP	Management Plan (monitoring)
MRP	Monitoring and Reporting Program Order No. R5-2005-00833
MRPP	Monitoring and Reporting Program Plan
MUN	Municipal and Domestic Supply (beneficial use)
NA	Not Applicable
ND	Not Detected
NM	Normal Monitoring
NSG	Not significantly different from the control but greater than 80% of the control
NTR	National Toxics Rule
OP	Organophosphate
PAM	Polyacrylamide
PCA	Pesticide Control Advisor
pH	Power of Hydrogen
PUR	Pesticide Use Report
RB	Regional Board
RfD	Reference Dose
SAMR	Semi-Annual Monitoring Report

SC	Specific Conductance
SG	Statistically significantly different from control; Greater than 80% threshold
SJCDWQC	San Joaquin County & Delta Water Quality Coalition
SL	Statistically significantly different from control; Less than 80% threshold
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TRS	Township, Range, Section
UC	University of California
USEPA	United States Environmental Protection Agency
WQO	Water Quality Objective
WQTL	Water Quality Trigger Limit

List of Units

cfs	cubic feet per second
cm	centimeter
L	Liter
lbs	pounds
mg	milligram
MPN/100mL	most probable number per 100 milliliters
sec	second
µg	microgram

INTRODUCTION

As required by the California Regional Water Quality Control Board Central Valley Region Monitoring and Reporting Program Order No. R5-2008-0005 for Coalition Groups under Amended Order No. R5-2006-0053 Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharge from Irrigated Lands (Conditional Waiver), the San Joaquin County and Delta Water Quality Coalition (SJCDWQC or Coalition) submitted a management plan on September 30, 2008 to outline methods to identify agriculture sources, track implemented management practices, and performance goals. The Management Plan was developed to work with the Coalition's Monitoring and Reporting Program Plan (MRPP) and identify when constituent-specific monitoring would occur to identify sources and evaluate effectiveness of management practices. A Management Plan update is scheduled every April 1 to report on the previous years activities and update management plan implementation schedules and timelines for reporting to the Central Valley Regional Water Quality Control Board (CVRWQCB or Regional Board) on the effectiveness of the management plan for the upcoming year. Yearly updates allow the Coalition to assess the need to conduct outreach to growers, evaluate information about pesticide use, and obtain water quality data for both irrigation and dormant seasons.

The SJCDWQC Management Plan is divided into two parts: a Management Plan introduction followed by individual Site Subwatershed Management Plans. The Management Plan introduction provides an overview of the Coalition's Management Plan strategy including:

- a brief background of watershed information,
- Coalition monitoring history,
- the Management Plan process of prioritization,
- overview of general constituent sources and characteristics and
- overall goals, performance measures and schedules.

The individual Site Subwatershed Management Plans address specific water quality issues for each site subwatershed including all exceedances of water quality trigger limits, analysis of sourcing techniques, recommendations of management practices that can be used to improve water quality and specific schedules for outreach and evaluation of management practice effectiveness. The Management Plan update includes an updated Management Plan introduction and updated priority Site Subwatershed Management Plans.

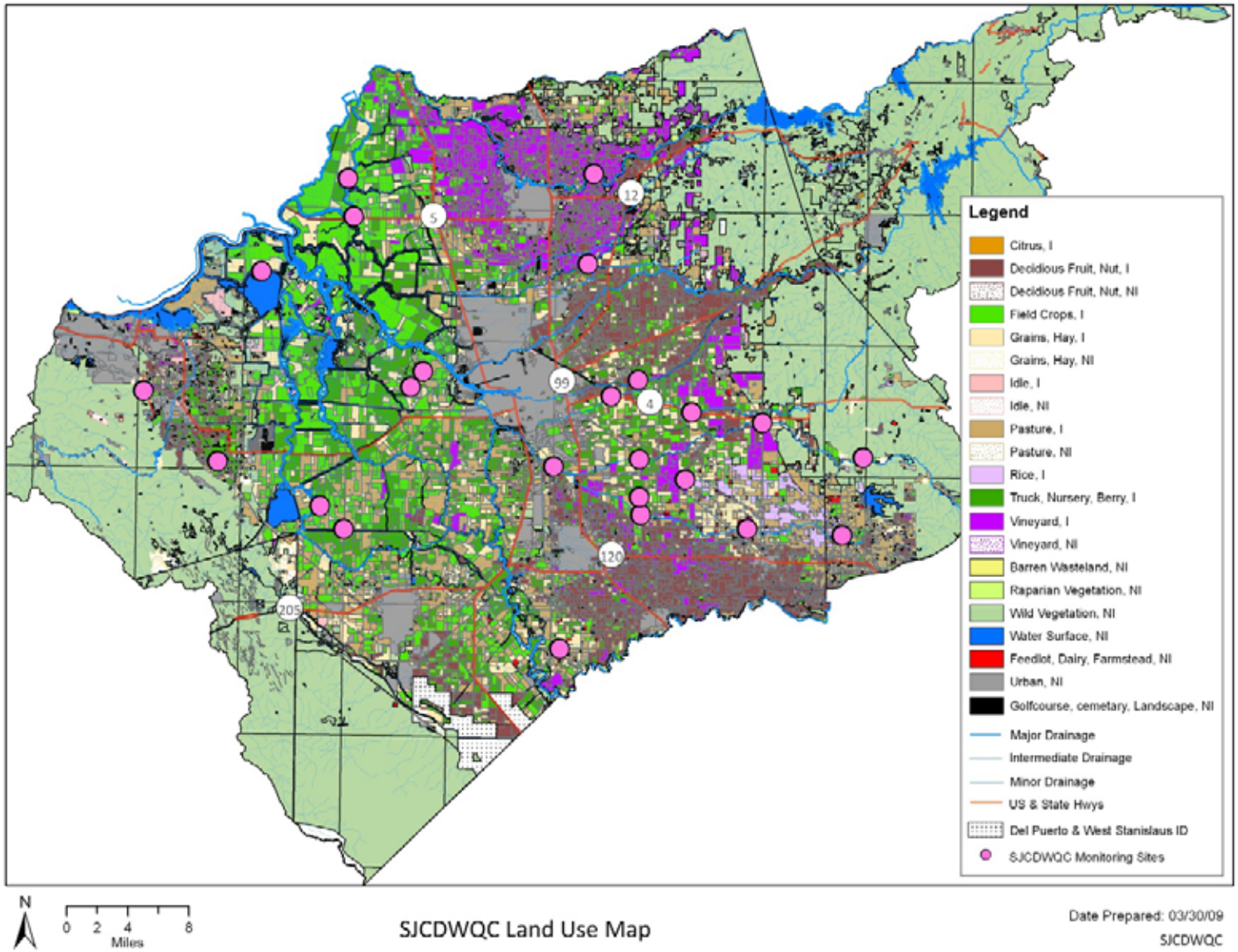
WATERSHED SETTING

The SJCDWQC area includes parts of San Joaquin, Contra Costa, Alameda, and Calaveras counties and comprises approximately 1,057,350 acres of which 52% are considered irrigated agriculture (DWR, 2001). The northern border of the Coalition area corresponds to the county line between San Joaquin and Sacramento Counties. The eastern portion of the Coalition area was expanded in April of 2004 and now includes portions of Calaveras County that are in the upper Calaveras River, Bear Creek, and Mokelumne River subwatersheds. These subwatersheds extend from San Joaquin County into Calaveras County. Agricultural land use in this part of the Coalition area is primarily orchards and vineyards and includes a very small amount of irrigated agriculture. The southern border of the Coalition area is the Stanislaus River with the exception of the Del Puerto and West Stanislaus Irrigation Districts at the southern edge of the Coalition area, which are not covered by the Coalition. As such, the Coalition boundary at the southwest corner of San Joaquin County is approximately that of the Delta Mendota Canal and California Aqueduct. The western boundary of the Coalition area has also been expanded and now lies along the western CVRWQCB Region 5 boundary in Contra Costa County and Alameda County. There are several small subwatersheds in this portion of the Coalition region including the Kellogg Creek, Marsh Creek, Sand Creek, and Brushy Creek subwatersheds that drain the northern section of Mount Diablo. These water bodies flow east through urban areas on the western edge of the central Delta. Growers from these areas joined the Coalition at its inception and the expansion of the Coalition boundary is a formal recognition of their membership in the Coalition.

The impact of urban areas on water quality may be equal to the effects from agricultural land use, especially due to the rapid and ongoing growth of urban centers. The rapid growth of cities such as Lodi, Stockton, Lathrop, and Manteca on the east side of the Delta and Antioch, Sand Hill, Knightsen, and Brentwood on the west side of the Delta are consuming large amounts of irrigated agricultural land. Land designated as agricultural only a few years ago, is now covered by housing developments and shopping malls. Due to economic conditions, urban growth has slowed but eventually will increase again.

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 548,362 acres that are considered irrigated agriculture (based on 2001 DWR data at http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm). A variety of crops are grown within the Coalition boundaries and different crops are often found in regions specific to microclimate, soil type, and local farming history (Figures 1 and 2). A more detailed discussion of crop type is provided in the SJCDWQC MRPP submitted for review on July 25, 2008.

Figure 1. Agriculture lands in the SJCDWQC area.



Within the Coalition area, the lower reaches of the San Joaquin River drain the eastern and western parts of the California Central Valley (Valley). Drainage water is either exported to the San Francisco Bay through the Delta, or conveyed southward via the State Water Project and the Delta Mendota Canal. There are three major rivers in the Coalition area other than the San Joaquin River: Stanislaus River, Calaveras River, and Mokelumne River. These east side tributaries of the San Joaquin River drain a portion of the Sierra Nevada Mountain range from east to west. The watershed of the Coalition area is the crest of the Sierra Nevada, and the drainage area is bounded by the San Joaquin River on the west, the Stanislaus River on the south, and the Mokelumne River on the north. Intermediate sized water bodies in the Coalition area (Littlejohns Creek, Duck Creek, Lone Tree Creek, Bear Creek, French Camp Slough, Dry Creek, Marsh Creek, Mormon Slough, Mosher Creek, and Pixley Slough) are tributaries to either one of the major rivers or empty into the San Joaquin Delta. Smaller water bodies found in the Coalition area are primarily canals and ditches that convey water to one of the larger rivers or intermediate creeks/sloughs, or are used to drain Delta islands. Figure 1 is a map of the agricultural lands in the Coalition region. More discussion of hydrology specific to each of the water bodies monitored by the Coalition can be found in the MRPP.

HISTORY OF COALITION MONITORING

Coalition ambient water quality and sediment toxicity monitoring were initiated in 2004 in the SJCDWQC region following the inception of the Irrigated Lands Program in 2002. Each year both the number of sites monitored and the constituents analyzed increased in accordance with the most recent CVRWQCB adopted orders and resolutions for the Irrigated Lands Regulatory Program (ILRP). During the first season of monitoring in 2004, samples were collected from six sites and were sent to laboratories to test for nine constituents/analytes plus water column toxicity testing for three different species. By 2007, 15 monitoring sites were sampled and over 50 analytes tested in addition to toxicity analyses. Table 1 lists the sites monitored during each the storm and irrigation seasons across years of sampling. Specific subwatershed sampling information, including number of constituents and events when the site was dry, are included in the subwatershed management plan section of this document.

Table 1. Sample sites and years monitored.

A site marked as "Dry" was dry for all sampling events during that season. A blank box means this location was not sampled for during that year and season.

Station Name	Irrigation 2004	Storm 2004/2005	Irrigation 2005	Storm 2005/2006	Irrigation 2006	Storm 2006/2007	Irrigation 2007	Storm 2007/2008	Irrigation 2008	Fall 2008	Storm 2008/2009
Bear Creek @ North Alpine Road										x	x
Calaveras River @ Belotta Intake	x										
Delta Drain- Terminous Tract off Glasscock Rd		x	x	x							
Delta Drain- Terminous Tract off Guard Rd		x	x	x							
Drain @ Woodbridge Rd										x	x
Duck Creek @ Drais Rd[1]									x		
Duck Creek @ Hwy 4	x				x	x	x	x	x	x	x
French Camp Slough @ Airport Way		x	x	x	x	x	x	x	x	x	x
Grant Line Canal @ Clifton Court Rd		x	x	x	x	x	x	x	x		
Grant Line Canal near Calpack Rd		x	x	x	x	x	x	x	x		
Kellogg Creek @ Hwy 4		x	x	x							
Kellogg Creek along Hoffman Ln			x	x	x	x	x	x	x		
Littlejohns Creek @ Escalon-Bellota Rd[1]									x		
Littlejohns Creek @ Jack Tone Rd	x	x	x	x	x	x	x	x	x		
Lone Tree Creek @ Brennan Rd[1]			x	x					x		
Lone Tree Creek @ Jack Tone Rd	x	x	x	x	x	x	x	x	x		
Lone Tree Creek @ Valley Home Rd[1]									x		
Marsh Creek @ Balfour Ave		x	x	x							
Marsh Creek @ Concord Ave			x	x	x	x	Dry	x	x[2]		
Marsh Creek @ Marsh Creek Rd Upper[1]							x				
Marsh Creek @ Marsh Creek Rd Lower[1]							x				
Mokelumne River @ Bruella Rd	x	x	x	x	x	x	x	x	x	x	x
Mokelumne River @ Fish Hatchery[1]			x								
Mormon Slough @ Jack Tone Rd					x	x	x	x	x		
Potato Slough @ Hwy 12	x	x	x	x							
Roberts Island Drain @ Holt Rd					x	x	x	x	x	x	x
Roberts Island Drain along House Rd					x	x	x	x	x		
Sand Creek @ Hwy 4 Bypass					x	x	x	x	x		
South Webb Tract Drain								x	x[3]	x	x
Stanislaus River Drain @ South Airport Way										x	x
Terminous Tract Drain @ Hwy 12		x	x	x	x	x	x	x	x	x	x
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd					x	x	x	x	x		
Unnamed Drain to Lone Tree Creek @ Wagner Rd[1]									x		

[1]Upstream sampling of normal monitoring locations conducted for source identification.
[2]Monitored April-August, then replaced by South Webb Tract Drain
[3]Monitored September only; replaced Marsh Creek @ Concord Ave

Overview of 2008 Monitoring

This is the first yearly update to the Coalition's Management Plan. The 2008 year's monitoring data are reviewed and assessed for water quality improvements and exceedances. This update includes an assessment of water quality during the last 12 months including new exceedances and new site/constituents requiring management plans.

During 2008, storm, irrigation, and fall monitoring was conducted as outlined in the Coalition's MRPP submitted in August of 2008. In addition, Management Plan sampling continued during irrigation months. Management Plan sampling involved either an additional sampling event or upstream monitoring for constituents that exhibited more than one exceedance of a water quality trigger limit (WQTL). The Coalition's Semi Annual Monitoring Report (SAMR) submitted on March 1, 2009 lists the locations, dates and type of sampling that was conducted during the irrigation season including Management Plan sampling (MP), Normal monitoring (NM) and sediment. There were a total of 24 sites that were monitored during 2008; additional sampling took place 12 times at four sites and upstream sampling took place 22 times at six sites during irrigation season.

At this time, 17 water bodies in the Coalition region require a management plan: Bear Creek, Drain @ Woodbridge Ave, Duck Creek, French Camp Slough, Grant Line Canal @ Clifton Court Rd, Grant Line Canal near Calpack Rd, Kellogg creek, Littlejohns Creek, Lone Tree Creek, Mokelumne River, Mormon Slough, Roberts Island Drain @ Holt, Roberts Island Drain along House, Sand creek, South Webb Tract Drain, Terminous Tract Drain, Unnamed Drain to Lone Tree Creek.

Beneficial Uses

The Regional Board has assigned beneficial uses (BU) to many water bodies within the Coalition region, but many water bodies monitored by the Coalition do not have assigned BUs. Using the tributary rule, the Coalition applied BUs to upstream tributaries based on the assigned BU in downstream water bodies as listed in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basin (Basin Plan) (Table 2). Water Quality Trigger Limits (WQTLs) are based on the BUs applied to the specific water body. Consequently, identifying an appropriate group of BUs specifies the appropriate WQTLs which in turn determine the exceedances managed by the Coalition and outlined in this document.

Table 2. Management plan sample sites that drain directly into the major rivers of the SJCDWQC region and the beneficial use for each of the major river reaches.

Site subwatershed (site name)	Immediate Downstream River	Beneficial Use of Immediate Downstream River*
Bear Creek @ North Alpine Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
Drain @ Woodbridge Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
Duck Creek @ Highway 4	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
French Camp Slough @ Airport Way	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Grant Line Canal @ Clifton Court Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Grant Line Canal near Calpack Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Kellogg Creek along Hoffman Lane	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Littlejohns Creek @ Jack Tone Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Mokelumne River @ Bruella Rd	Mokelumne River[1]	2, 3, 7-14
Mormon Slough @ Jack Tone Road	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Roberts Island Drain @ Holt Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Roberts Island Drain along House Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Sand Creek @ Hwy 4 Bypass	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
South Webb Tract Drain		
Terminous Tract Drain @ Hwy 12	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta[2]	1-5, 7-12, 14, 15

[1] Comanche Reservoir to Delta reach
[2] "Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis" (wording from the Central Valley Region Basin Plan).
* See below Beneficial Use code list.

Beneficial Use List
Municipal and Domestic Supply - 1
Agriculture Supply (irrigation) - 2
Agriculture Supply (stock watering) - 3
Industrial Process Supply - 4
Industrial Service Supply - 5
Water Contact Recreation - 6
Non-contact Water Recreation - 7
Warm Freshwater Habitat - 8
Cold Freshwater Habitat - 9
Migration of Aquatic Organisms (warm) - 10
Migration of Aquatic Organisms (cold) - 11
Spawning, Reproduction, and/or Early Development (warm) - 12
Spawning, Reproduction, and/or Early Development (cold) - 13
Wildlife Habitat - 14
Navigation – 15

Water Quality Trigger Limits

Water quality trigger limits (WQTLs) have been established to preserve water quality within the Valley. The most recent WQTLs are listed in Table 3 (updated by the Regional Board on September 16, 2008). Objectives and limits listed in the WQTL table are based on the following beneficial uses: Agricultural Supply; Cold Freshwater Habitat; Municipal and Domestic Supply; Spawning, Reproduction, and/or Early Development of Freshwater Aquatic Life; Water Contact Recreation; and Wildlife Habitat. For sites and constituents that have exceeded a WQTL two or more times, a management plan is required to be implemented. A tally of WQTL exceedances is compiled in Table 4 for all years and all sampling locations. WQTLs have changed over years of monitoring and therefore the Coalition may have reported exceedances in the past that are no longer considered exceedances of current WQTL and there may also be exceedances reported in this document that have not been reported in previous documents.

Table 3. Water Quality Trigger Limits (WQTLs) for constituents and parameters measured during Coalition monitoring (updated on September 16, 2008).

