San Joaquin County Resource Conservation District

San Joaquin County Resource Conservation District
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Stockton, California 95219
209-472-7127 ext 125

October 20, 2010

Pamela Creedon, Executive Officer
Irrigated Lands Conditional Waiver Program
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Dear Ms. Creedon,

The San Joaquin County and Delta Water Quality Coalition is submitting an amendment to its Monitoring and Reporting Program Plan (MRPP) (approved on May 17, 2010). The attached MRPP document includes an updated amendment table, Table A, which includes a description and page number for each amendment and modification since the original submittal on August 25, 2008.

MRPP Attachment I (site subwatershed maps) and Attachment III (QAPP) have also been revised and are included with this amendment. The attached QAPP includes an updated amendment table that details the specific QAPP updates (description and page number) for easy reference. No updates were made to MRPP Attachment II (site subwatershed PUR summary) and therefore it is not included with this amendment.

Revisions to the SJCDWQC MRPP include the following (see specifics in Table A of the amended MRPP and QAPP):

- Updates to sample sites and zone numbers (approved on December 17, 2008)
- Updates to land use and rainfall data website references
- Updates to the overall monitoring strategy (approved on March 30, 2009)
- Updates to laboratory methods and SOPs including analytical method references, quality control limits and precision calculations for sediment grain size (pending approval)
- Updates to monitoring constituents
    - Corrected a typo for constituents monitored for 2009 at Mokelumne River @ Bruella Rd and Roberts Island Drain @ Holt Rd (approved December 17, 2008)
    - Corrected an oversight and added deltamethrin:tralomethrin to the sediment pyrethroids constituent list (pending approval)
- Reports to be submitted electronically (approved on May 17, 2010)
- Updated the MRP order number to correct a typo
- Updates to the QAPP project management section to include appropriate personnel updates
- Updates to the QAPP data validation and usability section to include revised verification SOPs and data progression flow chart

The revisions pending approval do not change the overall monitoring strategy of the SJCDWQC MRPP approved on May 17, 2010 and therefore the amended SJCDWQC MRPP maintains compliance with MRP Order No. R5-2008-0005.

Submitted respectfully,

Michael L Johnson
SJCDWQC Technical Program Manager
Michael L. Johnson, LLC

Table A. Updates to SJCDWQC MRPP submitted on August 25, 2008 and amended on January 9, 2009 and October 20, 2010.

Item No.	Description of Update	MRPP Page No.	CVRWQCB Approval Date
Amended on January 9, 2009			
1	**Sample sites and zone numbers**		
	Removed sampling sites Stanislaus River Drain @ South Airport Way, Stanislaus River Drain @ East Division Ave, and Walthall Slough Drain @ Airport Way. Added Walthall Slough @ Woodward Avenue location.	Table 3, Page 28 Figure 12, Page 31 Table 4, Page 36 Figure 13, Page 41 Verbiage, Page 47-49 Table 6, Page 50 Table 9, Page 55 Verbiage, Page 56 Table 10, Page 58 Table 12, Page 64 Attachment I	December 17, 2008
	Updated Five Mile Slough zone number from 5 to 4; site is represented by Roberts Island Drain @ Holt Rd for TMDL constituent diazinon.	Verbiage, Page 56 Table 10, Page 58	December 17, 2008
Amended on October 20, 2010			
1	**Land use and rainfall data references.**		
	Updated California Department of Pesticide Regulation and Department of Water Resources reference links.	Verbiage, Page 8	Pending
2	**Monitoring strategy.**		
	Assessment Monitoring modified to include only one Assessment Monitoring location which will rotate annually.	Verbiage, Page 32, 33, 35 Table 9, Page 55 Table 10, Page 58 Table 12, Page 64 Table 20, Page 86	March 30, 2009
3	**Monitoring constituents.**		

Item No.	Description of Update	MRPP Page No.	CVRWQCB Approval Date
	Corrected a typo: Deleted "X" from Mokelumne River @ Bruella Rd Organophosphates monitoring and added "X" to Mokelumne River @ Bruella Rd and Roberts Island Drain @ Holt Rd Organochlorines monitoring for 2009.	Table 12, Page 64	March 30, 2009
	Updated the spelling of "demeton-s." It was previously misspelled as "dimeton-s."	Table 11, Page 61 Table 13, Page 69	Pending
	Added deltamethrin:tralomethrin to the sediment pyrethroids analysis list. Deltamethrin is listed in the MRP but due to an oversight the analyte was not previously added to our MRPP or QAPP tables.	Table 11, Page 61	Pending
4	**Analytical Methods.**		
	Updated sediment toxicity method to EPA 600/R-99-064 from EPA 100.1. The original method listed is believed to be a typo and all samples analyzed for sediment toxicity have always used the EPA 600/R-99-064 method.	Table 13, Page 69	Pending
	Updated methamidophos method to EPA 8321 from EPA 8141A. Laboratory started using EPA 8321 to analyze for methamidophos in July 2010.	Table 13, Page 69	Pending
	Updated sediment pyrethroid analytical method from EPA 8270 to GCMS-NCI-SIM. Laboratory started using GCMS-NCI-SIM to analyze for sediment pyrethroids in April 2010.	Table 13, Page 69	Pending
	Updated trifluralin RL to 0.05 µg/L from 0.01 µg/L. The original (and not feasible) value of 0.01 µg/L is believed to be a typo, while the value to 0.05 µg/L is that recommended in the MRP.	Table 13, Page 69	Pending
	Updated sediment pyrethroid MDL and RL values to match those recommended by the lab.	Table 13, Page 69	Pending
	Updated glyphosate, cadmium, lead, molybdenum, TKN and ammonia MDL values to match those achievable by the lab.	Table 13, Page 69	Pending
	Updated turbidity, hardness, molybdenum and TKN RL values to match those achievable by the lab (turbidity 0.5 NTU to 0.05 NTU, hardness 10 mg/L to 5 mg/L, molybdenum 0.3 µg/L to 0.25 µg/L, and TKN 0.5 mg/L to 0.1 mg/L).	Table 13, Page 69	Pending
	Updated dichlorvos and demeton-s RL values from 0.2 µg/L to 0.1 µg/L to correct an original typo.	Table 13, Page 69	Pending
5	**Reporting Plan**		
	Updated verbiage to indicate that report submission will be electronic.	Table 15, Page 75 Verbiage, Page 74	May 17, 2010
6	**Updates to QAPP (see QAPP Table A)**	**Attachment III**	

Monitoring and Reporting Program Plan

San Joaquin County Delta Water Quality Coalition

Originally submitted on: August 25, 2008
Amendments submitted on: January 9, 2009 and October 20, 2010

Prepared by MLJ-LLC

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ATTACHMENTS

LIST OF ACRONYMS

BU	Beneficial Uses
cm	Centimeter
cfs	Cubic Feet Per Second
COC	Chain of Custody
CVRWQCB	Central Valley Regional Water Quality Control Board
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane-+
DO	Dissolved Oxygen
DPR	(California) Department of Pesticide Regulation
DWR	Department of Water Resources
EPA	Environmental Protection Agency
^{o}F	Degrees Farenheit
K_{oc}	Organic Carbon Partioning Coefficient
kg	Kilogram
L	Liter
LCS	Laboratory Control Spike
LCSD	Laboratory Control Spike Duplicate
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg	Milligram
mL	Milliliter
MLJ-LLC	Michael L. Johnson, LLC.
MPN	Most Probable Number
MRP	Monitoring and Reporting Program
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MUN	Municipal and Domestic Supply Beneficial Use
NA	Not Applicable
ND	Not Detected
ng	Nanogram
NRCS	Natural Resource and Conservation Service
NTU	Nephelometric Turbidity Unit
OP	Organophosphate
PCA	Pesticide Control Advisor
pH	Power of Hydrogen (measure of acidity)
PR	Percent Recovery
PUR	Pesticide Use Reports
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit

RPD	Relative Percent Difference
SJR	San Joaquin River
SJCDWQC	San Joaquin County and Delta Water Quality Coalition
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TID	Turlock Irrigation District
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
µg	Microgram
µmhos	Micromhos
USEPA	United States Environmental Protection Agency
WQTL	Water Quality Trigger Limit

INTRODUCTION

The San Joaquin County and Delta Water Quality Coalition (hereafter referred to as the SJCDWQC or Coalition) Monitoring and Reporting Program Plan (MRPP) has been prepared according to the Monitoring and Reporting Program Order No. R5-2008-0005 (MRP) for Coalition Groups under the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Resolution No. R5-2006-0053. Together with the SJCDWQC Management Plan, the MRPP is a work plan for all aspects of the monitoring and reporting program including environmental monitoring, outreach, reporting and tracking progress in reducing the amount of waste discharged that affects the quality of the waters within the SJCDWQC as part of the Irrigated Lands Regulatory Program (ILRP).