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Field and Physical Parameters					
pH	6.5 - 8.5 units	Numeric		Sacramento/San Joaquin Rivers Basin Plan (page III.6.00)	1
Electrical Conductivity (maximum)	700 µmhos/cm	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Dissolved Oxygen (minimum)	7 mg/L	Numeric	Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Rivers Basin Plan. Water Quality Control Plan for the Tulare Lake Basin.	1
	5 mg/L		Warm Freshwater Habitat	Basin Plan Objective, page III-5.00: for waters designated WARM (aquatic life). Tulare Lake Basin Plan	
Turbidity	variable	Numeric	Municipal and Domestic Supply	Basin Plan Objective - increase varies based on natural turbidity	1
Total Dissolved Solids	450 mg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Total Suspended Solids	NA				
Temperature	variable	Numeric		Basin Plan Objective (see objectives for COLD, WARM, and Enclosed Bays and Estuaries)	1
E coli	235 MPN/100 ml	Narrative	Water Contact Recreation	EPA ambient water quality criteria, single-sample maximum	3
Fecal coliform	200 MPN/100 ml 400 MPN/100 ml	Numeric	Water Contact Recreation	Sacramento/San Joaquin Rivers Basin Plan (page III.3.00) Geometric mean of not less than five samples for any 30- day period, nor shall more than 10% of the total number of samples taken during a 30 -day period.	1
TOC	NA				
Pesticides - Carbamates					
Aldicarb	3 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Carbaryl	2.53 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average	3
Carbofuran	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methiocarb	0.5 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates	3
Methomyl	0.52 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average (California Department of Fish and Game) (aquatic life)	3
Oxamyl	50 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Drinking Water Standards - Maximum Contaminant Levels (MCLs). California Dept of Health Services. Primary MCL	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Pesticides - Organochlorines					
DDD(p,p')	0.00083 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR, Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
DDE(p,p')	0.00059 ug/L				
DDT(p,p')	0.00059 ug/L				
Dicofol	NA				
Dieldrin	0.00014 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) / Continuous Concentration 4-day average (total)	1
Endrin	0.036 ug/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-Day Average	1
	0.76 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
Methoxychlor	0.03 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - Freshwater Aquatic Life Protection - instantaneous maximum	3
	30 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Pesticides - Organophosphates					
Azinphos methyl	0.01 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - instantaneous maximum	3
Chlorpyrifos	0.015 ug/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Rivers Basin Plan: page III-6.01; San Joaquin River & Delta, Sacramento & Feather Rivers; more stringent 4-day average.	1
Diazinon	0.1 ug/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan: San Joaquin River & Delta numeric standard. Sacramento & Feather Rivers numeric standard	1
Dichlorvos	0.085 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. Cal/EPA Cancer Potency Factor as a drinking water level	3
Dimethoate	1.0 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Notification Level – DHS (MUN, human health). California Notification Levels. (Department of Health Services)	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Demeton-s	NA				
Disulfoton	0.05 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - Freshwater Aquatic Life Protection - instantaneous maximum	3
Malathion	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methamidophos	0.35 ug/L	Narrative	Municipal and Domestic Supply	Basin Plan Toxicity Objective, Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Methidathion	0.7	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose (MUN, human health)	3
Parathion, Methyl	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Phorate	0.7 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Phosmet	140 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Group A Pesticides					
Aldrin	0.00013 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	3 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Instantaneous maximum	
Chlordane	0.00057 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0043 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor	0.00021ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Heptachlor Epoxide	0.0001 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Total Hexachlorocyclohexane (including lindane)	0.0039 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.95 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Maximum Concentration (1-hour Average)	
Endosulfan	110 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR (USEPA) - Continuous Concentration 4-day average (total)	
Toxaphene	0.00073 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0002 ug/L		Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Pesticides - Herbicides					
Atrazine	1.0 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Cyanazine	1.0 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Health Advisory (human health)	3
Diuron	2 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. USEPA Health Advisory. Likely to be carcinogenic to humans (U.S. Environmental Protection Agency, 2005 Guidelines for Carcinogen Risk Assessment).	3
Glyphosate	700 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Linuron	1.4 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Molinate	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Paraquat dichloride	3.2 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Simazine	4.0 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Thiobencarb	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Trifluralin	5 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Cancer Risk Level. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water	3
Metals (c)					
Arsenic	10 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Boron	700 ug/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Cadmium	for aquatic life; variable (see cadmium worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness	1
	5 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Copper	for aquatic life; variable (see copper worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness/	1
	1,300 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Lead	for aquatic life; variable (see lead worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	15 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 ug/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 ug/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 ug/L		Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level.	
Nickel	For aquatic life variable (see Nickel worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	100 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Selenium	50 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
	5 ug/L (4-day average)	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR Freshwater Aquatic Life Protection - Continuous Concentration - 4-Day Average	
Zinc	For aquatic life variable (see Zinc worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness/	1
Nutrients					
Nitrate as NO3 Nitrate as N	45,000 ug/L as NO3 10,000 ug/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Nitrite as Nitrogen	1,000 ug/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Ammonia	For aquatic life variable (see ammonia worksheet).	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Freshwater Aquatic Life Criteria, Continuous Concentration	3
	1.5 mg/L (regardless of pH and Temperature values)	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Taste and Odor Threshold (Ammore and Hautala)	3
Hardness	NA				
Phosphorus, total	NA				
Orthophosphate, soluble	NA				
TKN	NA				

Category 1: Constituents that have numeric water quality objectives in the Sac-SJR Basin Plan or other WQO listed by reference such as MCLs (Page III-3.0)* , CTRs (Page III-10.1)*, and chlorinated hydrocarbon pesticides (Page III-6.0, third bullet)*. Other numeric objectives may only apply to specific water bodies sections, or during specified time periods (see Basin Plan for more details).
Category 2: Pesticides with discharge prohibitions. Prohibitions apply to any discharges not subject to board-approved management practices (Page IV-25.0)*.
Category 3: Constituent does not have numeric WQO, and does not have a primary MCL. WQ Trigger Limit exceedance is based on implementation of narrative objective. All detections should be tracked. None are default exceedances.
Category 4: Coalitions may propose alternative triggers for specific water bodies. The coalition must provide the documentation that supports their proposed alternative trigger.
(*) Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Revised on October 2007. Narrative WQTLs are based on Water Quality Goals Database. Updated by Jon Marshack on 16 July 2008
NA = Not Available. Until completion of evaluation studies and MRPP submittals with site specific information on beneficial uses.
ND = Non Detect.

2004 - 2008 Exceedances

An important aspect of the SJCDWQC Management Plan is to provide yearly updates of exceedances based on the most recent WQTLs (Table 3). Table 4 depicts a tally of exceedances for sites monitored from 2004 through 2008. Sites not included in this tally, as described in the SJCDWQC Management Plan submitted on September 30, 2008 include Marsh Creek and Potato Slough. In addition, Stanislaus River Drain @ South Airport Way is not included in Table 4 (sampled from October – December 2008) since it was removed from the SJCDWQC MRPP due to the large number of dairies upstream which are covered under the dairy program. The Coalition began monitoring at a downstream location on Walthall Slough in January 2009. Table 5 includes a tally of exceedances experienced since the last update (September 30, 2008) which includes monitoring results from the 2008 storm, irrigation, and fall seasons. In both tables, cells with green highlights indicate exceedances that are under the SJCDWQC Management Plan. In Table 5, blue highlights indicate sites/constituents that are included in the SJCDWQC Management Plan due to exceedances experienced in 2008.

Table 4. SJCDWQC exceedance tally based on results through December 2008.

Sites are listed alphabetically by station name and constituents are listed alphabetically within each of the following groups: field parameters, inorganics, bacteria, metals, pesticides and toxicity. Constituents under a management plan are highlighted.

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	*Ceriodaphnia dubia, Survival (%)*	*Pimephales promelas, Survival (%)*	*Selenastrum capricornutum, Total Cell Count*	*Hyalella azteca, Survival (%)*	*E. coli, MPN/100 mL*	Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Arsenic, µg/L	Boron, µg/L	Cadmium, µg/L	Copper, µg/L	Lead, µg/L	Molybdenum, µg/L	Nickel, µg/L	Azinphos methyl1, µg/L	Carbofuran	Chlorpyrifos, µg/L	Cypermethrin, total, µg/L	DDD (p,p'), µg/L	DDE (p,p'), µg/L	DDT (p,p'), µg/L	Diazinon, µg/L	Dieldrin, µg/L	Dimethoate, µg/L	Disulfoton, µg/L	Diuron, µg/L	Endrin1, µg/L	Linuron, µg/L	Malathion, µg/L	Methidathion	Methomyl1, µg/L	Methyl parathion, µg/L	Permethrin, total, µg/L	Simazine, µg/L	Thiobencarb, µg/L
Bear Creek @ North Alpine Rd	3							1																															
Drain @ Woodbridge Rd	2		2					1	2			2																											
Duck Creek @ Hwy 4	16	3		5		3		6													10					1							1						
Duck Creek @ Drais Rd	3	1																			1																		
French Camp Slough @ Airport Way	11	3		2		2	3	20							12	2			1	1	8					2	4	1		2				1					2
Grant Line Canal @ Clifton Court Rd	23	7	19	1		2	2	20	16	1		10		12	6	8		1		1	5			2	1			1											
Grant Line Canal near Calpack Rd	35		42	3		10	6	19	25	1		4		7		1		2			4			1					1	1		1	1						
Kellogg Creek along Hoffman Ln	8	4	3	2		4	4	4	3		1				3									3	2														
Kellogg Creek @ Hwy 4	3	1	8	1	2	1	3	5	6												1																1		
Littlejohns Creek @ Jack Tone Rd	13	1			1	5	2	6							5					1	7					1													
Littlejohns Creek @ 26 Mile Rd	4	1																																					
Lone Tree Creek @ Jack Tone Rd	15	3	1	1	2	7	2	26	1	4				3	7	1					6	1		1	1	2				3								1	2
Lone Tree Creek @ Brennan Rd	3		1	1	1	3		3	1												1																		
Lone Tree Creek @ Valley Home Rd	5	1													1																								
Mokelumne River @ Bruella Rd	4	3		5		10		1							3										1*														
Mokelumne River @ Fish Hatchery	1																																						
Mormon Slough @ Jack Tone Rd	11	4		2		4	1	1													7															1		1	
Roberts Island Drain @ Holt Rd	24		27	1		5	2	5	16												2			3						2									
Roberts Island Drain along House Rd	23	3	22	2		4	4	7	14			1									2	1		2	1														
Sand Creek @ Hwy 4 Bypass	25		36	3	1	3	10	17	19												2		1	5	3	2	7		3		1				1				
South Webb Tract Drain	4							2	1			3	1				1																						
Terminous Tract Drain @ Hwy 12	23		20		1	4		8	13			5									2				1								1						
Delta Drain- Terminous Tract off Glasscock Rd	7		4		1		2	4	4																														
Delta Drain- Terminous Tract off Guard Rd	7		10			1	1	2	7																														
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4	1	2	4		5	4	10	1						5	2				1	10			1						3				1				2	3
Unnamed Drain to Lone Tree Creek @ Wagner Rd	1																				1																		

*DDT detected in the field blank sample only and included in summary and tally of exceedances, but not considered representative of water quality at the sample site.

Upstream management plan sites are indented and listed below the primary site.

Table 5. SJCDWQC exceedance tally based 2008 storm, irrigation, and fall sampling events.

Sites are listed alphabetically by station name and constituents are listed alphabetically within each of the following groups: field parameters, inorganics, bacteria, metals, pesticides and toxicity. Blue highlighted cells are new management plan constituents and green highlighted cells represent constituents with management plans prior to the irrigation season of 2008.

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Ceriodaphnia dubia, Survival (%)	Pimephales promelas, Survival (%)	Selenastrum capricornutum, Total Cell Count	Hyalella azteca, Survival (%)	E. coli, MPN/100 mL	Dissolved Solids, mg/L	Ammonia, mg/L	Arsenic, µg/L	Boron, µg/L	Copper, µg/L	Lead, µg/L	Molybdenum, µg/L	Hardness	Carbofuran	Chlorpyrifos, µg/L	DDD (p,p'), µg/L	DDE (p,p'), µg/L	DDT (p,p'), µg/L	Diazinon, µg/L	Dieldrin, µg/L	Dimethoate, µg/L	Disulfoton, µg/L	Diuron, µg/L	Malathion, µg/L	Methyl parathion, µg/L	Simazine, µg/L	Thiobencarb, µg/L
Bear Creek @ North Alpine Rd	3							1																						
Drain @ Woodbridge Rd	2		2					1	2		2																			
Duck Creek @ Hwy 4	8	1		4		2		1										5									1			
Duck Creek @ Drais Rd	3	1																1												
French Camp Slough @ Airport Way	4	2				1	1	4									1	3				1	3	1		1				
Grant Line Canal @ Clifton Court Rd	6	1	8	1		2		4	6		4		1					1												
Grant Line Canal near Calpack Rd	10		12			6		4	7		1																1			
Kellogg Creek along Hoffman Ln	3	1				4	2						1			1														
Littlejohns Creek @ Jack Tone Rd	3					2							2				1	3												
Littlejohns Creek @ 26 Mile Rd	4	1																												
Lone Tree Creek @ Jack Tone Rd	3	1	1	1	1	4		6	1	1			1			1		1				1				1				
Lone Tree Creek @ Brennan Rd	1																													
Lone Tree Creek @ Valley Home Rd	5	1											1																	
Mokelumne River @ Bruella Rd						6		1																						
Mormon Slough @ Jack Tone Rd	5	4		1		3												5										1	1	
Roberts Island Drain @ Holt Rd	9		12			4		3	8									1								1				
Roberts Island Drain along House Rd	9		11	2		4	2	1	5		1							2		1	1									
Sand Creek @ Hwy 4 Bypass	12		16			3	4	7	7										1	2	1	1	5		3					
South Webb Tract Drain	4							2	1		3	1			1															
Terminous Tract Drain @ Hwy 12	5		10			3			6		2							2			1									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2	1		3		1	3	5					5	2			1	5								1			1	1
Unnamed Drain to Lone Tree Creek @ Wagner Rd	1																	1												

Upstream management plan sites are indented and listed below the primary site.

The most common exceedances were dissolved oxygen, *E. coli*, TDS/SC, chlorpyrifos, and *Selenastrum* toxicity. Exceedances of the copper WQTL were common as well. Exceedances of the DO WQTL and *Selenastrum* toxicity occurred almost uniformly across all sites in the Coalition region. Exceedances of the chlorpyrifos, *E. coli*, SC/TDS, and copper WQTLs were distributed across fewer watersheds such that a majority of the exceedances were experienced at fewer locations. Table 7 provides the exceedances during 2008 sampling already under previous Management Plans. DO levels exceeded the WQTL at Duck Creek @ Highway 4, French Camp Slough @ Airport Way, Grant Line Canal @ Clifton Court Road, Grant Line Canal near Calpack Road, Kellogg Creek along Hoffman Lane, Littlejohns Creek @ Jack Tone Road, Lone Tree Creek @ Jack Tone Road, Mormon Slough @ Jack Tone Road, Roberts Island Drain @ Holt Road, Roberts Island Drain along House Road, Sand Creek @ Hwy 4 Bypass, Terminous Tract Drain @ Highway 12, Unnamed Drain to Lone Tree Creek @ Jack Tone Road. pH exceeded the WQTL at Duck Creek @ Highway 4, Grant Line Canal @ Clifton Court Rd, Kellogg Creek along Hoffman Lane, and Lone Tree Creek @ Jack Tone Road. TDS/SC exceeded the WQTL at Grant Line Canal @ Clifton Court Road, Grant Line Canal near Calpak Road, Roberts Island Drain @ Holt Road, Roberts Island Drain along House Road, Sand Creek @ Highway 4 Bypass, and Terminous Tract @ Highway 12. *Selenastrum* toxicity occurred at Grant Line Canal near Calpak Road, Littlejohns Creek @ Jack Tone Road, Lone Tree Creek @ Jack Tone Road, and Unnamed Drain to Lone Tree Creek @ Jack Tone Road. *Hyalella* toxicity occurred at French Camp Slough @ Airport Way, Kellogg Creek along Hoffman Lane, Robert's Island Drain along House Road, and Sand Creek @ Highway 4 Bypass. *E. coli* exceeded the WQTL at Duck Creek @ Highway 4, French Camp Slough @ Airport Way, Grant Line Canal @ Clifton Court Road, Grant Line Canal near Calpak Road, Lone Tree Creek @ Jack Tone Road, Robert's Island Drain @ Holt Road, Robert's Island Drain along House Road, Sand Creek @ Highway 4 Bypass, and Unnamed Drain to Lone Tree Creek @ Jack Tone Road. Copper exceeded the WQTL at Grant Line Canal @ Clifton Court Road, Kellogg Creek along Hoffman Lane, Littlejohns Creek @ Jack Tone Road, and Lone Tree Creek @ Jack Tone Rd. Chlorpyrifos concentrations exceeded the WQTL at Duck Creek @ Highway 4, French Camp Slough @ Airport Way, Grant Line Canal @ Clifton Court Road, Littlejohns Creek @ Jack Tone Road, Lone Tree Creek @ Jack Tone Road, Mormon Slough @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Road. Other exceedances triggering management plans are arsenic at Grant Line Canal @ Clifton Court Road, Grant Line Canal near Calpak Road, and Terminous Tract @ Highway 12, ammonia at Lone Tree Creek @ Jack Tone Road, DDT/DDD/DDE at Sand Creek @ Highway 4 Bypass, diazinon at French Camp Slough @ Airport Way, Lone Tree Creek @ Jack Tone Road, and Sand Creek @ Highway 4 Bypass, dieldrin at Sand Creek @ Highway 4 Bypass, diuron at Lone Tree Creek @ Jack Tone Road and Unnamed Drain to Lone Tree Creek @ Jack Tone Road, and thiobencarb at Unnamed Drain to Lone Tree Creek @ Jack Tone Road.

2008 New Site/Constituents Requiring Management Plans

As a result of 2008 monitoring several new sites/constituents require management plans (Table 5). Exceedances of DO will trigger management plans at Bear Creek @ North Alpine Road, Drain @ Woodbridge Rd, South Webb Tract Drain, and Stanislaus River Drain @ South Airport

Way. *Ceriodaphnia* toxicity will trigger management plans for Duck Creek @ Highway 4, Mormon Slough @ Jack Tone Road, Roberts Island along House Road, and Unnamed Drain to Lone Tree Creek @ Jack Tone Road. *Pimephales* toxicity will trigger management plans for Lone Tree Creek @ Jack Tone Road. *Selenastrum* toxicity will trigger management plans for Duck Creek @ Highway 4, French Camp Slough @ Airport Way, Grant Line Canal @ Clifton Court Road, Kellogg Creek along Hoffman Lane, Mokelumne River @ Bruella Road, Mormon Slough @ Jack Tone Road, Roberts Island @ Holt Road, Roberts Island along House Road, Sand Creek @ Highway 4 Bypass, and Terminous Tract @ Highway 12. *Hyalella* toxicity will trigger a management plan at Unnamed Drain to Lone Tree Creek @ Jack Tone Road. Exceedances of *E. coli* will trigger management plans at South Webb Tract Drain and Stanislaus River Drain @ South Airport Way. Exceedances of the copper WQTL will trigger management plans for Unnamed Drain to Lone Tree Creek @ Jack Tone Road. Exceedances of the chlorpyrifos WQTL will trigger management plans for the Robert's Island @ Holt Road, Roberts Island along House Road, Stanislaus River Drain @ South Airport Way, and the Terminous Tract @ Highway 12 watersheds. Other exceedances triggering management plans are pH at French Camp Slough @ Airport Way and Mormon Slough @ Jack Tone Road, TDS/SC at Drain @ Woodbridge and Stanislaus River Drain @ South Airport Way, arsenic at Drain @ Woodbridge Road and South Webb Tract Drain, lead at Unnamed Drain to Lone Tree Creek @ Jack Tone Road, DDT/DDD/DDE at Roberts Island Drain along House Road, dieldrin at French Camp Slough @ Airport Way, disulfoton at Sand Creek @ Highway 4 Bypass, diuron at French Canp Slough @ Airport Way, and simazine at Unnamed Drain to Lone Tree Creek @ Jack Tone Road.

Upstream sites were monitored for Management Plan constituents as well as DO, SC, pH, and temperature as part of sampling procedures. As a result, field and physical parameters not under a site subwatershed's management plan may have been monitored at an upstream location. During 2008 monitoring, all field or physical parameter exceedances at an upstream location were constituents previously covered under a management plan at the normal monitoring site.

MANAGEMENT PLAN PROCESS

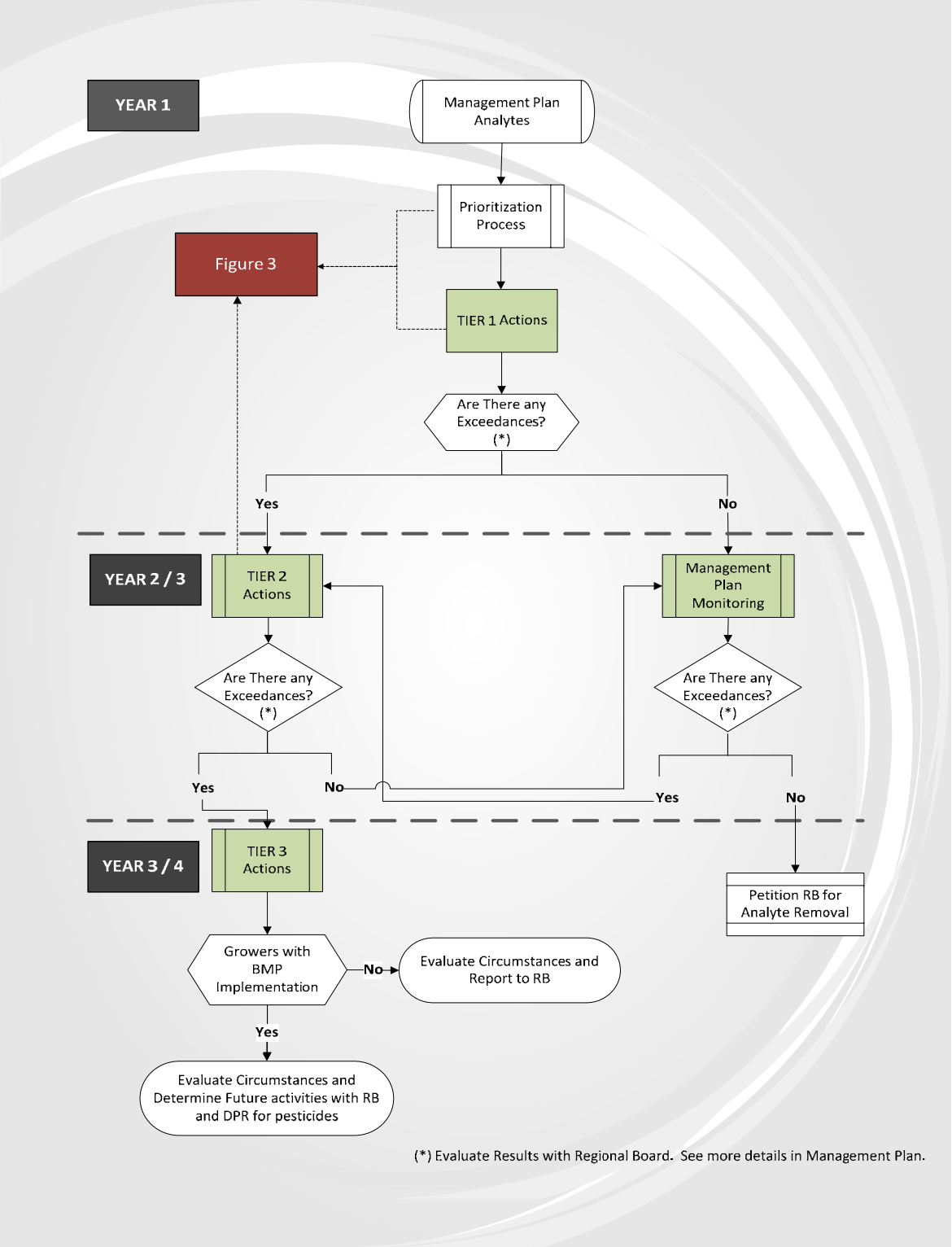
The SJCDWQC Management Plan process was first outlined in the SJCDWQC Management Plan submitted on September 30, 2008. This process was a combination of years and tiers diagramed in a flow chart which then determined the specific actions that would be taken by the Coalition (Figure 2). For a more complete description of this process including the definition of years and tiers, see the SJCDWQC Management Plan (submitted September 30, 2008).