The SJCDWQC was formed in 2003 to enhance and improve water quality in San Joaquin County and the western edge of the Delta watershed that includes the eastern portion of Contra Costa County, portions of Calaveras County and a small portion of Alameda County, while sustaining the economic viability of agriculture, associated values of managed wetlands and sources of safe drinking water. The Coalition is managed by the San Joaquin County Resource Conservation District (RCD) Board of Directors who oversee Coalition activities. The RCD authorizes all spending and actions conducted by the Coalition. A Steering Committee composed of stakeholders within the Coalition region including landowners, representatives of irrigation districts and water agencies, and farm bureau representatives, reports to the RCD Board of Directors and manages the invoicing, budget, membership, outreach and documents required for ILRP compliance.

This report contains a description of watershed characteristics within the Coalition area and provides data and information describing the area's hydrology and drainage patterns, land use and crop data. A large portion of this document describes the monitoring program including the monitoring plan, sampling sites, sampling methods, quality assurance and information on each of the site subwatersheds. Pesticide use in each of the site subwatersheds that are or will be monitored is included in this MRPP as well as management practices available to prevent water quality degradation as a result of agricultural discharge. A discussion on management practices, programs and applicable management projects used to reduce or eliminate agricultural discharge of pesticides into receiving water bodies concludes this MRPP. Table 1 lists the MRP requirements as listed under the Conditional Waiver in association with the sections of this MRPP.

This MRPP includes the Coalition's strategy to addresses the five Program questions listed in the Regional Board MRP (Table 1). In addition, the Coalition is working to identify critical gaps in knowledge on a site subwatershed basis through the use of the Coalition's Management Plan. The MRPP creates a framework for which the Coalition can assess water quality impairments due to agricultural discharge and methods by which to ensure and/or improve current water quality conditions.

Table 1. Location of descriptions to address the requirements in the SJCDWQC MRPP.

MRPP Section	MRP Requirement #	Requirements
1. Introduction	NA	Not a required section
2. Description of Coalition Area	2,5	**(2)** Geography, topography, hydrology, land use including crop type(s) and other characteristics relevant to the monitoring; **(5)** Provide designated beneficial uses of each of the Coalition water bodies.
3. Monitoring Strategy	1	**(1)** Description of Assessment Monitoring, Core Monitoring and Special Project Monitoring.
4. Monitoring Sites	3,6	**(3)** Including GIS coordinates (Albers Projection, NAD83, and units in meters) and rationale for selection of each site. Rationale should be based on 'representativeness' of the location for dischargers from irrigated agriculture within the Coalition Group's boundaries; **(6)** Detailed map(s) of the Coalition Group's area showing irrigated lands, identifying crop type(s), monitoring sites, main water bodies, tributaries, canals, channels, and drainages. Maps or discussion shall provide details that show which fields are represented by each monitoring site within the Coalition Group's boundaries.
5. Water and Sediment Quality Monitoring Plan	12,17	**(12)** Monitoring periods, including description and frequencies of monitoring events and justification for deviations from the MRP Order requirements; **(17)** Parameters to be monitored including minimum and site specific requirements.
6. Monitoring Protocol	18,19,13,14,15,16	**(18)** Reference to the Coalition Group Quality Assurance Project Plan (QAPP) consistent with the requirements described in Attachment C of the MRP Order; **(19)** Documentation of monitoring protocols including sample collection methods and Laboratory Quality Assurance manual; **(13)** Information (either qualitative or quantitative, depending on the needs of the monitoring design process) about sources of bias and variability that could affect the validity of a monitoring design and/or the reliability of monitoring data; **(14)** Definition of desired levels of spatial and temporal resolution; **(15)** Definition of acceptable levels of uncertainty; **(16)** Description of data analysis methods to be used to evaluate data from each monitoring program component.
7. Reporting Plan	NA	Not a required section.