During the 2007 and 2008 irrigation season, monitoring on additional dates and upstream Management Plan monitoring were conducted following the process outlined in Figure 2. In 2009, the Coalition will utilize source information gained from Management Plan Monitoring during its outreach efforts, especially within high priority site subwatersheds. Due to the extensive amount of monitoring conducted within the Coalition region, the Coalition will focus its efforts on documenting changes in management practices and perform outreach at both an individual and grower group level.

The next Management Plan update will be submitted on April 1, 2010 and will include documentation of management practice implementation and outreach activities. This update will also assess any new exceedances that occurred during 2009 at both core and assessment sites triggering a management plan. In 2010 the Coalition will focus on evaluating management practice implementation within the Coalition area especially within high priority site subwatersheds.

Figure 2. Coalition Management Plan process and associated actions.

The prioritization process (including TIER actions) is included in Figure 3.



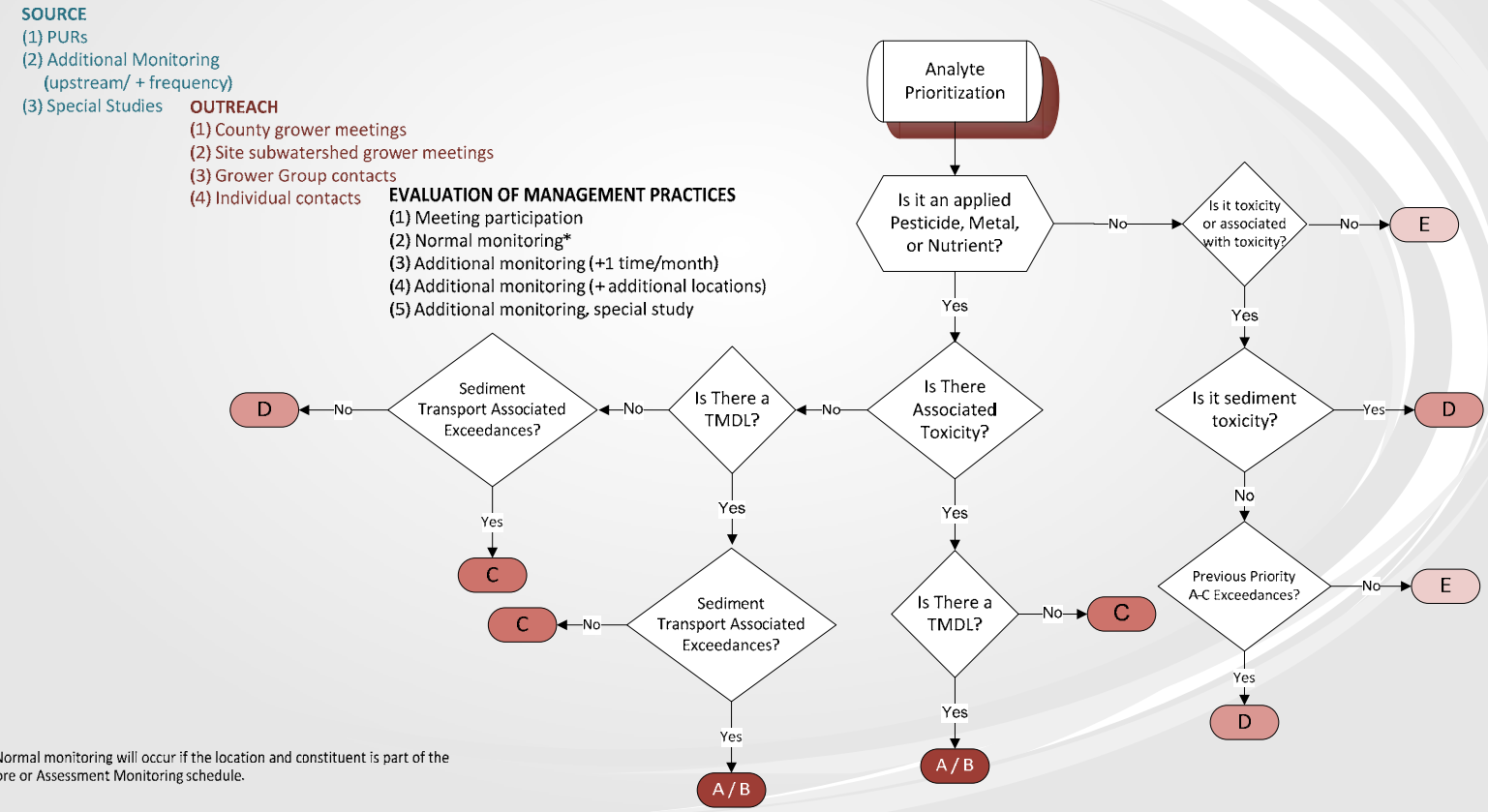
RB- Regional Board
DPR- Department of Pesticide Regulation
BMP- Best Management Practices

PRIORITIZATION OF EXCEEDANCES

The SJCDWQC developed a prioritization process which allows the Coalition to focus on constituents of the greatest concern. These constituents are included in the Management Plan process outlined in Figure 3. The prioritization process has been developed in collaboration with the Regional Board and allows the Coalition to focus on constituents where sourcing is possible (i.e. pesticide use reports) and for which management practices are available. Following the flow chart in Figure 3, a priority level is assigned to a Management Plan constituent for a specific site subwatershed. Priority levels will determine the level of activity for sourcing, outreach and evaluation. The SJCDWQC Management Plan (submitted September 30, 2008) includes a detailed description of the prioritization process including tiers and actions.

Figure 3. SJCDWQC prioritization process and associated actions.

Priority Level	TIER 1			TIER 2			TIER 3		
	Source	Outreach	Evaluation	Source	Outreach	Evaluation	Source	Outreach	Evaluation
A	1, 2	1, 2	2, 3	1, 2/3	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4	1, 2, 3, 4, 5
B	1, 2	1, 2	2, 3	1, 2/3	1, 2, 3	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4	1, 2, 3, 4, 5
C	1, 2	1, 2	2, 3	1, 2/3	1, 2, 3	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4	1, 2, 3, 4, 5
D	1, 2	1, 2	2, 3	1, 2/3	1, 2	2, 3	1, 2, 3	1, 2, 3	1, 2, 3, 4
E		1	2		1	2		1	2



PRIORITY-SPECIFIC MANAGEMENT GOALS AND PLANS

The prioritization of constituents and site subwatersheds is described in detail in the SJCDWQC Management Plan (submitted on September 30, 2008). Figure 3 includes actions at each tier and priority levels for sourcing, outreach and evaluation. The overall Management Plan process from year to year is outlined in Figure 2 and is described in the section Management Plan Process. Actions listed in Figure 3 are a guideline by which the Coalition develops its actions. The specific actions are addressed in the individual Site Subwatershed Management Plans and the Coalition may chose to perform actions other than those listed based on the magnitude and frequency of exceedances.

During the irrigation season of 2007 and 2008 the Coalition conducted monitoring on additional dates and upstream monitoring for all management plan sites/constituents following the process outlined in Figure 2 and 3. Grower group and individual contacts were initiated during 2008/2009 and will continue into 2010 using sourcing information obtained from Management Plan Monitoring data and PUR information. Therefore, for the 2009 irrigation and storm season, the Coalition will focus on high priority subwatersheds including Lone Tree Creek @ Jack Tone Rd, Unnamed Drain to Lone Tree Creek @ Jack Tone Rd and Duck Creek @ Hwy 4 in its strategy for outreach and Management Plan Monitoring. Monitoring will be conducted at these locations during months of past exceedances for high priority constituents from April 2009 to March 2010. Sampling scheduled between January and March will be based on storms and therefore the month sampled may be changed based on storm pattern in 2009/2010.

The Coalition began monitoring in October 2008 under a new Monitoring and Reporting Program Plan (MRPP) to meet the requirements of the ILRP Monitoring and Reporting Program Order No. R5-2008-0005 (MRP) for Coalition Groups. The MRPP submitted in August 2008 described the Coalition's monitoring program including five Core (one of which will be monitored for Assessment Monitoring constituents until it is fully characterized) and six Assessment Monitoring locations with Assessment Monitoring locations rotating every two years. In March 2009 the Coalition requested to reduce its monitoring to include the original five Core Monitoring locations and one Assessment Monitoring location which would be rotated annually between zones. The Coalition recently received approval from the Regional Board Executive Officer and will commence monitoring under the amended MRPP in April, 2009. Due to the change in monitoring plans, not all past monitoring locations are currently being monitored by the Coalition.

MANAGEMENT PLAN SCHEDULES

Management Plan Development Timelines

The SJCDWQC Management Plan submitted on September 30, 2008 included monitoring results from 2004 through September 2007. This update includes monitoring results through December 2008.

In the Management Plan addendum submitted on December 23, 2008 the Coalition submitted a proposed schedule for addressing each site subwatershed within the Management Plan with a high priority approach. An updated schedule is provided in Table 6.

Table 6. Proposed schedule for addressing each site subwatershed with a detailed, focused management plan approach.

Site Subwatershed Name	Year for focused approach
Duck Creek @ Highway 4	2008-2010
Lone Tree Creek @ Jack Tone Rd	2008-2010
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2008-2010
Grant Line Canal @ Clifton Court Rd	2010-2012
Grant Line Canal near Calpack Rd	2010-2012
Littlejohns Creek @ Jack Tone Rd	2010-2012
Terminous Tract Drain @ Hwy12	2011-2013
French Camp Slough @ Airport Way	2011-2013
Mokelumne River @ Bruella Rd	2011-2013
Sand Creek @ Hwy 4 Bypass	2012-2014
Kellogg Creek along Hoffman Lane	2012-2014
Mormon Slough @ Jack Tone Road	2012-2014
Roberts Island Drain @ Holt Rd	2013-2015
Roberts Island Drain along House Rd	2013-2015
Re-evaluate All Site Subwatersheds and Revise Schedule	**Annually**

Management Plan Performance Goals and Schedules

Management Plan Sampling Schedule

2008 Management Plan sampling was conducted as outlined in the SJCDWQC Management Plan submitted on September 30, 2008. As described in the September 30, 2008 Management Plan both additional and upstream Management Plan sampling was conducted based on site subwatershed exceedances, exceedance prioritization and Management Plan tier level. All results from Management Plan and normal monitoring were included in the SJCDWQC Semi Annual Monitoring Report (SAMR) submitted on March 1, 2009. Results from Management Plan sampling are included below in Table 7.

As described in the section Priority Specific Management Goals and Plans, the Coalition will be focusing on high priority subwatersheds during the irrigation and storm seasons of 2009/2010. Lone Tree Creek @ Jack Tone, Unnamed Drain to Lone Tree Creek @ Jack Tone and Duck Creek @ Hwy 4 will be monitored for priority constituents during months in which exceedances have occurred (Table 8).

Table 7. Management Plan sampling results (2008). A = additional sampling; U = upstream sampling.

Sample Site	Sample Date	Type	Arsenic, µg/L	Boron, µg/L	Cadmium, µg/L	Chlorpyrifos, µg/L	Copper, µg/L	Dieldrin, µg/L	Lead, µg/L	Nickel, µg/L	Selenium, µg/L	Zinc, µg/L	*Ceriodaphnia dubia*, % control	*Selenastrum capricornutum*, % control
Kellogg Creek along Hoffman Ln	4/30/2008	A											95, NSG	
Mokelumne River @ Bruella Rd	5/7/2008	A												10.39, SL
Mormon Slough @ Jack Tone Rd	5/7/2008	A				<0.003								
Sand Creek @ Hwy 4 Bypass	5/7/2008	A				<0.003		0.012					100, NSG	
Duck Creek @ Drais Rd	5/13/2008	U				0.42								
Littlejohns Creek @ 26 Mile Rd	5/13/2008	U	3	57	<0.06		1.6		0.19	1.3	0.17	2		
Littlejohns Creek @ Escalon Bellota	5/13/2008	U	0.5	9	<0.06		1.9		0.21	0.6	0.15	3		
Lone Tree Creek @ Valley Home Rd	5/13/2008	U	0.8	13	<0.06		4.6		1.2	2.4	0.21	10		
Mokelumne River @ Bruella Rd	6/3/2008	A					1.4						100, NSG	
Sand Creek @ Hwy 4 Bypass	6/3/2008	A				<0.003		<0.005					100, NSG	
Littlejohns Creek @ 26 Mile Rd	6/10/2008	U	3	56	<0.06		0.9		0.17	1.1	0.27	1		
Littlejohns Creek @ Escalon Bellota	6/10/2008	U	0.47	7	<0.06		1.8		0.2	0.5	<0.11	3		
Lone Tree Creek @ Valley Home Rd	6/10/2008	U	1.3	17	<0.06		5.7		1.5	3.3	0.27	12		
Mokelumne River @ Bruella Rd	7/8/2008	A					1.2							82.12, SG
Sand Creek @ Hwy 4 Bypass	7/8/2008	A											100, NSG	
Duck Creek @ Drais Rd	7/15/2008	U				<0.003								
Littlejohns Creek @ 26 Mile Rd	7/15/2008	U	2.9	54	<0.06		3.1		0.18	1.1	0.22	2		
Littlejohns Creek @ Escalon Bellota	7/15/2008	U				<0.003								138.73, NSG
Lone Tree Creek @ Brennan Rd	7/15/2008	U	1.2	25	<0.06	<0.003	3.8		0.6	2	0.24	7		
Lone Tree Creek @ Valley Home Rd	7/15/2008	U	1.5	17	<0.06		7		1.6	4.5	0.34	15		
Unnamed Drain to Lone Tree Creek @ Wagner Rd	7/15/2008	U				<0.003								
Mokelumne River @ Bruella Rd	8/5/2008	A					1.1							314, NSG
Littlejohns Creek @ 26 Mile Rd	8/12/2008	U	2.3	61	<0.06		0.8		0.07	1	<0.11	1		
Littlejohns Creek @ Escalon Bellota	8/12/2008	U				<0.003								117, NSG
Lone Tree Creek @ Brennan Rd	8/12/2008	U	1.2	18	<0.06	<0.003	3.3		0.67	1.8	<0.11	6		
Lone Tree Creek @ Valley Home Rd	8/12/2008	U	1.1	14	<0.06		3.7		0.68	2	<0.11	7		
Mokelumne River @ Bruella Rd	9/9/2008	A											100, NSG	
Mormon Slough @ Jack Tone Rd	9/9/2008	A				0.034								
Duck Creek @ Drais Rd	9/16/2008	U				<0.003								
Littlejohns Creek @ 26 Mile Rd	9/16/2008	U	1.6	88	<0.06		1		0.19	0.9	0.34	3.6		
Lone Tree Creek @ Brennan Rd	9/16/2008	U	0.8	14	<0.06		2.9		0.5	1.4	0.21	4.2		
Lone Tree Creek @ Valley Home Rd	9/16/2008	U	0.9	14	<0.06		3.8		0.84	2	0.12	8.7		
Unnamed Drain to Lone Tree Creek @ Wagner Rd	9/16/2008	U				0.14								

NSG – not significantly different from the control, greater than 80% of the control; SL – significantly different from the control, less than 80% of the control; SG – significantly different from the control, greater than 80% of the control.

Table 8. 2009 Management Plan sampling schedule (including storm sampling 2010).

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine
Duck Creek @ Hwy 4	2009	April	X	X		X			
Lone Tree Creek @ Jack Tone Rd	2009	April		X					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	April			X				
Duck Creek @ Hwy 4	2009	May		X		X			
Lone Tree Creek @ Jack Tone Rd	2009	May		X					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	May		X	X	X			
Duck Creek @ Hwy 4	2009	June				X			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	June				X			
Duck Creek @ Hwy 4	2009	July	X			X			
Lone Tree Creek @ Jack Tone Rd	2009	July			X	X			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	July			X	X			
Duck Creek @ Hwy 4	2009	August				X			
Lone Tree Creek @ Jack Tone Rd	2009	August			X	X			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	August			X				
Duck Creek @ Hwy 4	2009	September	X			X			
Lone Tree Creek @ Jack Tone Rd	2009	September			X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	September	X		X	X			
Lone Tree Creek @ Jack Tone Rd	2010	January		X	X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	January	X			X		X	X
Duck Creek @ Hwy 4	2010	February		X			X		
Lone Tree Creek @ Jack Tone Rd	2010	February		X	X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	February	X	X		X		X	X
Lone Tree Creek @ Jack Tone Rd	2010	March		X					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	March		X					

Management Practice Identification, Evaluation, and Outreach

Each year exceedances are identified and the source of the exceedance is investigated using one or more of the following: PURs, TIEs, past applications (when a pesticide causes an exceedance), and additional monitoring. Table 9 outlines the site subwatersheds by tier level and for each lists the priority level and Coalition actions that will be performed in 2009/2010. As mentioned previously, the Stanislaus Drain @ South Airport Way site is not included in this table.

The Coalition uses various surveys to understand current management practices implemented within the subwatershed region and to evaluate changes in practices and effectiveness of both current and new practices on improving water quality. The Coalition will use three types of surveys: general surveys, grower group surveys and individual surveys. The general survey was mailed to all members within the subwatershed area. Responses from returned surveys were entered into an Access database and are being linked to member information. The difficulty of using general surveys is that a single grower may fill out a survey for each parcel that he/she manages or they may fill out one survey for multiple parcels in multiple subwatersheds.

General Survey

The Coalition has linked surveys with individual parcels and conducted an analysis of management practices (as indicated by survey results) for all site subwatersheds. This analysis was submitted on December 30, 2008 in the General Survey Summary Report. The Coalition has previously summarized the results of the surveys by site subwatershed however this analysis allows the Coalition to evaluate management practices on a parcel level.

Grower Group Survey

The Grower Group Survey will be handed out at grower specific meetings in priority subwatersheds. Groups include growers of specific crops (row crops, grapes, orchards) and/or groups who use specific types of pesticides (i.e. organophosphates, herbicides, pyrethroids). These surveys will be included with meeting handouts and will assess whether a member has already filled out a general survey and whether they are interested in having a Coalition representative contact them to do an on-site assessment of their current management practices.

Individual Grower Meetings (Checklist)

The Individual Grower Checklist will be filled out by a Coalition representative during meetings with individual growers in high priority subwatersheds. These growers will be identified and contacted based on the following criteria:

- grower farms within a high priority management plan subwatershed,

- is identified as applying a chemical that is associated with a water quality exceedance,
- active member of the Coalition,
- close proximity to the watershed that could result in discharge of agricultural water.

The goal of individual grower meetings is to obtain information about current management practices from growers that have applied chemicals at times coinciding with water quality exceedances of that chemical. The checklists have been updated since the SJCDWQC Management Plan submittal on September 30, 2008 and an example individual checklist is included in Appendix I.

On November 24, 2008 the Coalition held a grower meeting for members in the Duck Creek site subwatershed to discuss water quality exceedances, management practices and conduct individual grower surveys. Twenty-two surveys were filled out representing 19 Coalition members (9,948 acres) within the Duck Creek subwatershed. Growers responded that they would likely reduce chlorpyrifos application rates (i.e. use the product less), utilize grass row centers in orchards, and at least one grower indicated that they may build a retention pond. The Coalition is in the process of entering the survey results in an Access database.

A second grower meeting was held on March 5, 2009 in Escalon which was hosted by Mid Valley Agricultural Services (a pesticide distribution company). Growers were invited to attend by their Pest Control Advisors (PCAs) and there were approximately 40 growers who attended (not all members). Management practices were discussed in relation to current water quality issues within the Coalition region and members were asked to fill out individual checklists. The Coalition is still in the process of collected all surveys and entering the information into a database.

Table 9. A list of site subwatershed tiers and corresponding level of actions for 2009. Some site subwatersheds are in both Tier 1 and Tier 2 for different constituents.

		Sourcing			Outreach				Evaluation		
	Priority	PUR Data	Additional / Upstream Monitoring	Special Studies	County Grower Meetings	Site Subwatershed Grower Meetings	Grower Group Contacts	Individual Contacts	Meeting Participation	Normal Monitoring	Additional / Upstream Monitoring / Special Study
Tier 1 Subwatersheds											
Bear Creek	E	x			x	x			x	x	
Drain @ Woodbridge Rd	D	x			x	x			x	x	
French Camp Slough	A	x			x	x			x	x	
Grant Line @ Clifton Ct	D	x			x	x			x		
Grant Line near Calpack Rd	A	x			x	x			x		
Kellogg Creek	E	x			x	x			x		
Littlejohns Creek	E	x			x	x			x		
Mokelumne River	C	x			x	x			x	x	
Unnamed Drain to Lone Tree Creek	C	x	x		x	x	x	x	x		x
Roberts Island @ Holt Rd	C	x			x	x			x	x	
Roberts Island along House Rd	C	x			x	x			x		
Sand Creek	A	x			x	x			x		
South Webb Tract Drain	C	x			x	x			x	x	
Terminous Tract	C	x			x	x			x	x	
Tier 2 Subwatersheds											
Duck Creek	A	x	x		x	x	x	x	x	x	x
French Camp Slough	A	x			x	x			x	x	
Grant Line @ Clifton Ct	A	x			x	x			x		
Grant Line near Calpack Rd	D	x			x	x			x		
Kellogg Creek	C	x			x	x			x		
Littlejohns Creek	A	x			x	x			x		
Lone Tree Creek	A	x	x		x	x	x	x	x		x
Mokelumne River	D	x			x	x			x	x	
Mormon Slough	A	x			x	x			x		
Roberts Island @ Holt Rd	E	x			x	x			x	x	
Roberts Island along House Rd	D	x			x	x			x		
Sand Creek	C	x			x	x			x		
Terminous Tract	D	x			x	x			x	x	
Unnamed Drain to Lone Tree Creek	C	x	x		x	x	x	x	x		x

Table 10. Management Plan sourcing, outreach and evaluation schedule.