MRPP Section	MRP Requirement #	Requirements
8. Water Quality Status	4,Q#1,Q#2,7,8	**(4)** Identification of known and potential water quality impairments and water quality limited water bodies; **(Q#1)** Are conditions in waters of the State that receive discharges of wastes from irrigated land within Coalition Group boundaries, as a result of activities within those boundaries, protective of beneficial uses (Identify represented, unrepresented and surrogate monitoring locations)? **(Q#2)** What is the magnitude and extent of water quality problems in waters of the State that receive agricultural drainage or are affected by other irrigated agriculture activities within the Coalition Group boundaries, as determined using monitoring information? **(7)** Relevant knowledge about the transport, fate, and effects of key pollutants, including best- and worst-case scenarios; **(8)** Relevant knowledge about the action of cumulative and indirect effects, and other factors that impact water quality.
9. Sources of Discharge	Q#3,9	**(Q#3)** What are the contributing sources(s) from irrigated agriculture to the water quality problems in waters of the State that receive agricultural drainage or are affected by other irrigated agriculture activities within Coalition Group boundaries? **(9)** Include a narrative discussion and summary tables of the information contained therein, including type of chemical (fungicide, herbicide, insecticide, and adjuvants), quantity applied, timing of applications, crops to which they were applied, and the geographic locations within the Coalition Group's boundaries in which each type was used.
10. Agricultural Practices Summary	10, 11, Q#4, Q#5	(10) Discussion of specific management practices in use and available programs to reduce or eliminate water quality impacts from irrigated agricultural discharges and locations where these occur. These practices might include tail water return systems, irrigation efficiency improvements, U.C. Cooperative Extension and NRCS grower outreach, etc. (11) Description of water management practices within the Coalition Group's boundaries and crop types in which they are used. Water management practices include, but are not limited to, water application for the purpose of hydrating crops, pre-planting irrigation, water application for the purpose of frost prevention, and water application to address salinity; (Q#4) What are the management practices that are being implemented to reduce the impacts of irrigated agriculture on waters of the State within the Coalition Group boundaries and where are they being applied? (reference management plans); (Q#5) Are water quality conditions in waters of the State within Coalition Group boundaries getting better or worse through implementation of management practices? (reference management plans).
11. Coalition Contact Information	20	**(20)** Coalition Group contact information.
***Signed Transmittal Letter**	21	**(21)** To be submitted with MRPP.

DESCRIPTION OF COALITION GROUP AREA

The Coalition region includes parts of San Joaquin, Contra Costa, Alameda and Calaveras counties and comprises approximately 1,057,350 acres of which 548,362 (52%) are considered irrigated agriculture. The County Agricultural Commissioner's offices, for San Joaquin, Contra Costa, Alameda and Calaveras Counties note that there are 520,172 acres, 22,000 acres, 3,695 acres and 2,495 acres of irrigated farm lands in the counties respectively (San Joaquin acreage is from the 2002 Agricultural Report). Contra Costa, Alameda and Calaveras County acreages are estimates because not all of the county area is within the Coalition area.

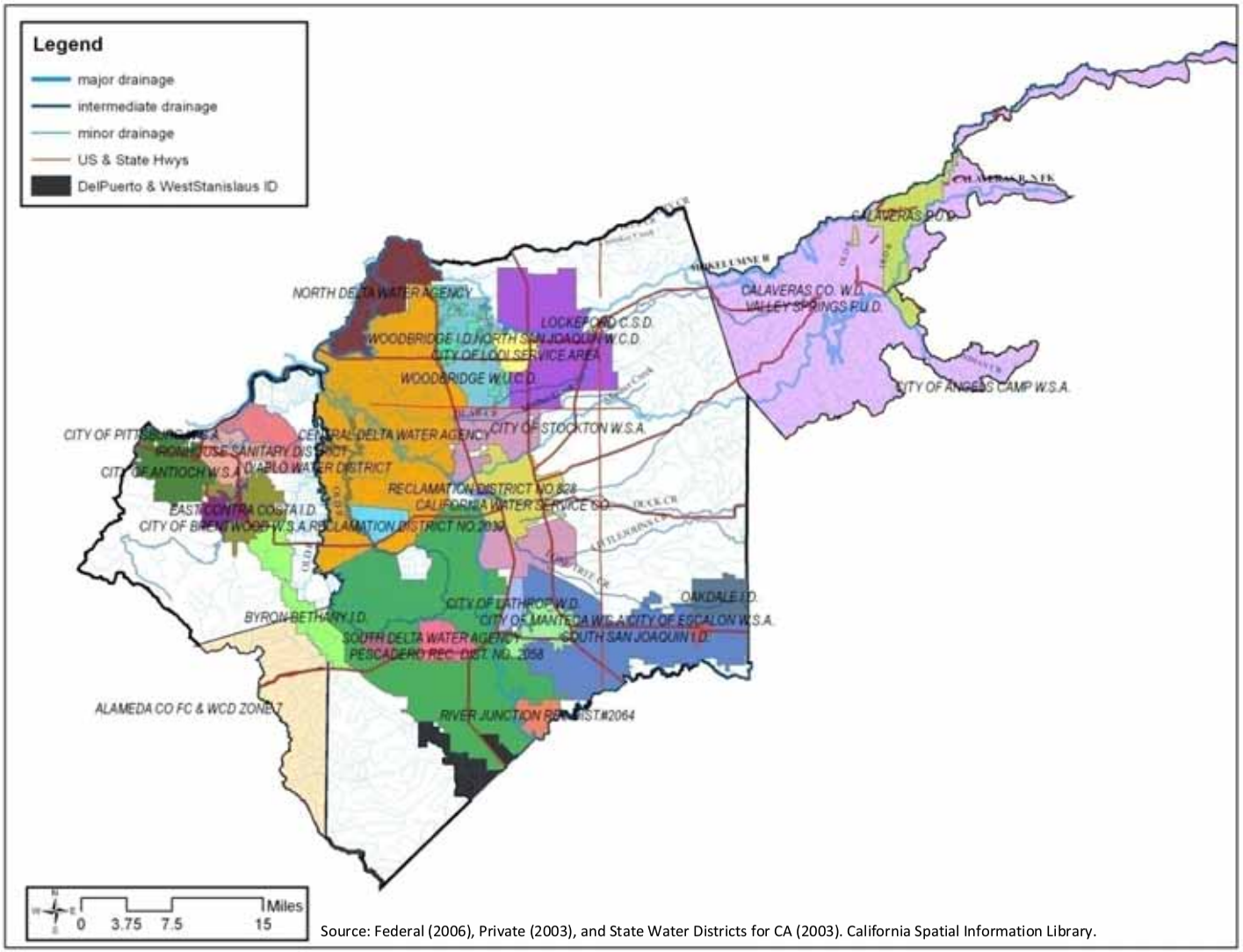
The northern border of the Coalition area corresponds to the county line between San Joaquin and Sacramento Counties. The eastern portion of the Coalition area was expanded in April of 2004 and now includes portions of Calaveras County that are the upper Calaveras River, Bear Creek, and Mokelumne River 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. 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 boundary of the CVRWQCB (Region 5) 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 from 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.