Action	Description	When
SOURCING		
(1) PUR data	Request pesticide use information from County Agricultural Commissioners to identify specific problem applications.	Standing requests with Ag Commissioners to receive data as soon as possible.
(2) Additional Monitoring	Additional monitoring conducted for specific constituents (Priority A-C) during months where exceedances have occurred at sites that are not currently monitored under the 2008 MRPP.	For high priority sites only, during irrigation and storm months (2009/2010) when past exceedances occurred.
(3) Special Studies	Special studies will occur when additional information about potential sources needs to be obtained beyond the additional monitoring.	Will be specific to the situation; no special studies are currently planned.
OUTREACH		
(1) County grower meetings and (2) site subwatershed grower meetings	Hold meetings for growers in the subwatershed to discuss management practices that can be used to eliminate exceedances and to encourage implementation of new management practices. Provide monitoring results to growers to inform farmers, landowners and/or stakeholders about water quality problems.	Between October and March depending on grower schedules.
(3) Grower group meetings	Provide information and outreach materials about management practices that could be used by growers to reduce the impact of agriculture on water quality specific to a group of growers (i.e walnut or alfafa growers).	Between each grower season (storm and irrigation) and as needed.
(4) Individual contacts	Conduct individual interviews with farmers, landowners and/or stakeholders to discuss water quality issues, current management practices and recommended management practices to improve water quality.	Between October and March depending on grower schedules.
EVALUATION		
(1) Meeting participation	Assess effectiveness of Coalition meetings by tracking attendance, documenting management practice implementation and monitoring water quality exceedances. Document where and when management practices have been implemented in order to track effects on water quality at relevant monitoring sites through individual grower meetings.	Annually in Management Plan updates.
(2) Normal monitoring	Normal monitoring at Core and Assessment Monitoring locations as part of the SJCDWQC MRPP submitted in 2008. Not all sites will be monitored under the 2008 MRPP. These results will supplement additional monitoring conducted under the Management Plan.	Once a month, every month of the year.
3) Additional Monitoring (sites not included in current MRPP)	Additional monitoring conducted for specific constituents (Priority A-C) during months where previous exceedances have occurred at sites that are not currently monitored under the 2008 MRPP. Results will be used to evaluate improvements in water quality.	For high priority sites only, during irrigation and storm months (2009/2010) when past exceedances occurred.

Action	Description	When
(4) Additional Monitoring (+additional locations)	Additional monitoring conducted for for specific constituents (Priority A-C) during months where previous exceedances have occurred at locations upstream of the site under the Management Plan. Upstream sampling results will be used to evaluate improvements in water quality.	Previously conducted in 2008; will not be conducted in 2009.
(5) Additional Monitoring (special study)	Additional monitoring for special studies will be done to evaluate specific management practice effectiveness.	As specified in the Site Subwatershed Management Plan. No special studies are currently planned.

Table 11. Management Plan tracking schedule.

Priority Subwatershed Evaluation of Management Practices	Duck Creek @ Hwy 4	Lone Tree Creek @ Jack Tone Rd	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd
Associate baseline survey responses with member APNs.	November 2008	November 2008	November 2008
Determine number/type of management practices currently in place.	December 2008	December 2008	December 2008
Group Grower Contacts[1]	November 2008	April 2009 – April 2010	April 2009 – April 2010
Individual Contacts	November 2008	April 2009 – April 2010	April 2009 – April 2010
Implementation of new management practices.	April 2009 – February 2010	April 2009 – February 2010	April 2009 – February 2010
Assess number/type of new management practices implemented.	October 2009 -February 2010	October 2009 - February 2011	October 2009 - February 2011
Evaluate effectiveness of new management practices[2].	April 2009 – February 2011	April 2009 – February 2011	April 2009 – February 2011

[1]Grower Group Contacts are outlined in the Site Subwatershed Management Plans and may not be applicable for all constituents.
[2]Evaluating effectiveness will be dependent on the type of management practice implemented. This is general guideline to be used for practices that can be assessed without special study monitoring.

Table 12. Management Plan implementation schedule.

Constituent	Management Practice	Constituents of Concern	Anticipated Implementation Date	Anticipated Evaluation Date
Lone Tree Creek @ Jack Tone Rd	Reduction in application rates	Chlorpyrifos	April - September 2009	April 2010
	Sprinkler or microspray irrigation	Chlorpyrifos	December 2010	April 2011
	Retention pond/holding basin	Chlorpyrifos, Copper, Diuron, *Selenastrum* toxicity, Sediment toxicity	December 2010	April 2011
Duck Creek @ Hwy 4	Reduction in application rates	Chlorpyrifos	April - September 2009	April 2010
	Sprinkler or microspray irrigation	Chlorpyrifos	December 2010	April 2011
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Reduction in application rates	Chlorpyrifos	April - September 2009	April 2010
	Sprinkler or microspray irrigation	Chlorpyrifos	December 2010	April 2011
	Retention pond/holding basin	Chlorpyrifos	December 2010	April 2011
	Center grass rows, grass waterways, or grass filter strips	Chlorpyrifos, Diuron, *Selenastrum* toxicity	December 2010	April 2011

Management Practice Performance Goals

The SJCDWQC Management Practice Performance Goal, Water Quality Management Practice Performance Goals #1-7 and associated Performance Measures are described in detail in the ESJWQC Management Plan (submitted on September 30, 2008). The Coalition developed a detailed plan of action to achieve these goals which led to direct outputs and indirect outcomes during 2008/2009. The Water Quality Management Practice Performance Goals and associated Performance Measures, Outputs and Outcomes from 2008/2009 are discussed below.

SJCDWQC Management Practice Performance Goal: *To continue to monitor and analyze the water and sediment quality of SJCDWQC site subwatersheds and to facilitate the implementation of management practices by providing outreach and support to growers in order to effectively enhance water quality in the Coalition region.*

Water Quality Management Practice Performance Goal #1: Identify potential sources of exceedances.

Performance Measures

1.1 Continue irrigation and storm monitoring for exceedances at Coalition sites.

1.2 Request pesticide use information from County Agricultural Commissioners.

1.3 Identify applications with the potential to cause toxicity or result in an exceedance of a specific chemical.

2008 Outputs and Outcomes

The Coalition conducted monitoring during the storm and irrigation seasons of 2008 (January – September) under the previous SJCDWQC MRPP. Starting in October 2008, monitoring was conducted under the new SJCDWQC MRPP submitted on August 25, 2008. During the irrigation season of 2008, monitoring on additional dates and upstream monitoring was conducted to further identify sources of priority constituents (Table 7). Results were discussed in relation to overall Coalition water quality in the March 1, 2009 SAMR and are also discussed in the Site Subwatershed Management Plans for priority subwatersheds.

As presented in the Coalition's Monitoring and Reporting Program Plan, the primary method of source identification is to use the pesticide use reports (PURs) filed with each County Agricultural Commissioner. The Coalition continues to use PUR reports to associate water quality exceedances with specific applications so that problem applications can be identified. This has also created an avenue to target outreach toward particular landowners or application events. PUR data are included with each SAMR and will be included in future Annual Monitoring Reports (AMRs). In addition, for priority subwatersheds, additional analysis of PUR data is included in this Management Plan update (see the Site Subwatershed section).

2009 Strategy

The Coalition plans to proceed with normal monitoring as outlined in the most recent SJCDWQC MRPP and any additional Management Plan monitoring as outlined in this document. In addition, the Coalition will continue to associate PUR data with exceedances enabling the Coalition to identify sources and then target outreach toward problem applications and/or specific landowners to improve water quality.

Water Quality Management Practice Performance Goal #2: Inform growers with irrigated crop land about water sampling results and obtain information on

Performance Measures

2.1 Provide monitoring results to all Coalition members and other interested parties.

2.2 Provided monitoring results at annual meetings in the winter of 2008-09.

2.3 Encourage growers to implement new management practices where applicable.

2.4 Document where and when management practices have been implemented in order to track effects on water quality at relevant monitoring sites.

2008 Outputs and Outcomes

Results are provided to all Coalition members through mailings, meetings at the County and site subwatershed level, and personal contacts. Specific examples of mailings are listed in Table 13 (April 1, 2008, July 2008, and Jan/Feb 2009). Dates and details of general grower meetings are listed in both Table 14 (March 10 at Grant Line Canal and March 10 in the Stockton Area, March 20, May 1, May 2, May 15, July 15, and July 16, 2008, Fall 2008, and November 19 and November 21, 2008) and Table 15 (November 24, 2008 and March 5, 2009). During meetings, presentations on monitoring results and on the use of management practices to address specific constituents are conducted by Coalition representatives; supplementary information is often distributed or made available. It is the landowner's responsibility to implement management practices on their farms where appropriate and the Coalition's responsibility to provide appropriate resources and support and track the implementation of management practices. The Coalition used all Management Practice Outreach and Education events (Table 14) and all Management Practice Tracking and Implementation meetings (Table 15) as opportunities to encourage landowners to implement management practices via presentations, discussions, conversations, and supplemental materials. The Coalition also informed growers of water quality exceedances and reviewed management practices during the 2008 Annual Agricultural Commissioner Meetings.

To facilitate the tracking of management practice implementation, the Coalition submitted a SJCDWQC General Survey Summary Report (submitted January 30, 2009) to establish a baseline of management practices. The baseline can be used to evaluate new management practice implementation.

2009 Strategy

The Coalition initiated meetings where individual grower surveys are distributed to attendees and completed during the meeting. The information obtained on the surveys are parcel specific and include questions regarding what practices the grower plans to implement in the next year. The Coalition will use this information to determine which growers are implementing new practices and can follow up with the grower in the next year to evaluate any new practices.

Water Quality Management Practice Performance Goal #3: Provide growers with information on Best Management Practices to address toxicity or exceedances of water quality standards.

Performance Measures

3.1 Hold meetings for growers to discuss management practices that can be used to eliminate exceedances.

3.2 When available, provide information on the results of the management practices studies (described below).

3.3 Assess effectiveness of Coalition meetings by tracking attendance, documenting management practice implementation and monitoring water quality exceedances.

2008 Outputs and Outcomes

Results and exceedances are communicated to growers through Coalition mailings and at site subwatershed grower meetings. Local workshops are organized for the subwatershed to inform growers when and where exceedances occur. Prior to those meetings landowners and operators (both Coalition members and non members) are contacted by the Coalition by mail about the specific exceedances in their site subwatershed. During a typical meeting, the Coalition reviews results of monitoring including exceedances of Management Plan constituents, discusses BMPs, presents results of management practice studies, and provides handouts, pamphlets, and other useful information. Table 13 lists grower meeting and workshops notifications (all mailings except April 1, 2008); Tables 14 and 15 describe in detail grower meetings and workshops (all events listed except October 2008 in Table 14). The Coalition records attendance to meetings and updates records of Management Practices implemented, and, coupled with continued monitoring, will be able to gauge the Coalition's effectiveness of outreach. Coalition strategies can then be shaped around these results.

2009 Strategy

The Coalition will continue to conduct annual grower meetings, grower group meetings and individual contacts during the spring and fall of 2009. In March 2009 the Coalition joined forces with Mid Valley Agricultural Services to hold a meeting for growers in the area in collaboration with their PCAs. The joint effort by all parties to discuss current water quality issues and management practices are important to ensure that new practices will be implemented. It is

critical that both the grower and the PCA are both aware of water quality concerns and potential practices to mitigate agricultural runoff. The Coalition is talking with other pesticide distribution companies to conduct additional meetings in 2009.

Water Quality Management Practice Performance Goal #4: Provide support to growers to implement management practices that will reduce the impact of discharges from agriculture on water quality.

Performance Measures

4.1 Provide information and outreach materials about Management Practices that could be used by growers to reduce the impact of agriculture on water quality.

4.2 Where general outreach and education efforts do not result in the implementation of effective management practices or improvements in water quality in the subwatershed, growers who have the potential to impact water quality through use of specific pesticides will be contacted individually in order to ensure that management practices are being employed.

2008 Outputs and Outcomes

The Coalition provides Management Practice information and outreach materials at every opportunity. Growers were alerted to exceedances, water quality trends, and relevant BMPs in the Watershed Coalition News (Table 13, April 1, 2008). Handouts, pamphlets, and other useful information are made available at every management practice outreach and education meeting and workshop (Tables 14). The BMP Handbook, Management Practices for Protecting Water Quality (binder of BMPs information, developed by CURES) is a significant resource for growers and was sent to all Coalition members during October 2008.

2009 Strategy

As discussed under Performance Goal #2, the Coalition has begun conducting meetings where individual surveys are completed with the goal of tracking implementation of new management practices. The Coalition is moving forward with conducting individual grower meetings in priority subwatersheds in an effort provide more effective outreach and education to improve water quality (Table 14, fall 2008 and November 21, 2008). In addition, the Coalition will continue to mail and hand out information on studies documenting the effectiveness of management practices, and provide resources to help encourage growers to implement additional management practices.

Water Quality Management Practice Performance Goal #5: Perform evaluations of management practices suitable for San Joaquin County and Delta Water Quality Coalition irrigated agriculture.

Performance Measures

5.1 Communicate results of management practices efficiency studies to landowners as results become available.

5.2 Monitoring at sites with exceedances will occur after implementation of management practices to evaluate effectiveness within each subwatershed.

2008 Outputs and Outcomes

CURES, the Westside San Joaquin River Watershed Coalition, local irrigation and water districts and landowners/operators are sponsoring a project addressing water quality in Orestimba Creek which will be applicable to some areas of the SJCDWQC. Funded through a State Water Resources Control Board grant (*Western San Joaquin Valley Pesticide BMP Implementation Program*), the project emphasizes developing information on the effectiveness of several management practices. The SJCDWQC obtained a Proposition 50 grant to evaluate management practices for control of pesticides on several crop types in the Lone Tree Creek and Grant Line Canal watersheds. Several special studies were conducted during 2008 storm and irrigation seasons as a part of this program; details are listed in Table 17.

Results of management practice efficacy studies are made available to growers through presentations, discussions, and conversations at general and individual grower meetings. In particular, the grower meetings listed in Table 14 on January 16, February 28, and March 10, 2008 and listed in Table 17 held on December 11, 2008 were all held specifically to discuss with growers the results of investigative studies. Additionally, all Coalition members were provided the BMP Handbook, Management Practices for Protecting Water Quality, which contains extensive and comprehensive information concerning results of management practices efficiency studies (Table 17, October 2008).

2009 Strategy

Continued monitoring and management practice implementation tracking via surveys and individual contacts enables the Coalition to evaluate its effectiveness within each individual watershed. The Coalition will use information that it obtains during individual contacts in high priority subwatersheds to determine the efficacy of newly implemented management practices on downstream water quality.

Water Quality Management Practice Performance Goal #6: Work with pesticide retailers and Pest Control Advisors to assist in providing outreach to growers and applicators in the Coalition region.

Performance Measures

6.1 Provide management practice information to growers by working with sales representatives and pest control advisors to promote BMPs in the management plan region.

2008 Outputs and Outcomes

The Coalition has been very successful working with the sales representatives and Pest Control Advisors (PCAs) to promote use of management practices when applying the product. As discussed under Performance Goal #3, the Coalition joined with Mid Valley Agricultural Services to host a grower meeting on March 5, 2009 and invited their customers (including several non-Coalition members) to discuss the SJCDWQC Coalition program, common exceedances and appropriate management practices.

2009 Strategy

Coalition representatives will continue to meet and work with PCAs during 2009 including attending meetings, offering continuing education credits for attending grower meetings and inviting PCA's to meet with Coalition representatives during individual contacts. The Coalition is working with other pesticide distribution companies to conduct joint meetings with growers and PCAs.

Water Quality Management Practice Performance Goal #7: Anticipate potential water quality problems caused by agricultural inputs.

Actions

7.1 Distribute management practices publications on preventing movement of pyrethroids in irrigation runoff or through drift.

2008 Outputs and Outcomes

The Coalition strived to educate growers about the issues with pyrethroids insecticides and preventative management practices through presentations and distributions at meetings. Table 17 (February 28 and March 10, 2008) and Table 20 (April 9, April 25, and December 11, 2008) contain details of these meetings. Management practices targeted to sediment are outlined in two publications the Coalition distributes to growers entitled *"Pyrethroid Insecticides/Orchards; Management Practices for Protecting Water"* and *"Pyrethroid Insecticides/Row Crops, Management Practices for Protecting Water."* These 8-page publications outline numerous practices to manage off-site movement of pyrethroids through irrigation runoff or spray drift.

2009 Strategy

The Coalition will continue efforts to make available and distribute information regarding pyrethroids in irrigation runoff and drift including member mailings and hosting BMP information on the SJCDWQC website.

SUMMARY OF COALITION OUTREACH ACTIVITIES

The SAMRs submitted on June 30, 2008 and March 1, 2009 included information on Coalition activities, events and deliverables that occurred during the 2008 storm and irrigation monitoring season, respectively, including all exceedance and communication reports delivered to the Regional Board staff. Below is a summary of those activities, events and deliverables from January 2008 to March 2009. Coalition activities are categorized into grower notification (Table 13), management practice outreach and evaluation (Table 14), management practice tracking and implementation (Table 15), general survey status (Table 16), and collaborations and special studies (Table 17).

Table 13. SJCDWQC grower notification of exceedances and management practices relevant to the 2008 monitoring seasons.

Grower Notification				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
Jan., Feb. 2008	All	Mailing of Energy, Irrigation, and Regulation Workshop Flyer and Registration.	All Constituents	Mike Wackman, Terry Prichard
April 1, 2008	All	Mailing to all members of Coalition newsletter.	All Constituents	Mike Wackman
July 2008	Lone Tree Creek Subwatershed	Announcement in San Joaquin Farm Bureau News of Lone Tree Creek Grower Meeting July 15 and 16, 2008 to discuss Lorsban and copper exceedances and respective BMPs.	Chlorpyrifos, Copper	Mike Wackman
July 2008	Lone Tree Creek Subwatershed	Mailing announcing grower meeting July 15 and 16, 2008 to discuss Lorsban and copper exceedances and respective BMPs.	Chlorpyrifos, Copper	Mike Wackman
October 24, 2008	All	Mailing announcing Agricultural Commissioner Office's annual grower meeting.	All Constituents	Mike Wackman
December 10, 2008	Duck Creek	Mailing to announce Duck Creek sub watershed grower meeting in Farmington; followed up with reminder postcard 7 days after initial mailing.	All Constituents	Terry Prichard

Grower Notification				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
February 18,2009	Lone Tree Creek, Temple Creek, Duck Creek, Littlejohns Creek	Mailing to announce MidValley Ag Services hosting Grower Mtg at Escalon Sportsman Club (sent to all members MidValley Ag); followed up with phone call after initial mailing.	All Constituents	Terry Prichard

Table 14. SJCDWQC management practice outreach and education to growers relevant to the 2008 monitoring seasons.

Management Practice Outreach and Education				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
January 16, 2008	Lodi Area	California Cherry Research Review & Growing Sweet Cherries Organically Workshop to promote managing storm runoff from orchards. Presented research results comparing runoff volumes in a cover crop and clean cultivated conditions. Discussed delayed dormant applications, the use of cover crops and runoff treatment strategies.	Organo-phosphates, simazine and diuron	Terry Prichard
February 28, 2008	Stockton Area	Tri-County Walnut Institute Meeting with landowners and PCAs to discuss strategies to minimize pesticide residues in runoff from walnut orchards, specifically in early season (late March- May). Also discussed use of irrigation management, avoidance of sensitive areas, and use of spray buffers during mid April to September.	Copper, OPs, and pyrethroids	Terry Prichard
March 10, 2008	Grant Line Canal	Grower meeting focusing on exceedances that occurred each spring as a result of chlorpyrifos applications for alfalfa weevil. Trial results from a Prop50 study conducted within the Grant Line Canal area were discussed including the efficacy of other products (Warrior and Steward) in comparison to chlorpyrifos	Chlorpyrifos, pyrethroids	John Meek, Terry Prichard
March 10, 2008	Tracy Area	Grantline road sub watersheds focus on alfalfa pest control – selecting insecticides with shorter half-lives and lower solubility	All Constituents	Mike Wackman, Terry Prichard
March 20, 2008	Stockton Area	Energy, Irrigation, and Regulation Workshop: Discussed ag diesel engine regulation, the current status of the ILRP, and BMPs to improve water use, improve runoff, and to control off-site movement of ag residues.	All Constituents	Mike Wackman, Terry Prichard

Management Practice Outreach and Education				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
April 25, 2008	Linden Area	Making Pheromone Mating Disruption Work in Walnut outreach meeting	OP's	Terry Prichard
May 1, 2008	All subwatersheds sites in Stockton Area	Grower outreach meeting discussing exceedances from the previous irrigation season and BMPs for the upcoming irrigation season.	All Constituents	MLJ-LLC, Mike Wackman, Terry Prichard
May 2, 2008	All subwatershed sites in Tracy Area	Grower outreach meeting discussing exceedances from the previous irrigation season and BMPs for the upcoming irrigation season.	All Constituents	MLJ-LLC, Mike Wackman, Terry Prichard
May 15, 2008	Lockeford	Air Quality and Water Quality Workshop	All Constituents	San Joaquin County Resource Conservation Service
July 15, 2008	Lone Tree Creek Subwatershed	Alfalfa, corn, and tomato grower meeting to address recent exceedances in area and review BMPs.	Chlorpyrifos (Lorbsan), Copper	Mike Wackman, Terry Prichard
July 16, 2008	Lone Tree Creek Subwatershed	Walnut and grape growers meeting to address recent exceedances in area and review BMPs.	Chlorpyrifos (Lorbsan), Copper	Mike Wackman, Terry Prichard
Fall 2008	Central Delta Region	Individual grower meeting to tour grower's farm then discuss the importance of understanding current irrigation and pesticide application practices and implementing management practices in achieving water quality objectives specific to individual grower.	All Constituents	Mike Wackman, Terry Prichard, Rachelle Antinetti, Parry Klassen, UC Farm Advisor
October 2008	All	Handbook containing information on BMP sent out to all Coalition members. Developed by CURES.	All Constituents	CURES
November 18, 2008	Lodi Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Mike Wackman
November 19, 2008	Duck Creek Subwatershed	Grower meeting to address measured water quality standard exceedances and discuss BMPs and pesticide product options.	All Constituents	Mike Wackman, Terry Prichard
November 20, 2008 (2 meetings)	Ripon/Manteca/ Escalon Areas	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Terry Prichard

Management Practice Outreach and Education				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
November 21, 2008	Lone Tree Creek Subwatershed	Individual grower meeting to discuss chlorpyrifos exceedances linked with individual grower use; visited grower fields to view runoff conditions and discuss potential management practices.	All Constituents	Rachelle Antinetti, Terry Prichard, and Joe Gasper (PCA)
November 24, 2008	Duck Creek Subwatershed	Grower meeting to give presentation on better management practices and collect management practice surveys.	All Constituents	Mike Wackman, Terry Prichard
November 24, 2008	Linden Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Rachelle Antinetti
November 25, 2008	Escalon Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Mike Wackman
December 2, 2008	Stockton Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Mike Wackman
December 4, 2008	Tracy Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Mike Wackman
December 9, 2008	Lodi Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Rachelle Antinetti
December 18, 2008	Stockton Area	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Terry Prichard
March 5, 2009	Escalon	Mid Valley Agricultural Services hosted Grower Meeting at Escalon Sportsman Club; invited all their PCAs, approximately 50 growers attended, including some growers not in coalition. Discussed program; distributed surveys. (Prichard's continuing to work with other groups (other pesticide sellers).)	All Constituents	Terry Prichard, Mike Wackman

Table 15. SJCDWQC management practice tracking and implementation relevant to the 2008 monitoring seasons.

Management Practice Tracking and Implementation				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
November 24, 2008	Duck Creek Subwatershed	Grower meeting to give presentation on better management practices and collect management practice surveys.	All Constituents	Mike Wackman, Terry Prichard
March 5, 2009	Escalon	Mid Valley Agricultural Services hosted Grower Meeting at Escalon Sportsman Club; invited all their PCAs, approximately 50 growers attended, including some growers not in coalition. Discussed program; distributed surveys. (Prichard's continuing to work with other groups (other pesticide sellers).	All Constituents	Terry Prichard, Mike Wackman

Table 16. Status of general surveys within the SJCDWQC region.

General Surveys				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
January 30, 2009	All	General survey results linked to parcels and summarized in the SJCDWQC General Survey Summary Report.	Not Applicable	MLJ-LLC

Table 17. SJCDWQC collaborations and special studies to address water quality issues during the 2008 monitoring seasons.

Collaborations and Special Studies				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
January 2008	San Joaquin Count orchard	Prop50 study to investigate orchard floor management practices effects on influencing runoff volumes and influencing herbicide residual contained in the runoff waters.	Simazine and diuron	Terry Pritchard (Prop50)
Spring 2008	San Joaquin County tailwater pond	Prop50 study to assess tailwater ponds as an alternative to surface water discharge and evaluate pond management in relation to surface water discharge.	Chlorpyrifos	Terry Prichard (Prop50)

Collaborations and Special Studies				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
Spring 2008	San Joaquin County walnut orchards	Prop50 study to reduce frequency and volume of spraying needed to combat walnut blight disease by using a combination of disease model prediction and spraying.	Copper Hydroxide	Terry Prichard (Prop50)
April 2008	San Joaquin County	Prop50 study investigating the effect of using weed seeker booms attached to application sprayers to reduce the volume and use of soil active herbicides, such as simazine and diuron.	Simazine and diuron	Terry Prichard (Prop50)
April 9, 2008	San Joaquin County	Meeting for walnut growers participating in experiment (East County Codling Moth Pheromone Mating Disruption) to discuss management practices required to successfully use pheromone mating disruption.	Organophosphates, pyrethroid insecticides	Terry Prichard (Prop50)
April 23, and June 1, 2008	Duck Creek Subwatershed	Prop50 study evaluating a common practice of applying chlorpyrifos with the seed in a bed to determine the risk of significant concentrations in furrow irrigation runoff waters from a corn field.	Chlorpyrifos	Terry Prichard (Prop50)
April 25, 2008	San Joaquin County	Field meeting to discuss monitoring codling moths and the steps to decide if supplemental insecticides sprays are necessary and which are most appropriate.	Organophosphates, pyrethroid insecticides	Terry Prichard (Prop50)
June 28, 2008	San Joaquin County tomato field	Prop50 study to determine most efficient method to protect tomato plants by comparing two spraying methods as well as an alternative non-copper material, Actigard.	Copper Hydroxide	Terry Prichard (Prop50)
December 11, 2008	East San Joaquin County	Meeting for walnut growers (6 growers representing 300 acres) participating in experiment to discuss results of the management practice evaluation which compared the used of pheromone mating disruption of codling moth in contrast to standard practice of using OP and pyrethroid insecticides.	Organophosphates, pyrethroid insecticides	Terry Prichard (Prop50)

I. DUCK CREEK

Management Plan Constituents

Priority A

- Chlorpyrifos
- Diazinon

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Selenastrum capricornutum* water column toxicity

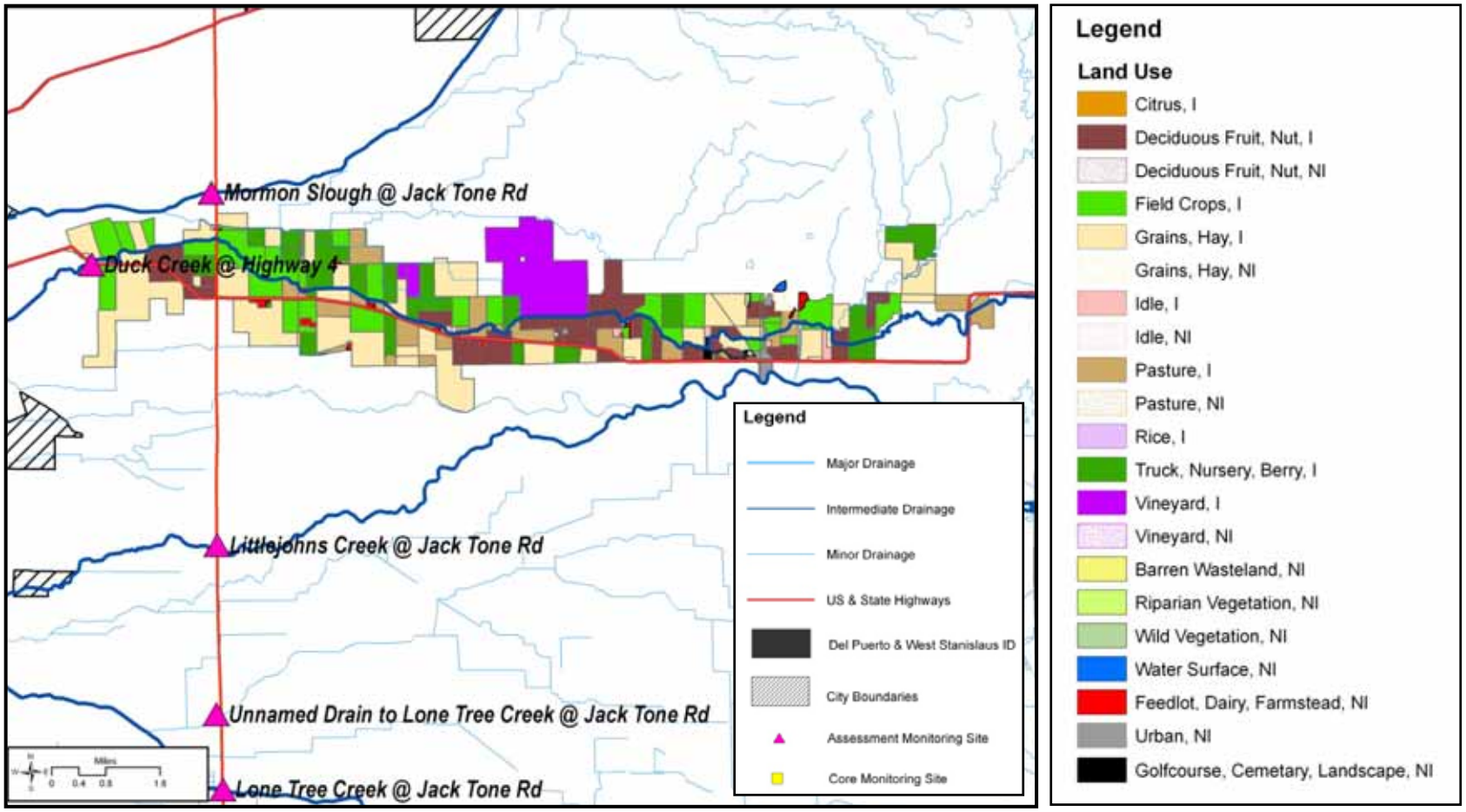
Priority E

- Dissolved Oxygen
- pH
- *E. coli*

Description of Duck Creek Site Subwatershed

Duck Creek @ Highway 4 (10,777 irrigated acres) is located just to the east of the city of Stockton. Duck Creek drains a section of southern San Joaquin County between Stockton and the Lone Tree Creek site subwatershed. During the summer, flow in the creek is typically low. The creek channel was dredged over several months early in the 2007 irrigation season. The predominant land uses are field crops and irrigated pasture. There is also a large amount of deciduous orchards in the site subwatershed, and truck farm/nursery and berry crops are also grown. Figure I-1 illustrates the land use within this site subwatershed area.

Figure I-1. Site subwatershed map of land use for sample site at Duck Creek @ Hwy 4.



Subwatershed Monitoring History

Monitoring occurred at the Duck Creek @ Hwy 4 monitoring site during the irrigation season of 2004 and the storm and irrigation seasons of 2006, 2007, and 2008 (Table I-1). Samples were collected from this site for field parameters and the analysis of water chemistry and toxicity (Table I-2). Two irrigation events were monitored in 2004 for all field and physical parameters (including bacteria), chlorpyrifos, diazinon, four pyrethroids, and water column toxicity to all three species. Sediment was collected only once in 2004. This location was removed from the monitoring program in 2005 and the Coalition restarted sampling at Duck Creek @ Hwy 4 during the irrigation season of 2006. Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table I-2). Management Plan Monitoring for the Coalition was initiated in June of 2007 and included additional sampling at Duck Creek @ Hwy 4 in September for chlorpyrifos (Table I-3). Upstream Management Plan Monitoring occurred in 2008 at Duck Creek @ Drais Road for chlorpyrifos during the months of May, July, and September (Table I-4). This location was selected to provide information on the contribution from either the upper or lower site subwatershed to the load of chlorpyrifos measured at the Highway 4 site. The location of the upstream site is provided in Table I-5 and Figure I-2. Exceedances of field and physical parameters, *E. coli*, pesticides and water column toxicity have occurred at the upstream site. A summary and discussion of these exceedances are provided in the next section (Table I-6).

Walker Slough, the most immediate downstream waterbody, is listed as impaired for pathogens due to urban runoff/storm sewers and recreational and tourism activities. Duck Creek is not currently considered impaired, however it is proposed for listing on the 2008 303d list.

Duck Creek @ Hwy 4 is an Assessment Monitoring location under the new MRPP and monitoring was initiated with the first rotation of sites from October 2008 to December 2010. The Coalition will also continue to conduct Management Plan Monitoring at this site. Management Plan Monitoring is described in better detail later in this document.

Table I-1. Duck Creek @ Highway 4 sampling events per season and year. An irrigation season sampling event encompasses normal monitoring and any associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall event encompasses normal monitoring

	2004	2005		2006		2007		2008		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Events Sampled	2	NA	NA	NA	5	2	6	2	6	2
Events Not Sampled	0	NA	NA	NA	0	0	0	0	0	0
Total	**2**	**NA**	**NA**	**NA**	**5**	**2**	**6**	**2**	**6**	**2**

NA - Not applicable. This site was not sampled during this season/year.

Table I-2. Duck Creek @ Highway 4. Number of analyses run per constituent in each sampling season (only environmental samples and field analyses listed).

Method	Constituent	2004	2006	2007		2008		
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Field and Physical Parameters								
NA	pH	2	5	3	8	3	10	2
NA	Specific Conductivity	2	5	3	8	3	10	2
NA	Dissolved Oxygen	2	4	3	8	3	10	2
EPA 160.1	Dissolved Solids	2	5	2	6	2	6	2
EPA 160.2	Suspended Solids					1		2
EPA 180.1	Turbidity	2	5	2	6	2	6	2
SM 9223 B	E. coli	2	5	2	6	2	6	2
EPA 110.2	Color	2	5	2	6	1	6	
EPA 415.1	TOC	2	5	2	6	2	6	2
EPA 405.1	BOD		1	2	2			
Carbamates								
EPA 8321A	Aldicarb		5	2	6	2	6	2
EPA 8321A	Carbaryl		5	2	6	2	6	2
EPA 8321A	Carbofuran		5	2	6	2	6	2
EPA 8321A	Methiocarb		5	2	6	2	6	2
EPA 8321A	Methomyl		5	2	6	2	6	2
EPA 8321A	Oxamyl		5	2	6	2	6	2
Organochlorines								
EPA 8081A	DDD		5	2	6	2	6	2
EPA 8081A	DDE		5	2	6	2	6	2
EPA 8081A	DDT		5	2	6	2	6	2
EPA 8081A	Dicofol		5	2	6	2	6	2
EPA 8081A	Dieldrin		5	2	6	2	6	2
EPA 8081A	Endrin		5	2	6	2	6	2
EPA 8081A	Methoxychlor		5	2	6	2	6	2
Organophosphates								
EPA 8141A	Azinphos methyl		5	2	6	2	6	2
EPA 8141A	Chlorpyrifos	2	5	2	7	2	6	2
EPA 8141A	Diazinon	2	5	2	6	2	6	2
EPA 8141A	Dichlorvos					1		2
EPA 8141A	Dimethoate		5	2	6	2	6	2
EPA 8141A	Disulfoton		5	2	6	2	6	2
EPA 8141A	Demeton-s					1		2
EPA 8141A	Malathion		5	2	6	2	6	2
EPA 8141A	Methamidophos		5	2	6	2	6	2
EPA 8141A	Methidathion		5	2	6	2	6	2
EPA 8141A	Parathion, Methyl		5	2	6	2	6	2
EPA 8141A	Phorate		5	2	6	2	6	2
EPA 8141A	Phosmet		5	2	6	2	6	2
Group A Pesticides								
EPA 8081A	Aldrin					1		2
EPA 8081A	Chlordane					1		2
EPA 8081A	Endosulfan I					1		2
EPA 8081A	Endosulfan II					1		2
EPA 8081A	HCH, alpha					1		2
EPA 8081A	HCH, beta					1		2
EPA 8081A	HCH, delta					1		2
EPA 8081A	HCH, gamma					1		2
EPA 8081A	Heptachlor					1		2
EPA 8081A	Heptachlor epoxide					1		2
EPA 8081A	Toxaphene					1		2
Pyrethroids								
EPA 8081A	Bifenthrin		5	2	6	1	6	
EPA 8081A	Cypermethrin	2	5	2	6	1	6	
EPA 8081A	Cyhalothrin, lambda	2	5	2	6	1	6	

Method	Constituent	2004	2006	2007		2008		
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 8081A	Permethrin	2	5	2	6	1	6	
EPA 8081A	Cyfluthrin		5	2	6	1	6	
EPA 8081A	Esfenvalerate/ Fenvalerate	2	5	2	6	1	6	
Triazines								
EPA 619	Atrazine		5	2	6	2	6	2
EPA 619	Cyanazine		5	2	6	2	6	2
EPA 8321A	Diuron		5	2	6	2	6	2
EPA 547M	Glyphosate		5	2	6	2	6	2
EPA 8321A	Linuron		5	2	6	2	6	2
EPA 8141A	Molinate		5	2	6	1	6	
EPA 549.2M	Paraquat dichloride		5	2	6	2	6	2
EPA 619	Simazine		5	2	6	2	6	2
EPA 8141A	Thiobencarb		5	2	6	1	6	
EPA 8141A	Trifluralin					1		2
Metals (Total)								
EPA 200.8	Arsenic					1	6	2
EPA 200.8	Boron					1	6	2
EPA 200.8	Cadmium					1	6	2
EPA 200.8	Copper					1	6	2
EPA 200.8	Lead					1	6	2
EPA 200.8	Molybdenum					1		2
EPA 200.8	Nickel					1	6	2
EPA 200.8	Selenium					1	6	2
EPA 200.8	Zinc					1	6	2
Metals (Dissolved)								
EPA 200.8	Cadmium					1		2
EPA 200.8	Copper					1		2
EPA 200.8	Lead					1		2
EPA 200.8	Nickel					1		2
EPA 200.8	Zinc					1		2
Nutrients								
EPA 350.2	Ammonia as N					1	6	2
EPA 130.2	Hardness as CaCO3					1	6	2
EPA 300.0	Nitrate as N						6	
EPA 354.1	Nitrite as N						6	
EPA 353.3	Nitrate + Nitrite as N					1		2
EPA 351.3	Nitrogen, Total Kjeldahl					1	6	2
EPA 365.2	OrthoPhosphate as P					1	6	2
EPA 365.2	Phosphate as P					1	6	2
Toxicity								
EPA 821-02-012	Ceriodaphnia dubia	2	6	2	6	2	8	2
EPA 821-02-012	Pimephales promelas	2	5	2	6	2	6	2
EPA 821-02-013	Selenastrum capricornutum	2	5	3	6	2	8	2
EPA 600/R-99-064	Hyalella azteca	2	1	1	1		1	

Table I-3. Duck 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
Duck Creek @ Highway 4	25-Sep-07	A	**X**

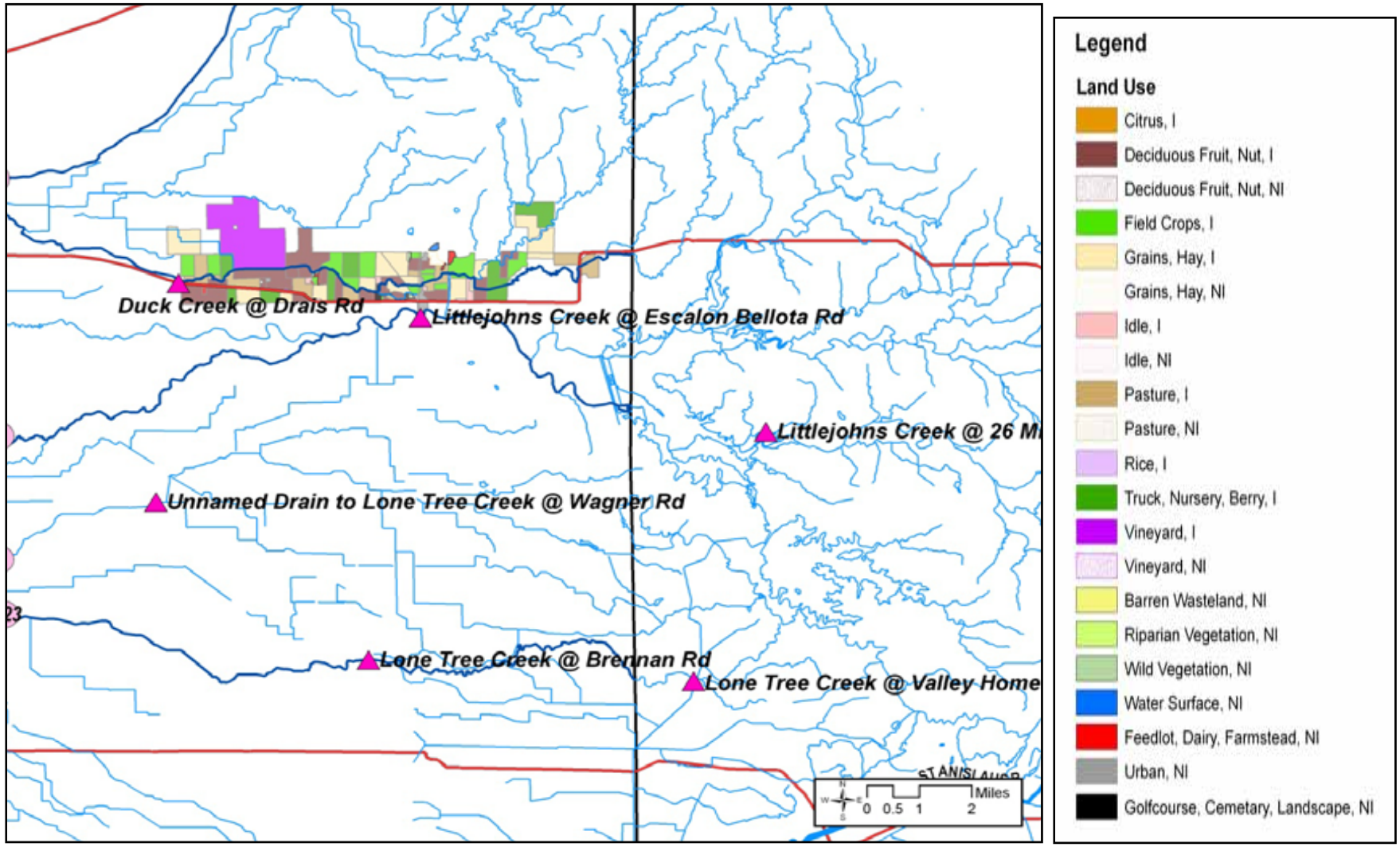
Table I-4. Duck Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Duck Creek @ Drais Rd	5-May-08	U	**X**
Duck Creek @ Drais Rd	15-Jul-08	U	**X**
Duck Creek @ Drais Rd	16-Sep-08	U	**X**

Table I-5. Coordinates of the Duck Creek site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Duck Creek @ Highway 4	531XDCAHF	37.9491	-121.1810
Duck Creek @ Drais Rd	531XDCADR	37.9348	-121.0841

Figure I-2. Site subwatershed map of land use for upstream Management Plan Monitoring site Duck Creek @ Drais Rd.