Within the Coalition region, the lower reaches of the San Joaquin River drain 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 major portion of the Sierra Nevada Mountain range from east to west. The watershed of the Coalition region 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 region (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 discharge to 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.

The San Joaquin County Delta Water Quality Coalition topography varies greatly from the foothills of the Coast range to the Delta islands up to the Sierras. Due to this diversity in topography and weather, agriculture is occurs primarily in the flatter, more temperate valley and Delta. The snow from the Sierras melts in the early spring to provide water to the Mokelumne and Calaveras Rivers. This snow pack helps provide runoff later into the spring and summer providing water for a longer irrigation season for crops in the valley.

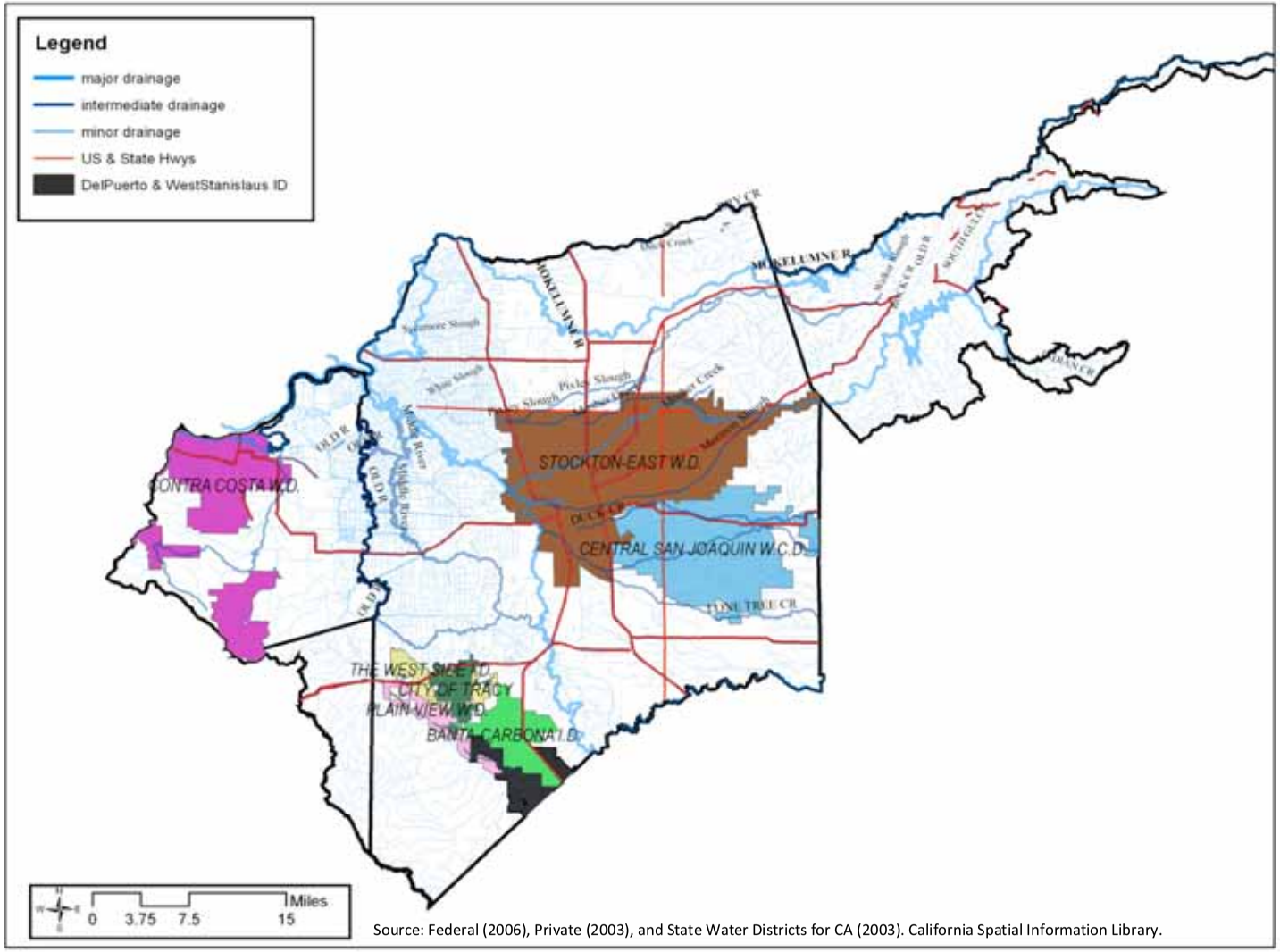
The Coalition area also includes within its boundaries portions numerous federal and state water districts, municipal water companies, reclamation districts, and sanitation districts within the Coalition area (Figures 1 and 2). All of these entities in the Coalition region have opted for coverage by the Coalition with the exception of the South San Joaquin Irrigation District. Water bodies in the South San Joaquin Irrigation District area may have both irrigation district and Coalition monitoring when they convey agriculture return flows.

Figure 1. Boundaries of state and private irrigation and water districts within the Coalition area.



Source: Federal (2006), Private (2003), and State Water Districts for CA (2003). California Spatial Information Library.

Figure 2. Boundaries of federal irrigation and water districts within the Coalition area.



Source: Federal (2006), Private (2003), and State Water Districts for CA (2003). California Spatial Information Library.

The Coalition area has been divided into six zones to facilitate completion of a comprehensive monitoring program. These zones were designated based on hydrology, crop types, land use, soil types, and rainfall (Table 2). The zone names are based on the Core Monitoring location within that area and include: 1) Mokelumne River @ Bruella Zone, 2) French Camp @ Airport Way Zone, 3) Terminous Tract Drain @ Hwy 12 Zone, 4) Roberts Island Drain @ Holt Ave Zone, 5) Lower San Joaquin Zone, and 6) Contra Costa Zone. Zone 5 does not have a Core Monitoring location since the Coalition has not previously monitored in this area. Therefore there is no site name associated with the Zone and consequently it is called the Lower San Joaquin Zone. Zone 6 does not have a Core Monitoring location due to the increase of urbanization within the Contra Costa county and lack of agriculture in the southern portion of this zone. The sites previously sampled within the Contra Costa Zone (Sand Creek and Marsh Creek) have been fully characterized and will continue to be part of the SJCDWQC Management Plan with the exception of Marsh Creek which has been excluded from monitoring (per the approval of the Regional Board Executive Officer) due to surrounding urban development.

The boundaries of each zone are provided in Figure 3. Below is a description of each zone's land use, hydrology, precipitation, soil types and crop patterns. Information for land use was obtained from the California Department of Pesticide Regulation database which is current through 2008 (http://calpip.cdpr.ca.gov/main.cfm?redirect=true). Information for river flow data was obtained from the United States Army Corps of Engineers (http://www.spk-wc.usace.army.mil/plots/plot_menu_ca.html) and temperature, rainfall and elevation data was obtained from Department of Water Resources (http://www.water.ca.gov/floodmgmt/hafoo/csc/climate_data/joaquin.cfm).

Figure 3. Zone boundaries (1-6) within the SJCDWQC.