Exceedance History

Water quality results from sampling the Duck Creek site subwatershed during the irrigation season of 2008 included ten exceedances of dissolved oxygen (DO), two pH, two *E. coli*, six of chlorpyrifos, one of malathion, and six instances of toxicity, four to *Ceriodaphnia* and two to *Selenastrum*. Sampling prior to the 2008 irrigation season resulted in eight DO exceedances, two pH exceedance, six *E. coli* exceedances, five chlorpyrifos exceedances, one diazinon exceedance, and one instance each of water column toxicity to *Ceriodaphnia* and *Selenastrum*. All exceedances are listed in Table I-6 by season and date and are based on WQTLs 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 Table I-6 for those analytes with two or more exceedances within the last three years except for chlorpyrifos and diazinon which require a management plan after a single exceedance.

Table I-6. All exceedances experienced in samples collected from locations within the Duck Creek site subwatershed between August 2004 and December 2008 (sorted by season and date).

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	E. coli, MPN/100 mL	Chlorpyrifos, µg/L	Diazinon, µg/L	Malathion, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count
Duck Creek @ Hwy 4	Irrigation	16-May-06	5.6		2400	0.029				
Duck Creek @ Hwy 4	Irrigation	20-Jun-06	4.5		330					
Duck Creek @ Hwy 4	Irrigation	18-Jul-06	5.5							
Duck Creek @ Hwy 4	Irrigation	15-Aug-06		6.43						
Duck Creek @ Hwy 4	Irrigation	19-Sep-06				0.15			0	
Duck Creek @ Hwy 4	Irrigation	10-Apr-07			290					
Duck Creek @ Hwy 4	Irrigation	12-Jun-07		8.66						
Duck Creek @ Hwy 4	Irrigation	10-Jul-07	6.67			0.024				
Duck Creek @ Hwy 4	Irrigation	9-Aug-07	6.54							
Duck Creek @ Hwy 4	Irrigation	4-Sep-07	6.99			0.025				
Duck Creek @ Hwy 4	Irrigation	25-Sep-07	5.83			0.029				
Duck Creek @ Hwy 4	Irrigation	15-Apr-08				0.057			0	374263
Duck Creek @ Hwy 4	Irrigation	23-Apr-08							0	
Duck Creek @ Drais Rd	*Irrigation*	*13-May-08*	*6*	*6.05*		*0.42*				
Duck Creek @ Hwy 4	Irrigation	13-May-08	6.95	6.31						191899
Duck Creek @ Hwy 4	Irrigation	10-Jun-08	6.89			0.11		0.2		
Duck Creek @ Drais Rd	*Irrigation*	*15-Jul-08*	*2.66*							
Duck Creek @ Hwy 4	Irrigation	15-Jul-08	5.87			0.066			0	
Duck Creek @ Hwy 4	Irrigation	22-Jul-08	4.92						0	
Duck Creek @ Hwy 4	Irrigation	12-Aug-08	6			0.017				
Duck Creek @ Hwy 4	Irrigation	13-Aug-08	5.34							
Duck Creek @ Drais Rd	*Irrigation*	*16-Sep-08*	*3.99*							
Duck Creek @ Hwy 4	Irrigation	16-Sep-08	5.92			0.027				
Duck Creek @ Hwy 4	Storm	11-Feb-07			820					
Duck Creek @ Hwy 4	Storm	28-Feb-07			2400		0.11			793000
Duck Creek @ Hwy 4	Storm	6-Mar-07	5.8							
Duck Creek @ Hwy 4	Storm	23-Jan-08			240					
Constituent Priority			**E**	**E**	**E**	**A**	**A**		**D**	**D**

2007 and 2008 Management Plan Monitoring Results

In 2007 and 2008, Management Plan Monitoring was implemented at the Duck Creek site subwatershed for chlorpyrifos. The monitoring included additional sampling at Duck Creek @ Highway 4 in 2007 (Table I- 3) and upstream sampling at Duck Creek @ Drais Road in 2008 (Table I- 4). Table I-7 provides monitoring results for chlorpyrifos from all sampling events during the 2007 and 2008 irrigation seasons including Management Plan Monitoring (MPM). The chlorpyrifos WQTL was exceeded in July and September 2007 including the MPM sample collected on September 25, 2007. Exceedances of the chlorpyrifos WQTL were experienced again in 2008 during every normal monitoring event except during May. The upstream Management Plan Monitoring site experienced only one exceedance on May 13, 2008. Samples collected in months not experiencing exceedances had no detectable amounts of chlorpyrifos.

Table I-7. Duck 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 from the 2007-2008 irrigation seasons. Exceedance values are in bold.

Month:		April	May	June	July	August	Septmeber
2007 NM (@ Hwy 4)	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	**0.024**	<0.003	**0.025**
2007 MPM A (@ Hwy 4)	Date	NA	NA	NA	NA	NA	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	**0.029**
2008 NM (@Hwy 4)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	**0.057**	<0.003	**0.11**	**0.066**	**0.017**	**0.027**
2008 MPM US (@ Drais Rd)	Date	NA	5/13/08	NA	7/15/08	NA	9/16/08
	Chlorpyrifos (µg/L)	NA	**0.42**	NA	<0.003	NA	<0.003

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

Load Calculations

Loads have been calculated for the chlorpyrifos detections based on the following formula (Table I-8):

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

The load values calculated and presented for pesticides or other 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 the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table I-8. Chlorpyrifos loads calculated from concentration and discharge measured on each detection and exceedance date for the Duck Creek @ Hwy 4 and Duck Creek @ Drais Rd monitoring sites.

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	16-May-06	6.34	0.029	5.21
Duck Creek @ Hwy 4	Chlorpyrifos	18-Jul-06	NR	0.011	NA
Duck Creek @ Hwy 4	Chlorpyrifos	19-Sep-06	6.02	0.15	25.57
Duck Creek @ Hwy 4	Chlorpyrifos	10-Jul-07	14.43	0.024	9.81
Duck Creek @ Hwy 4	Chlorpyrifos	4-Sep-07	0	0.025	0
Duck Creek @ Hwy 4	Chlorpyrifos	25-Sep-07	2.16	0.029	1.77
Duck Creek @ Hwy 4	Chlorpyrifos	23-Jan-08	2.11	0.0081	0.48
Duck Creek @ Hwy 4	Chlorpyrifos	15-Apr-08	13.07	0.057	21.10
Duck Creek @ Hwy 4	Chlorpyrifos	10-Jun-08	15.51	0.11	48.31
Duck Creek @ Hwy 4	Chlorpyrifos	15-Jul-08	13.67	0.066	25.55
Duck Creek @ Hwy 4	Chlorpyrifos	12-Aug-08	4.97	0.017	2.39
Duck Creek @ Hwy 4	Chlorpyrifos	16-Sep-08	20.80	0.027	15.90
Duck Creek @ Drais Rd	*Chlorpyrifos*	*13-May-08*	*NR*	*0.42*	*NA*

NR – Unable to deploy instrument, too deep to wade and discharge not measured.
NA – Unable to calculate due to lack of information.

Source Identification

Priority A Constituents

Chlorpyrifos and diazinon are the only priority A constituents included in the Management Plan within the Duck Creek @ Hwy 4 site subwatershed. There has only been one exceedance of the diazinon WQTL (February 2007) and sources of this exceedance were discussed in the June 30, 2008 SAMR. There have been no detections of diazinon in samples collected in the storm monitoring months of 2008 or 2009.

Chlorpyrifos

Eleven exceedances of the chlorpyrifos WQTL (0.015 µg/L) occurred throughout the irrigation season in samples collected between 2004 and 2008 during normal and Management Plan Monitoring (Table I-6). To determine the source(s) 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. Township, range and section (TRS) in which chlorpyrifos was applied within four weeks of the exceedance date are identified. Within the Duck Creek @ Hwy 4 site subwatershed, chlorpyrifos has been applied 85 times in 2006, 45 times in 2007, and 53 times in 2008 (Table I-9). In both 2006 and 2007, May appears to be the peak application month with 2,462 pounds applied in 2006 and 1,211 pounds applied in 2007 (Table I-9, Figure I-3). Chlorpyrifos use has decreased with close to half the number of applications and less than half the pounds applied in 2007 as compared to 2006; chlorpyrifos use jumped slightly in 2008 with eight more applications compared to 2007, but the total pounds applied was still roughly half of that applied in 2006 (Table I-9). The average application rate of chlorpyrifos for the Duck Creek subwatershed from 2004-2008 is 1.32 lbs AI/acre (Table I-10). The highest application rates are associated with walnut orchards.

Table I-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2006 - 2008 in the Duck Creek @ Hwy 4 site subwatershed.

Month	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2006	1	18.6	40
April, 2006	2	38.5	50
May, 2006	28	2462.3	1696
June, 2006	12	1342.1	876.5
July, 2006	18	1942.9	1534
August, 2006	20	1170.7	1015
September, 2006	3	127.2	268
October, 2006	1	114.1	57
March, 2007	11	603.4	537
April, 2007	9	362.3	548
May, 2007	12	1211.3	803
June, 2007	2	156.8	78
July, 2007	7	429.5	572
August, 2007	3	70.2	80
October, 2007	1	42.5	42.5
March, 2008	13	756.5	642
April, 2008	10	433.0	440
May, 2008	11	1306.4	685
June, 2008	1	24.0	24
July, 2008	16	1180.0	887
August, 2008	2	114.0	57
2006 Total	85	7216.6	5536.5
2007 Total	45	2833.5	2618
2008 Total	53	3814.0	2735
Total	**182**	**13864.1**	**10889.5**

Figure I-3. Pounds of chlorpyrifos added to TRS within the Duck Creek @ Hwy 4 site subwatershed by month for 2006 - 2008. Asterisk (*) denotes months in which chlorpyrifos exceedances were detected at the site.

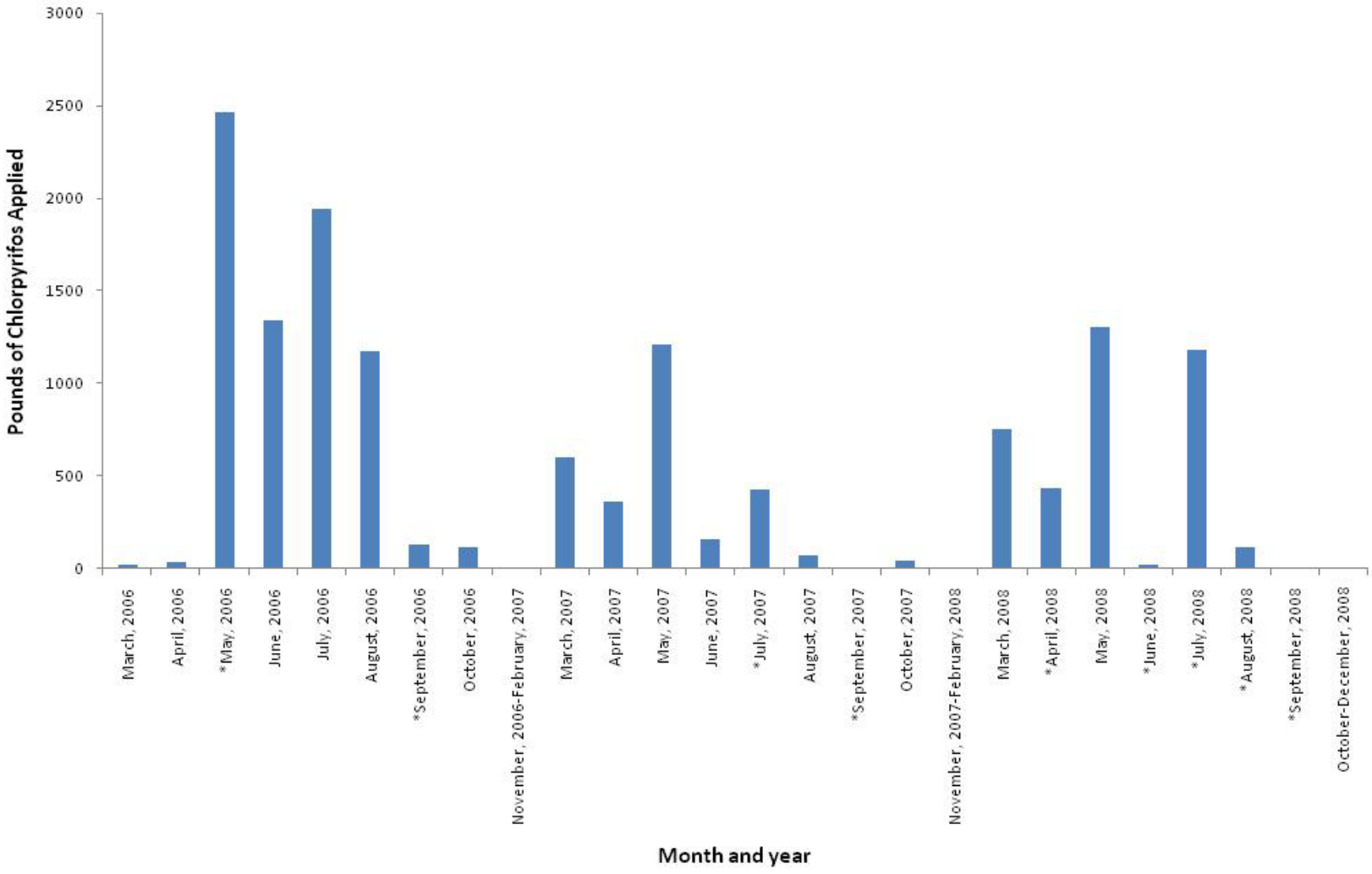


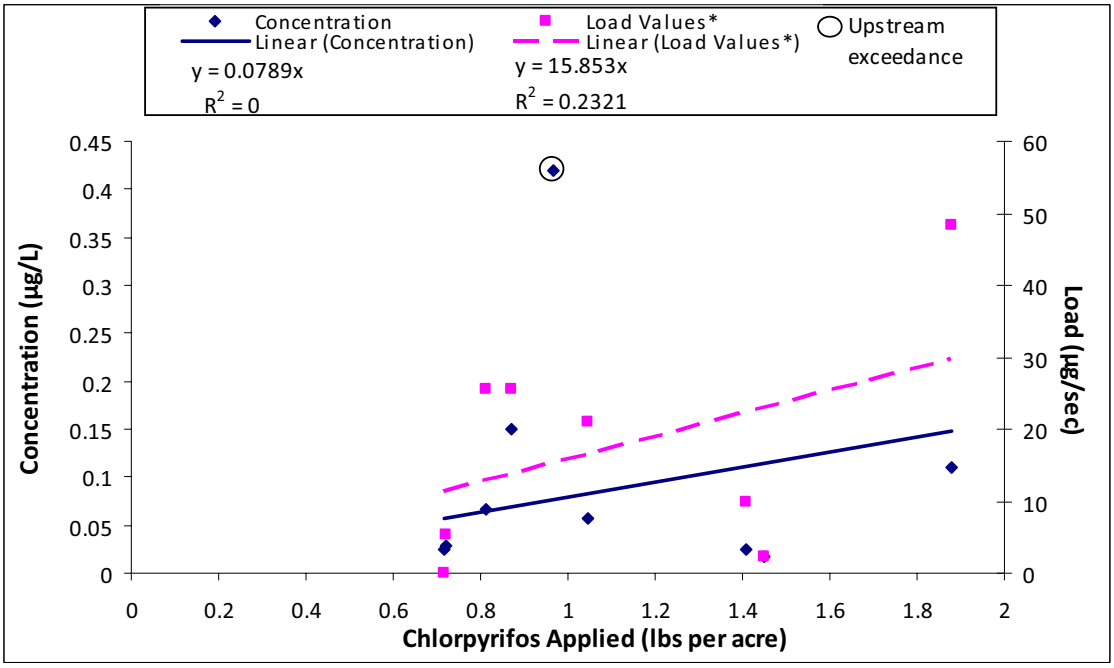
Table I-10. Average pound active ingredient (AI) per acre for chlorpyrifos based on PUR data from 2004-2008 within the Duck Creek @ Hwy 4 subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	0.50
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	0.46
			0.50
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	1.17
	CORN FOR/FOD	LORSBAN 15G GRANULAR INSECTICIDE	1.13
			1.17
	N-OUTDR CONTAINER/FLD GRWN PLANTS	ESTATE INSECTICIDE	0.49
	N-OUTDR PLANTS	DURSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	1
	WALNUT	GOVERN 4E INSECTICIDE	2.02
		LORSBAN 4E INSECTICIDE	0.50
			2.00
		LORSBAN-4E	0.47
			0.93
			1.86
			2.00
			2.00
			2.01
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN 4E INSECTICIDE	2.00
		LORSBAN 4E-HF	1.99
		LORSBAN-4E	0.46
			1.74
			1.86
			2.00
Average pounds chlorpyrifos applied per acre (2004-2008)			**1.32**

The Coalition developed hypotheses to guide the search for sources within the watershed. If the amount of chlorpyrifos (either concentration or load) detected in the sample water was positively associated with amount of chlorpyrifos, then the exceedance would most likely be a result of accumulated runoff from numerous parcels. Alternatively, if there was no relationship between the amount applied across the watershed and the amount found in the water, the exceedance would be a result of one or a few parcels with poorly managed discharge. In order to develop an outreach strategy based on PUR data and the above hypothesis, the Coalition must assume that all applications have been reported and that each application has been reported accurately. The outreach strategy of the Coalition varies depending on which hypothesis is correct. The hypotheses are not mutually exclusive as some parcels could always contribute to exceedances, although the magnitude of the exceedance would be determined by the amount of product applied.

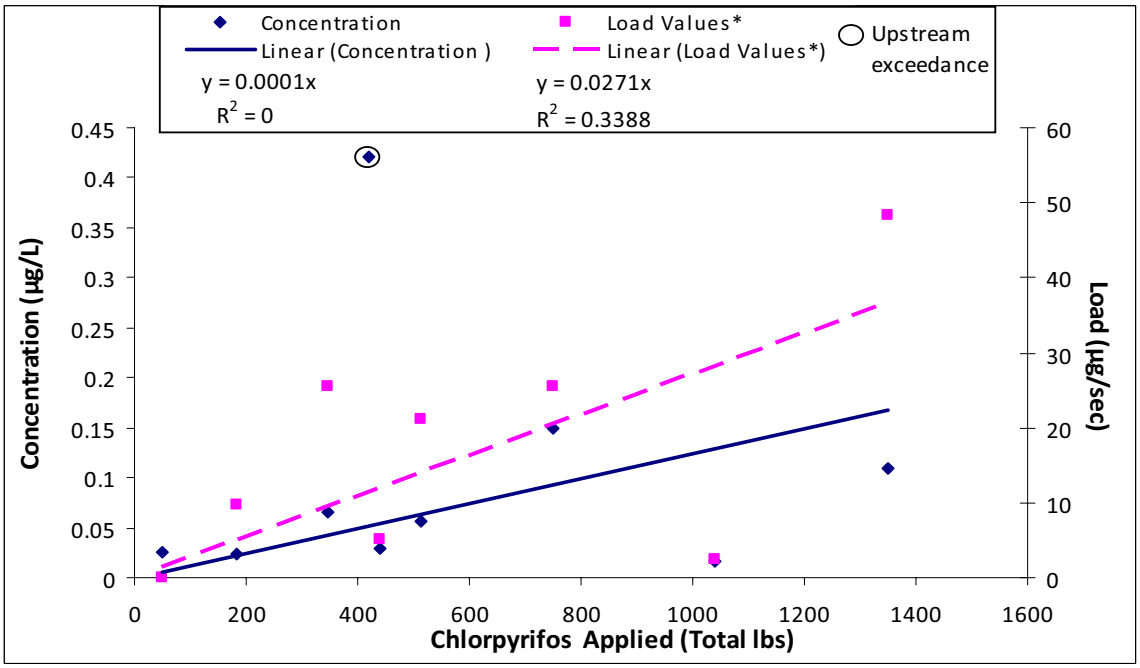
The Coalition performed an analysis of chlorpyrifos applications and concentrations and loads of chlorpyrifos in the water (all exceedances). A linear regression analysis was performed to establish the relationship both between application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure I-4) and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure I-5). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI were summed and divided by the summed acreage. The small sample size precluded a rigorous statistical treatment but sample sizes are sufficiently large to allow the two hypotheses to be distinguished. 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 I-4. Chlorpyrifos exceedance concentrations and loads compared to application rates (average lbs per acre) for the **Duck Creek @ Hwy 4** site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Load unavailable for 5/13/2008 upstream exceedance.