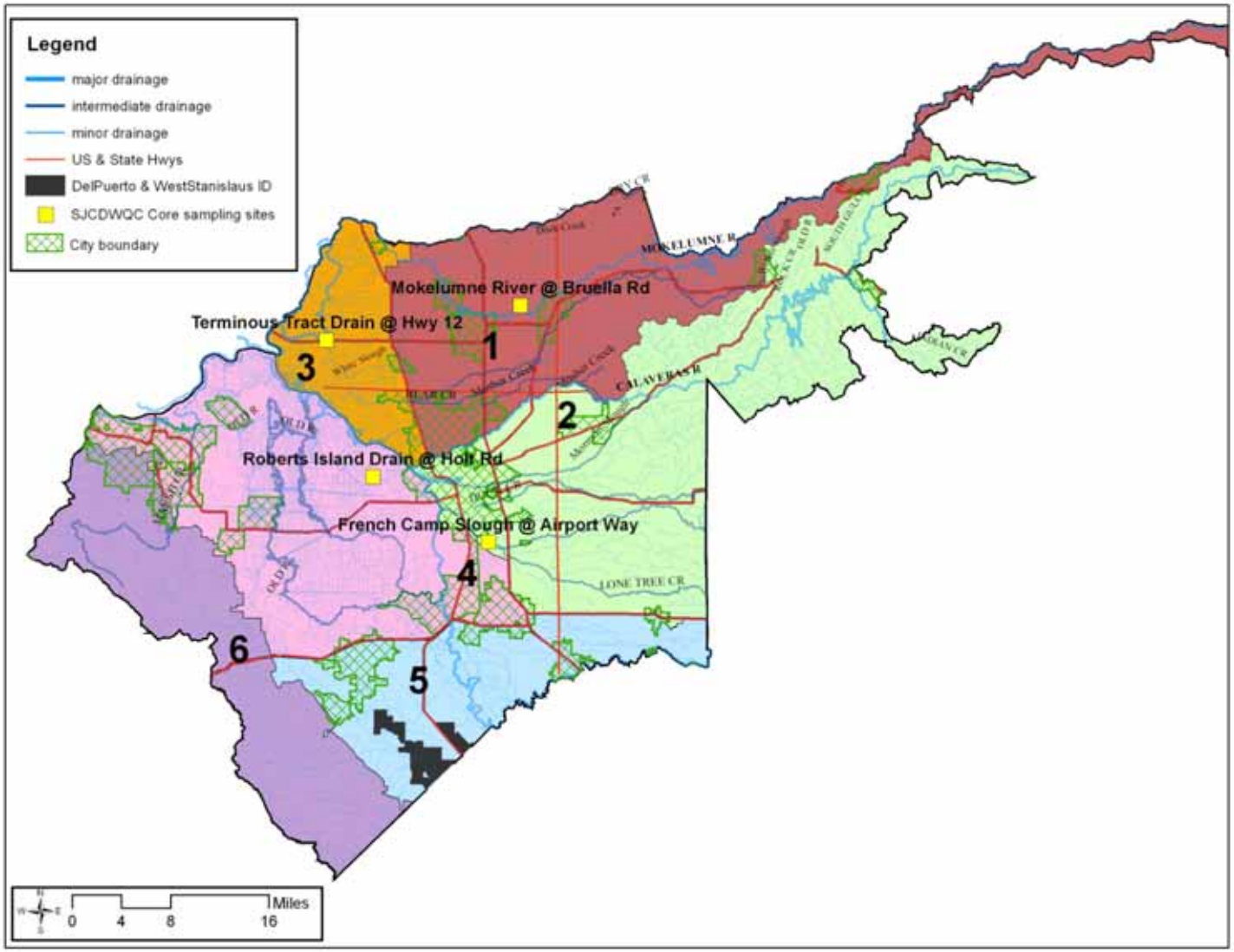


Table 2. Land use and soil percentages for SJCDWQC zones. Table will be updated yearly; refer to the AMR for the most recent land use and soil percentages.