Figure I-5. Chlorpyrifos exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Duck Creek @ Hwy 4 site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Load unavailable for 5/13/2008 upstream exceedance.

The regression of concentration on pounds AI per acre was not significant indicating that none of the variation in concentration was accounted for by the application rate (Figure I-4). There was no significant regression of chlorpyrifos concentration on pounds of active ingredient applied (Figure I-5). The lack of a relationship was a result of a single exceedance in September 2006 with a large positive residual. This exceedance was the result of nine applications: two applications each to alfalfa fields and walnuts orchards, and five applications to corn fields. The application method was aerial for all applications with the one exception of a ground application to the smaller of the walnut orchards. Regressions using load of chlorpyrifos as the response variable were significant with a positive slope indicating that as the application rate increased, so did the load. The slopes are somewhat high indicating that the amount entering Duck Creek increases rapidly with increasing application rate with additional contribution from elevated flows. An analysis of covariance could be performed using discharge as the covariate to evaluate the independent effect of application rate on load however discharge is a portion of the load calculation making interpretation of the analysis difficult.

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 I-11, I-12, I-13, I-14, I-15 and Figures I-6, I-7, I-8, I-9). During the course of monitoring, there were 22 sections associated with exceedances; each section had 1 to 4 applications in the month prior to sampling (Table I-11). Generally, these applications were associated with different parcels within the section. Sections were associated with one to six exceedances, and no sections were associated with all exceedances. Exceedances were associated with primarily alfalfa, almonds, and walnuts, via both aerial and ground application (Table I-10).

Table I-11. Duck Creek @ Hwy 4 site subwatershed. All TRS that had more than one application associated with an exceedance for chlorpyrifos 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*	Chlorpyrifos Applications per Date of Exceedance							
	5/16/2006	9/19/2006	7/10/2007	9/4/2007	4/15/2008	6/10/2008	7/15/2008	8/12/2008
1N7E1	1				1			
1N7E11		2						
1N7E12		1						
1N7E2								2
1N7E23							2	
1N7E3	1							1
1N8E10		1						1
1N8E11	2							1
1N8E13								1
1N8E14				1				
1N8E15		2						
1N8E16							1	1
1N8E2	1				1			
1N8E24								1
1N8E4	1					1		

TRS*	Chlorpyrifos Applications per Date of Exceedance							
	5/16/2006	9/19/2006	7/10/2007	9/4/2007	4/15/2008	6/10/2008	7/15/2008	8/12/2008
1N8E6							1	
1N8E7		1					2	
1N8E8		1	1				2	1
1N9E11		1			1	1		
1N9E17	2	2	1				1	1
1N9E18	1	2		1	2	3		1
1N9E19	1		1		1	4		

*Bolded TRS are members of the Coalition

Table I-12. Duck Creek @ Drais Rd site subwatershed. All TRS that had more than one application associated with an exceedance for chlorpyrifos in 2008. Table shows 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
	5/13/2008
1N8E11	1
1N8E24	2
1N9E11	1
1N9E19	1

*Bolded TRS are members of the Coalition.

Table I-13. Duck Creek @ Highway 4 site subwatershed. TRS with chlorpyrifos applications in month prior to each exceedance date for 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											
	4/15/2008			6/10/2008			7/15/2008			8/12/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
1N7E1	4/15/2008	4.65	10									
1N8E2	4/11/2008	74.34	80									
1N9E11	4/10/2008	16.00	16	6/4/2008	24.00	24						
1N9E18	3/31/2008	58.50	50	5/28/2008	52.52	26				7/18/2008	30.04	60
	4/7/2008	65.25	58	5/28/2008	92.92	46						
				5/28/2008	163.63	81						
1N9E19	4/8/2008	69.75	62	5/14/2008	15.52	31						
				5/14/2008	305.35	152.5						
				5/15/2008	65.23	32.5						
				5/19/2008	66.01	33						
1N8E4				5/29/2008	101.00	50						
1N7E23							7/13/2008	68.76	37			
							7/13/2008	78.05	42			
1N8E16							7/15/2008	5.01	10	7/15/2008	5.01	10
1N8E6							7/4/2008	34.00	17			
1N8E7							7/5/2008	20.03	40			
							7/9/2008	20.03	40			
1N8E8							7/12/2008	53.08	106	7/15/2008	26.04	52
							7/15/2008	26.04	52			
1N9E17							7/15/2008	20.03	40	7/15/2008	20.03	40
1N7E2										7/28/2008	27.88	15
1N7E3										8/5/2008	80.01	40
1N8E10										7/17/2008	185.84	100
1N8E11										7/26/2008	289.91	156
1N8E13										7/23/2008	230.44	124
1N8E24										7/23/2008	24.00	12

*Bolded TRS are members of the Coalition.

Table I-14. Duck Creek @ Drais Road upstream site subwatershed. TRS with chlorpyrifos applications in month prior to each exceedance date for 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		
	5/13/2008		
	Application Date	Pounds Applied	Acres Treated
1N8E11	4/22/2008	74.34	80
1N8E24	4/17/2008	4.46	12
	4/20/2008	4.80	12
1N9E11	5/10/2008	22.00	22
1N9E19	4/19/2008	112.50	95

*Bolded TRS are members of the Coalition.

Figure I-6. Duck Creek @ Hwy 4 TRS' that have had applications co-occurring with an exceedance.

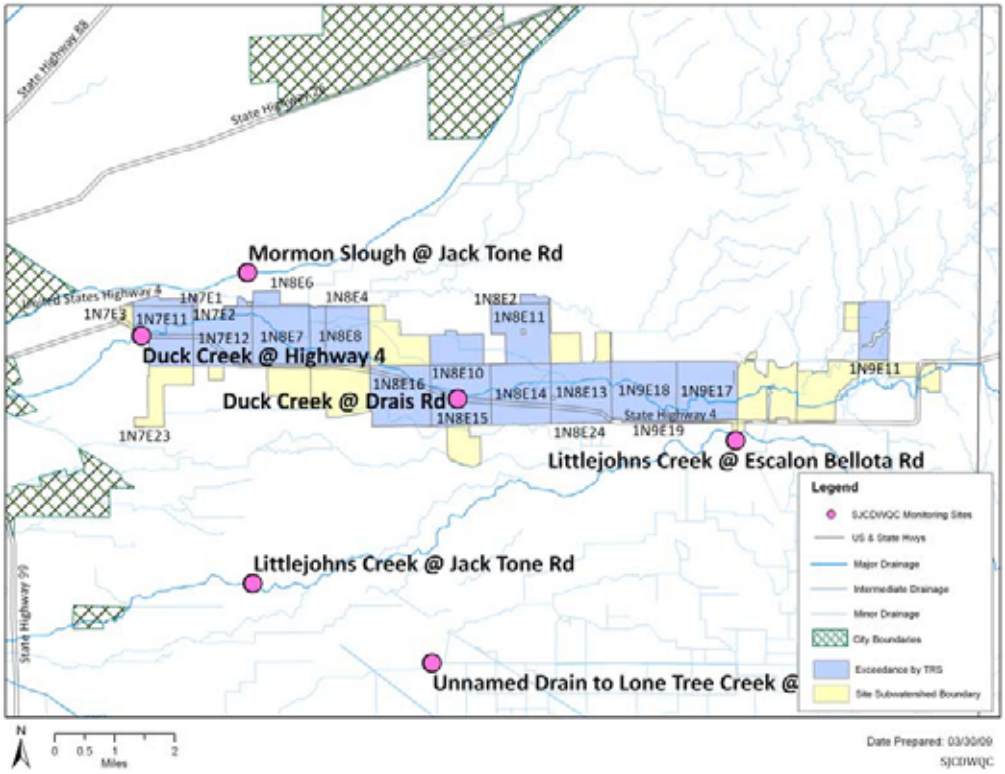


Figure I-7. Duck Creek @ Hwy 4 APN numbers within sections that have had applications co-occurring with an exceedance.

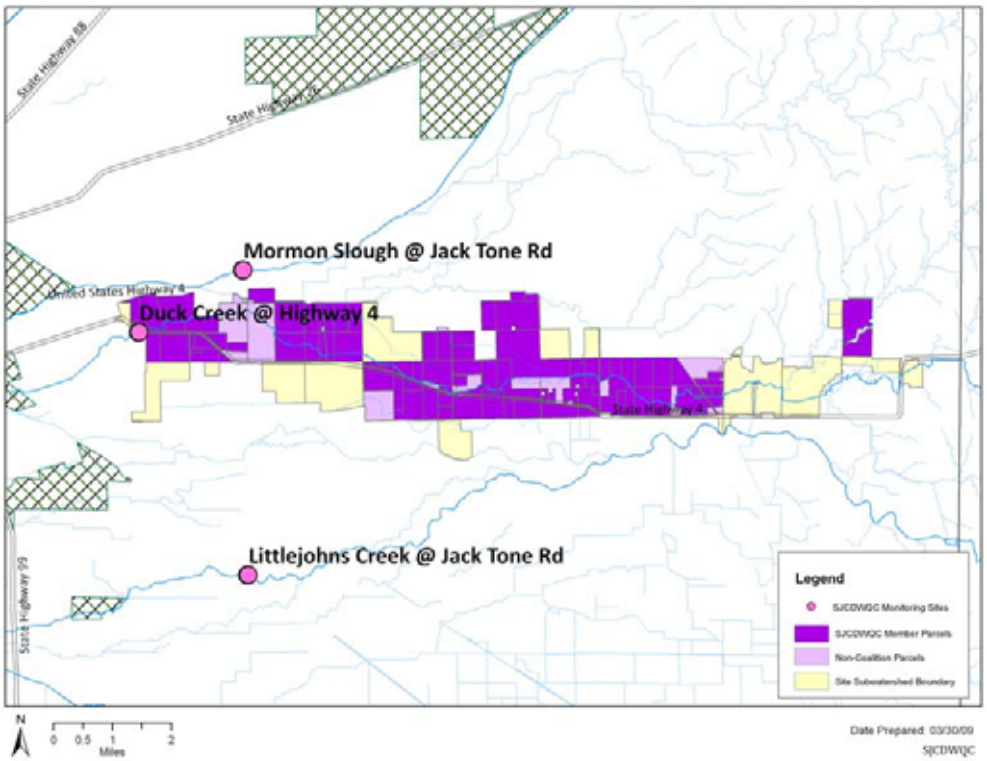


Figure I-8. Duck Creek @ Drais (US). TRS' that have had applications co-occurring with an exceedance.

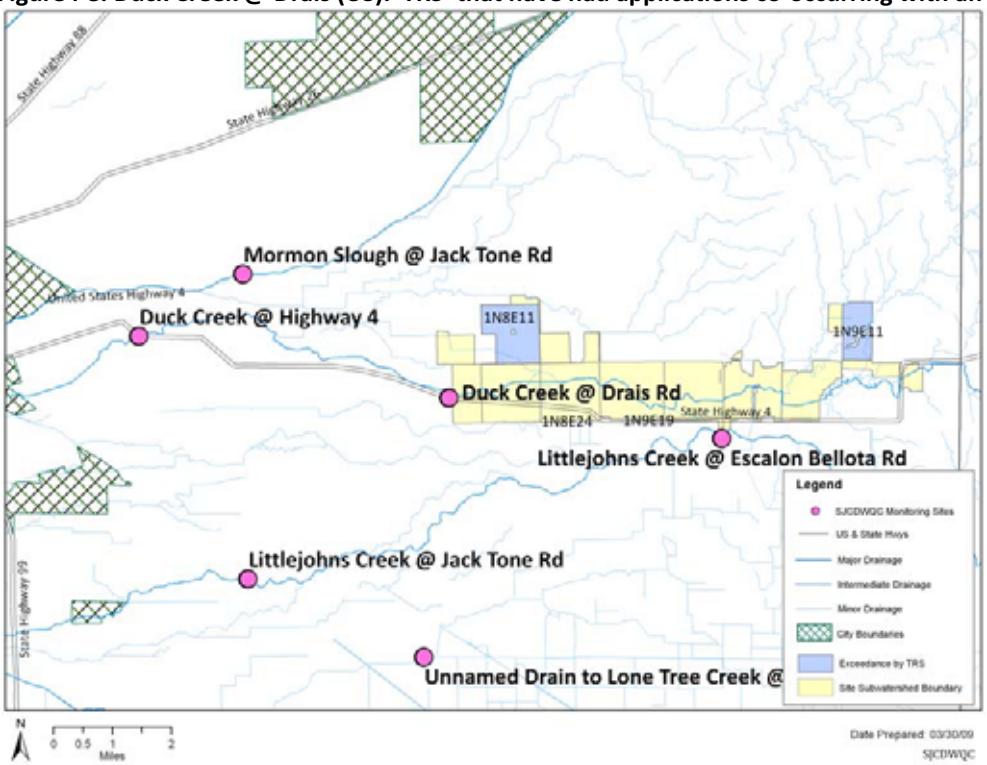
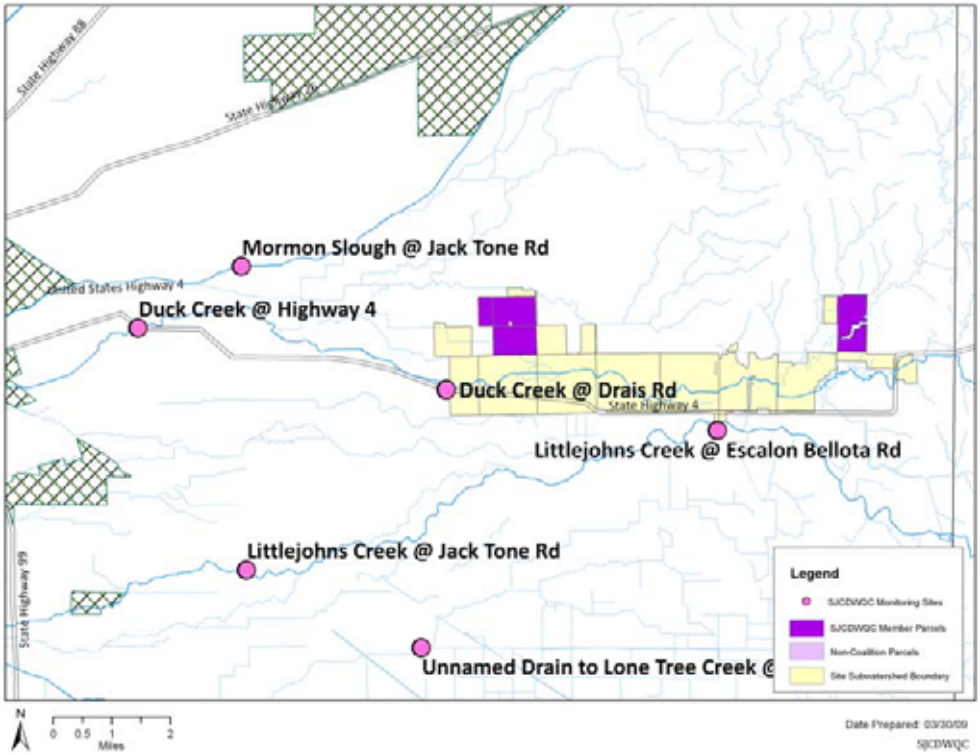


Figure I-9. Duck Creek @ Drais (US). APN numbers within sections that have had applications co-occurring with an exceedance.



The analyses conducted by the Coalition suggest that a large number of growers are involved in applications and that increasing application rates and total pounds applied result in increased concentrations in Duck Creek. Together, these results indicate that management of chlorpyrifos in this watershed should focus on providing information on a watershed basis to growers to review their operation to determine if irrigation return flows are managed properly. Alfalfa and walnut growers should be targeted for outreach especially prior to the irrigation season. Aerial applications could have contributed to the exceedances primarily from drift and the TRS' with exceedances are located adjacent to the creek further suggesting that drift could play a role in generating the exceedances. Outreach to aerial applicators should take place.

Selenastrum toxicity

Toxicity to *Selenastrum* occurred in both April and May 2008. Neither was accompanied by exceedances of herbicides or copper. Previous to 2008, algae toxicity occurred during February 2007. There were numerous samples from across the Coalition that were toxic to *Selenastrum* during the spring of 2008. The increased amount of toxicity could be attributed to the very dry winter when little rainfall was available to move herbicides from the fields. Instead, early irrigation could have removed sufficient quantities of herbicides to cause toxicity although not resulted in exceedances of the herbicides themselves. The Coalition will be sampling for *Selenastrum* toxicity in April and May 2009. There are still insufficient data to perform statistical analyses to relate toxicity to the amounts of various herbicides applied within the watershed.

Ceriodaphnia toxicity

Ceriodaphnia is listed as a Priority D constituent as a result of 2008 monitoring. Toxicity to *Ceriodaphnia* occurred twice during normal monitoring and the corresponding resamples in both April and July 2008. Prior to this monitoring year, toxicity to *Ceriodaphnia* has only occurred once during normal monitoring in September 2006.

Priority E Constituents

There were continued exceedances of DO, pH, and *E. coli* during the 2008 irrigation season. Although the Coalition will continue to collect these data, the constituents will remain low priority for the foreseeable future.

2009 Management Plan Monitoring

The Duck Creek site subwatershed will not be monitored as a Core or Assessment Monitoring location and therefore Management Plan Monitoring will be conducted for the following constituents during the irrigation season of 2009: chlorpyrifos (April – September), *Ceriodaphnia* toxicity (April, July and September) and *Selenastrum* (April and May). In addition, the Coalition will collect samples from Duck Creek @ Hwy 4 during the second storm (winter of 2008/2009) for *Selenastrum* toxicity and diazinon.

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.

General grower meetings were held for San Joaquin County growers in October 2007 and May 2008. All outreach in the 2007 irrigation season is documented in the Summary of Coalition Outreach Activities section of the Management Plan. The Coalition anticipates conducting grower meetings in the various Coalition counties prior to the irrigation season to address irrigation water quality concerns and management practices, and again between October and December focusing on dormant spray practices and presenting Coalition data from the previous year of monitoring.

In October 2008, a publication of Best Management Practices information, developed by the Center for Urban/Rural Environmental Stewardship (CURES), was sent 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.

Evaluation

This subwatershed is one of the three priority site subwatersheds within the SJCDWQC and therefore the Coalition is focusing its resources on identifying the sources of agricultural discharge within this subwatershed that could result in 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 Duck Creek subwatershed includes grower notification, management practice outreach and education, tracking of management practices implementation, and providing information on special studies of management practice efficacy. Mailings were provided to growers in Duck Creek subwatershed in January/February, April, and December 2008, and February 2009. These mailings announced grower meetings and sent the Watershed Coalition News to members. Management practice outreach and education was performed in January, February, March, May, October, November, and December 2008. Terry Prichard conducted a study evaluating chlorpyrifos runoff after incorporation of granular chlorpyrifos into the seed bed and conducted meetings with walnut growers to discuss monitoring of coddling moth and supplemental insecticides that may be necessary for control.

II. LONE TREE CREEK @ JACK TONE RD

Management Plan Constituents

Priority A

- Chlorpyrifos
- Diazinon

Priority C

- Copper
- Diuron
- *Ceriodaphnia* water column toxicity

Priority D

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

Priority E

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

Description of Lone Tree Creek Site Subwatershed

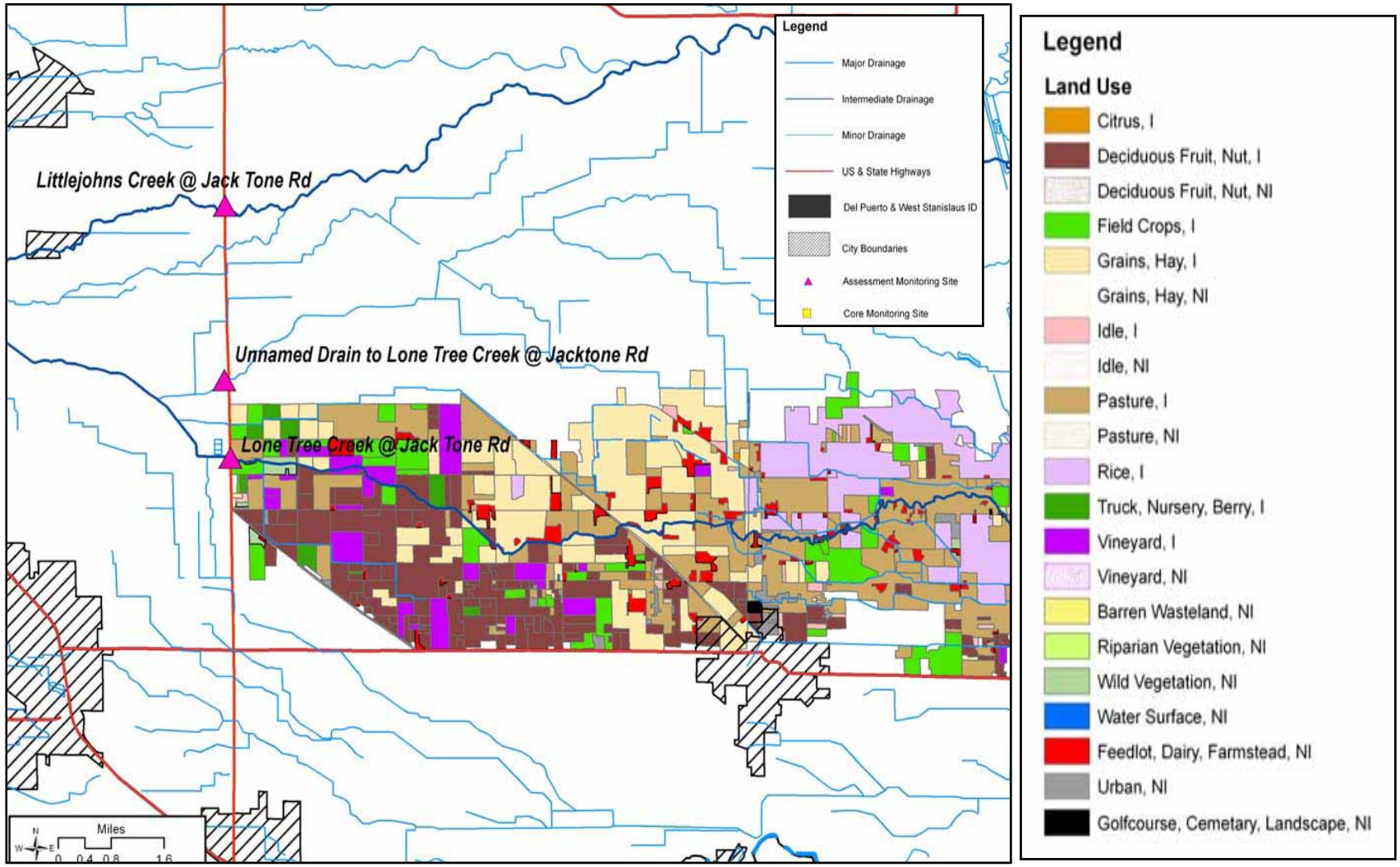
Lone Tree Creek is a 20-mile long modified natural channel originating south of Woodward Reservoir. This ephemeral stream carries natural runoff for the Farmington flood control basin during periods of high flow and is composed of mostly hardpan clay. During the irrigation season Lone Tree Creek carries agricultural supply and return flows to its confluence with Littlejohns Creek.

Lone Tree Creek @ Jack Tone Road is upstream from the French Camp Slough @ Airport Way site and contains 22,359 irrigated acres. This site drains a large portion of the southern SJCDWQC region and joins with Littlejohns Creek downstream eventually forming French Camp Slough which flows through urban areas before emptying into the Delta. The main agricultural land use upstream consists of deciduous orchards, field crops, irrigated pastures and dairies. Figure II-1 illustrates the land use within this site subwatershed area.

Lone Tree Creek @ Brennan Rd, upstream from the Lone Tree Creek @ Jack Tone Road site, drains primarily rice and pasture and contains 7,370 irrigated acres. This site was sampled at

the end of the irrigation season in 2005 and the storm season of 2006 as an upstream site to Lone Tree Creek @ Jack Tone Rd to try to narrow down toxicity and pesticide exceedance sources (prior to the development of the SJCDWQC Management Plan). Refer to Figure II-2 under Management Plan Monitoring for a map of the Lone Tree Creek @ Brennan Rd site subwatershed.

Figure II-1. Site subwatershed map of land use for the Lone Tree Creek @ Jack Tone Rd sample site.



Subwatershed Monitoring History

The Lone Tree site subwatershed was one of the original monitoring locations established by the Coalition in 2004. The original monitoring location, Lone Tree Creek @ Jack Tone Rd has been monitored since 2004 (Table II-1). Samples were collected from this site for field parameters and the analysis of water chemistry and toxicity. Two events were monitored in the 2004 irrigation season for all field and physical parameters (including bacteria), two organophosphates, four pyrethroids, water column toxicity to all three species, and sediment toxicity (Table II-3). Lone Tree Creek @ Brennan Rd was added as an upstream site in 2005 and has been monitored periodically (Tables II-2). Specific information on the analyses conducted across each of the monitoring seasons at each site is provided below (Table II-3, II-4). Management Plan Monitoring for the Coalition was initiated during June of 2007 and included additional sampling at Lone Tree Creek @ Jack Tone Rd in July and August for chlorpyrifos (Table II-5). In accordance with the upstream Management Plan Monitoring 2008 schedule, monitoring at Lone Tree Creek @ Brennan Road and at Lone Tree Creek @ Valley Home Road commenced for chlorpyrifos and metals during months with previous exceedances (Table II-5). The upstream monitoring sites were selected to divide the watershed into smaller areas which will allow an analysis of the contribution of each portion of the watershed to the load measured at the Jack Tone Road site. Lone Tree Creek @ Valley Home Rd was selected as a location upstream of agriculture to assess the contribution of total metals from the Sierra Nevada foothills. Sampling locations for the Lone Tree site subwatershed are provided in Table II-7 and Figures II-2, II-3. Exceedances of field and physical parameters, *E. coli*, pesticides, metals, and water column and sediment toxicity have occurred at this site. A summary and discussion of these exceedances is provided in the next section (Table II-8, II-9).

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 (see SJCDWQC MRPP submitted on August 25, 2008 for details). However the Coalition will continue to monitor for Management Plan constituents as outlined in this document.

Table II-1. 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 season event encompasses normal monitoring.

	2004	2005		2006		2007		2008		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Events Sampled	2	2	5	2	5	2	6	1	6	NA
Events Not Sampled	4	0	1	0	1	0	0	0	0	NA
Total	**2**	**2**	**5**	**2**	**5**	**2**	**6**	**1**	**6**	**NA**

Table II-2. Lone Tree Creek @ Brennan Rd sampling events per season and year. An irrigation season encompasses normal monitoring and associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall season event encompasses normal monitoring.

	2004	2005		2006		2007		2008		
	Irrigation	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Fall**
Events Sampled	NA	NA	1	2	NA	NA	NA	NA	6	NA
Events Not Sampled	NA	NA	1	2	NA	NA	NA	NA	3	NA
Total	**NA**	**NA**	**1**	**2**	**NA**	**NA**	**NA**	**NA**	**3**	**0**

NA - Not applicable. This site was not sampled during this season/year.

Table II-3. Lone Tree Creek @ Jack Tone Rd. Number of analyses performed per constituent in each sampling season (only environmental samples listed).

Method	Constituent	2004	2005		2006		2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Field and Physical Parameters											
NA	pH	2	3	5	4	5	3	9	3	9	
NA	Specific Conductivity	2	3	5	4	5	3	9	3	9	
NA	Dissolved Oxygen	2	3	4	3	4	3	9	3	9	
EPA 160.1	Dissolved Solids	2	2	5	2	5	2	6	1	6	
EPA 180.1	Turbidity	2	2	5	2	5	2	7	1	6	
SM 9223 B	E. coli	2	2	5	2	6	2	7	1	6	
EPA 110.2	Color	2	2	5	2	5	2	7	1	6	
EPA 415.1	Total Organic Carbon	2	2	5	2	7	2	6	1	6	
EPA 405.1	Biological Oxygen Demand					2	2	2			
Carbamates											
EPA 8321A	Aldicarb					5	2	6	1	6	
EPA 8321A	Carbaryl					5	2	6	1	6	
EPA 8321A	Carbofuran					5	2	6	1	6	
EPA 8321A	Methiocarb					5	2	6	1	6	
EPA 8321A	Methomyl					5	2	6	1	6	
EPA 8321A	Oxamyl					5	2	6	1	6	
Organochlorines											
EPA 8081A	DDD					5	2	6	1	6	
EPA 8081A	DDE					5	2	6	1	6	
EPA 8081A	DDT					5	2	6	1	6	
EPA 8081A	Dicofol					5	2	6	1	6	
EPA 8081A	Dieldrin					5	2	6	1	6	
EPA 8081A	Endrin					5	2	6	1	6	
EPA 8081A	Methoxychlor					5	2	6	1	6	
Organophosphates											
EPA 8141A	Azinphos methyl					5	2	6	1	6	
EPA 8141A	Chlorpyrifos	2	2	5	2	5	2	8	1	6	
EPA 8141A	Diazinon	2	2	5	2	5	2	6	1	6	
EPA 8141A	Dimethoate					5	2	6	1	6	
EPA 8141A	Disulfoton					5	2	6	1	6	
EPA 8141A	Malathion					5	2	6	1	6	

Method	Constituent	2004	2005		2006		2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 8141A	Methamidophos					5	2	6	1	6	
EPA 8141A	Methidathion					5	2	6	1	6	
EPA 8141A	Parathion,Methyl					5	2	6	1	6	
EPA 8141A	Phorate					5	2	6	1	6	
EPA 8141A	Phosmet					5	2	6	1	6	
Pyrethroids											
EPA 8081A	Bifenthrin			1	2	5	2	6	1	6	
EPA 8081A	Cypermethrin	2	2	5	2	5	2	6	1	6	
EPA 8081A	Cyhalothrin, lambda	2	2	5	2	5	2	6	1	6	
EPA 8081A	Permethrin	2	2	5	2	5	2	6	1	6	
EPA 8081A	Cyfluthrin			1	2	5	2	6	1	6	
EPA 8081A	Esfenvalerate/ Fenvalerate	2	2	5	2	5	2	6	1	6	
Triazines											
EPA 619	Atrazine					5	2	6	1	6	
EPA 619	Cyanazine					5	2	6	1	6	
EPA 8321A	Diuron					5	2	6	1	6	
EPA 547M	Glyphosate					5	2	6	1	6	
EPA 8321A	Linuron					5	2	6	1	6	
EPA 8141A	Molinate					5	2	6	1	6	
EPA 549.2M	Paraquat dichloride					5	2	6	1	6	
EPA 619	Simazine					5	2	6	1	6	
EPA 8141A	Thiobencarb					5	2	6	1	6	
Metals (Total)											
EPA 200.8	Arsenic					6	2	6	1	6	
EPA 200.8	Boron					6	2	6	1	6	
EPA 200.8	Cadmium					6	2	6	1	6	
EPA 200.8	Copper					6	2	6	1	6	
EPA 200.8	Lead					6	2	6	1	6	
EPA 200.8	Nickel					6	2	6	1	6	
EPA 200.8	Selenium					6	2	2	1	6	
EPA 200.8	Zinc					6	2	6	1	6	
Nutrients											
EPA 300.0	Nitrate as NO3					6	2	6	1	6	
EPA 354.1	Nitrite as N					6	2	6	1	6	

Method	Constituent	2004	2005		2006		2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 350.2	Ammonia as N					6	2	6	1	6	
EPA 130.2	Hardness as CaC03					6	2	6	1	6	
EPA 365.2	Phosphate as P					6	2	6	1	6	
EPA 365.2	OrthoPhosphate as P					6	2	6	1	6	
EPA 351.3	Nitrogen, Total Kjeldahl					6	2	6	1	6	
Toxicity											
EPA 821-02-012	*Ceriodaphnia dubia*	2	2	5	2	5	3	7	2	6	
EPA 821-02-012	*Pimephales promelas*	2	3	5	2	5	3	7	2	6	
EPA 821-02-013	*Selenastrum capricornutum*	2	3	5	3	5	4	7	2	8	
EPA 600/R-99-064	*Hyalella azteca*	2		3	1	1	1	1	1	1	

Table II-4. Lone Tree Creek @ Brennan Rd. Number of analyses performed per constituent in each sampling season (only environmental samples listed).

Method	Constituent	2005	2006	2008		
		Irrigation	Storm	Storm	Irrigation	Fall
Field and Physical Parameters						
NA	pH	1	5		3	
NA	Specific Conductivity	1	5		3	
NA	Dissolved Oxygen	1	4		3	
EPA 160.1	Dissolved Solids	1	2			
EPA 180.1	Turbidity	1	2			
SM 9223 B	E. coli	1	2			
EPA 110.2	Color	1	2			
EPA 415.1	Total Organic Carbon	1	2			
Organophosphates						
EPA 8141A	Chlorpyrifos	1	2		2	
EPA 8141A	Diazinon	1	2			
Pyrethroids						
EPA 8081A	Bifenthrin	1	2			
EPA 8081A	Cypermethrin	1	2			
EPA 8081A	Cyhalothrin, lambda	1	2			
EPA 8081A	Permethrin	1	2			
EPA 8081A	Cyfluthrin	1	2			
EPA 8081A	Esfenvalerate/Fenvalerate	1	2			
Metals (Total)						
EPA 200.8	Arsenic				3	
EPA 200.8	Boron				3	
EPA 200.8	Cadmium				3	
EPA 200.8	Copper				3	
EPA 200.8	Lead				3	
EPA 200.8	Nickel				3	
EPA 200.8	Selenium				3	
EPA 200.8	Zinc				3	
Toxicity						
EPA 821-02-012	*Ceriodaphnia dubia*	1	3			
EPA 821-02-012	*Pimephales promelas*	1	3			
EPA 821-02-013	*Selenastrum capricornutum*	1	3			
EPA 600/R-99-064	*Hyalella azteca*		1			

Table II-5. 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
Lone Tree Creek @ Jack Tone Rd	30-Jul-07	A	**X**
Lone Tree Creek @ Jack Tone Rd	28-Aug-07	A	**X**

Table II-6. Lone Tree Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month and analyte sampled.

Station Name	Date	Type	Chlorpyrifos	Total Metals
Lone Tree Creek @ Valley Home Rd	13-May-08	U		X
Lone Tree Creek @ Valley Home Rd	10-Jun-08	U		X
Lone Tree Creek @ Valley Home Rd	15-Jul-08	U		X
Lone Tree Creek @ Brennan Rd	15-Jul-08	U	X	X
Lone Tree Creek @ Valley Home Rd	12-Aug-08	U		X
Lone Tree Creek @ Brennan Rd	12-Aug-08	U	X	X
Lone Tree Creek @ Valley Home Rd	16-Sep-08	U		X
Lone Tree Creek @ Brennan Rd	16-Sep-08	U		X

Table II-7. Coordinates of the Lone Tree Creek site subwatershed sampling locations.

Station Name	Station Code	Target Lat	Target Long
Lone Tree Creek @ Jack Tone Rd*	531XLTCJR	37.8376	-121.144
Lone Tree Creek @ Brennan Rd*[u]	535XLTABR	37.82552	-121.016
Lone Tree Creek @ Valley Home Rd[u]	535LTCVHR	37.82023	-120.902

*Original SJCDWQC sampling site
[u]Upstream sites

Figure II-2. Site subwatershed map of land use for upstream Management Plan Monitoring site at Lone Tree Creek @ Brennan Rd.

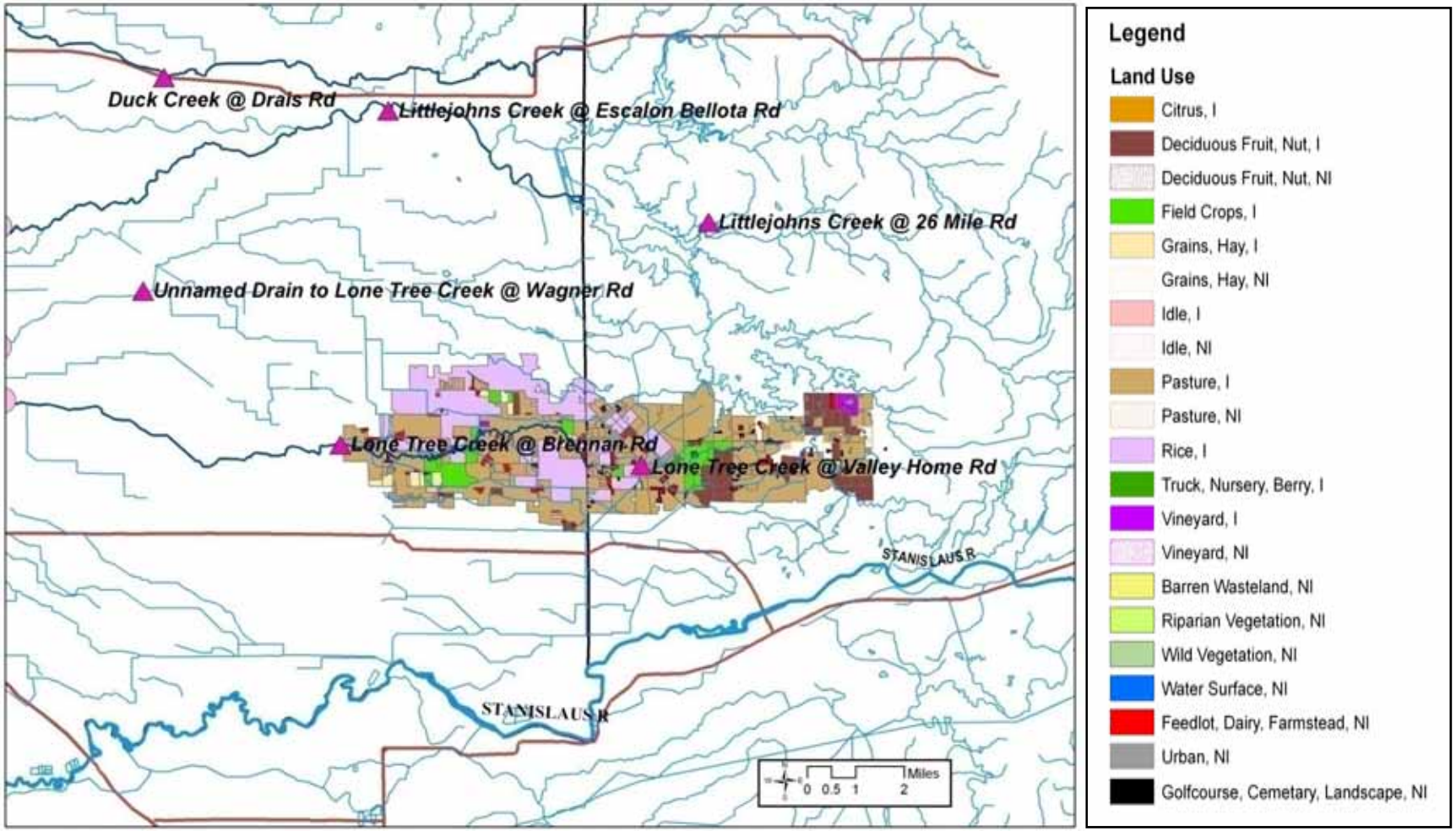
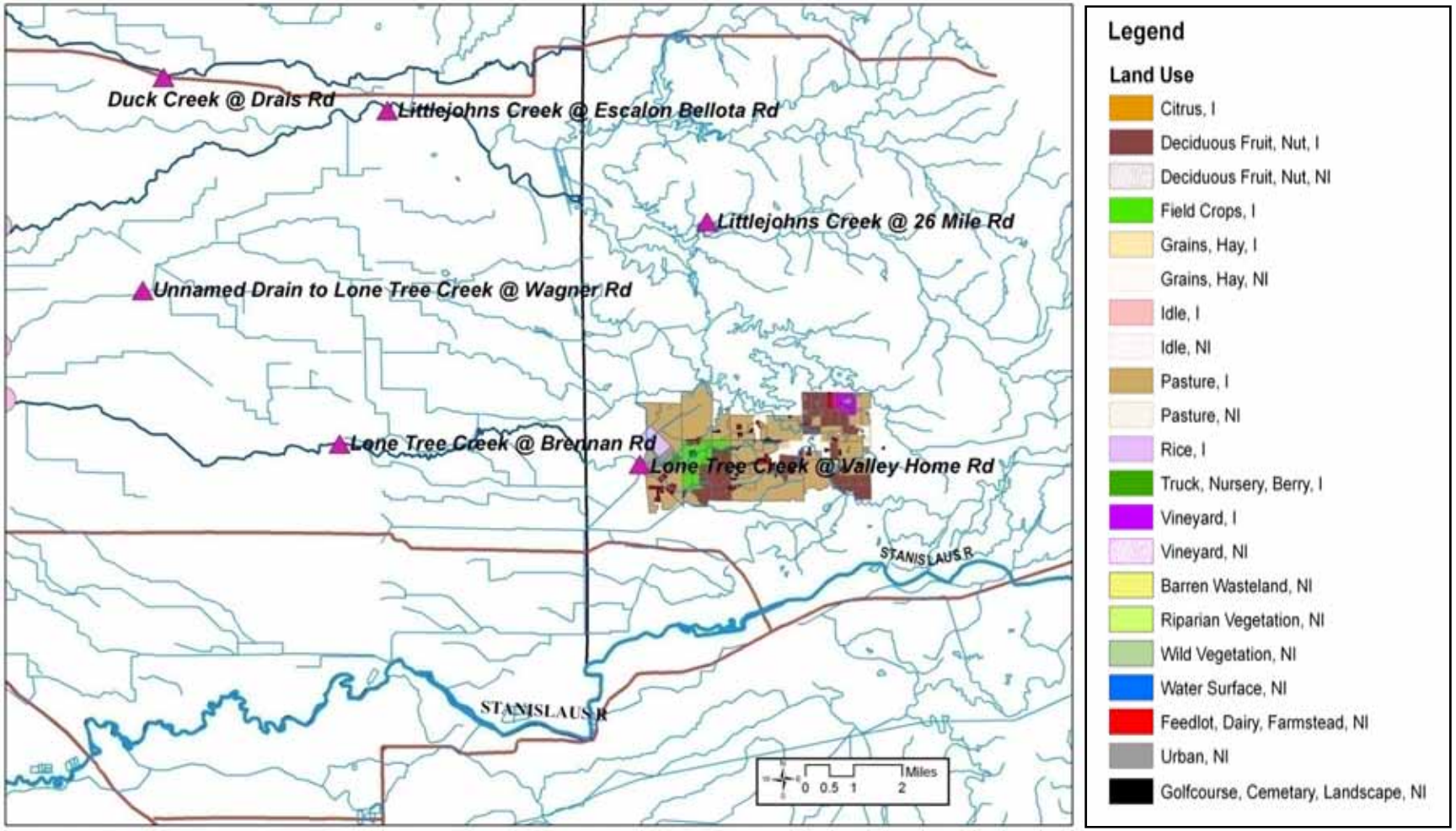



Figure II-3. Site subwatershed map of land use for upstream Management Plan Monitoring site at Lone Tree Creek @ Valley Home Rd.