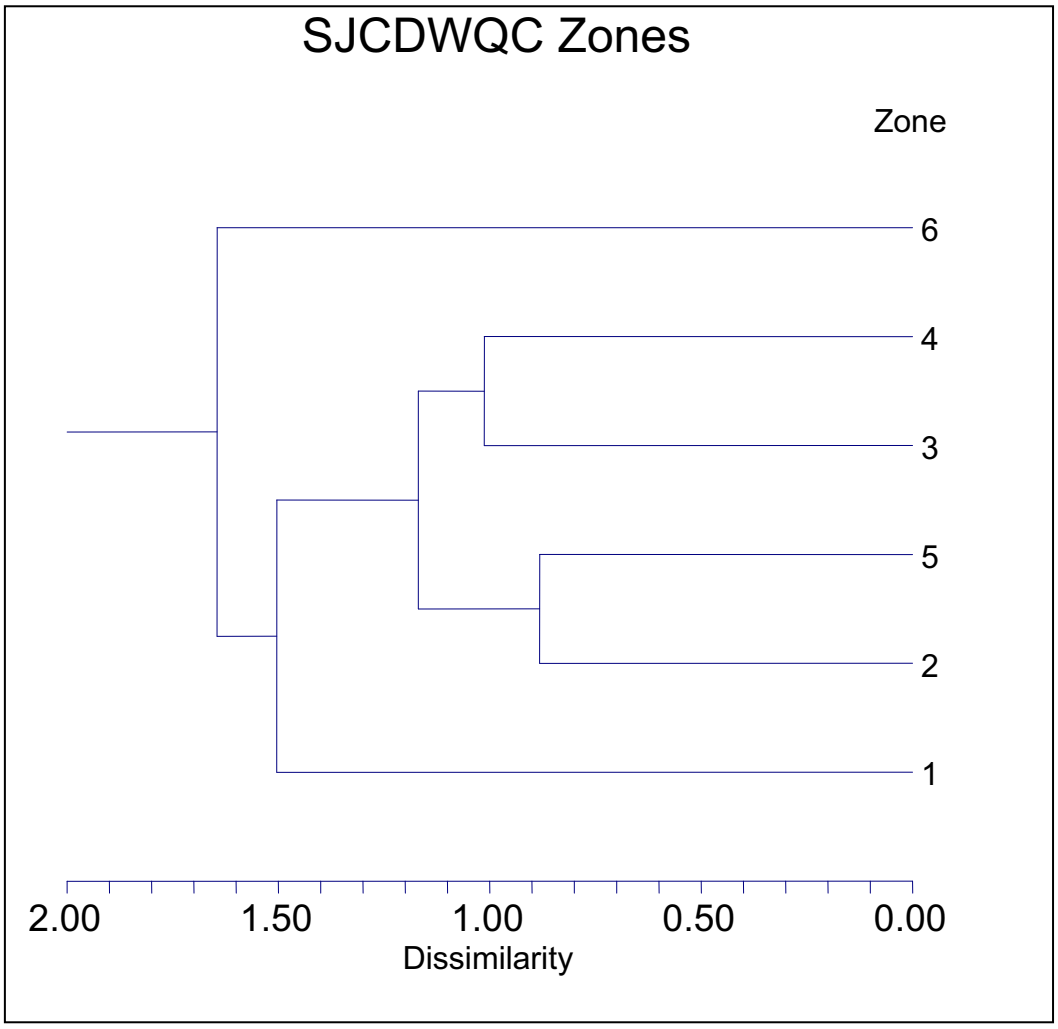
	1	2	3	4	5	6
	Mokelumne River @ Bruella Zone	French Camp Slough @ Airport Way Zone	Terminous Tract Drain @ Hwy 12 Zone	Roberts Island Drain @ Holt Rd Zone	Lower San Joaquin Zone	Contra Costa Zone
Total Acres	663,562.16	687,956.99	120,112.03	479,455.35	302,772.49	587,924.97
Irrigated Acres	114,067.73	158,304.64	73,253.05	192,546.54	101,786.85	2,294.19
Soil (average %):						
Sand	51.15	41.95	42.04	38.74	47.49	34.20
Silt	27.82	30.54	32.28	33.19	25.69	32.91
Clay	21.03	27.51	25.68	28.07	26.82	32.89
Land Use (% of irrigated acres):						
Deciduous Fruits/Nuts	15.31	31.33	0.86	5.71	40.86	49.86
Field Crops	8.37	10.58	49.10	31.53	14.43	11.73
Grains/Hay	4.52	16.57	16.31	12.47	11.54	13.19
Pasture	17.57	14.37	8.76	24.82	16.17	2.61
Vineyard	45.57	9.55	7.12	1.74	3.68	0.00
Dairies/Feedlots:						
% of total acres	0.32	0.53	0.45	0.51	0.59	0.02
Number of operations	474	521	73	512	285	30
Urban (% of total acres)	5.98	5.54	21.45	10.87	5.71	1.85
Depth to groundwater:						
Weighted average	99	91.94	17.1	17.32	31.94	30*
% area of groundwater	100	62	4	7	18	0.78

*only one contour/area data point exists

A dendrogram was created to illustrate the dissimilarity among the zones (Figure 4). The dendrogram was constructed using a hierarchical algorithm in which the two most similar zones are identified, in this case Zone 2 and Zone 5, and connected at the level of similarity/dissimilarity between the two. In this case the two zones are dissimilar at a level of approximately 0.9. The dissimilarity scale is a unitless measure that is an n-dimensional Euclidean distance between points. The variables for the two zones are averaged to form a new entity and the analysis is performed again with five zones. The next two most similar zones are identified; in this case Zone 3 and Zone 4, and they are connected at the appropriate level of dissimilarity (slightly greater than 1.0). The variables are averaged to form a new entity and the process continues with four zones, then three zones, and finally two zones. Although there are no statistical tests for significance of the differences between clusters, it is generally accepted that if the clusters are dissimilar at a level of approximately 0.15, the clusters are distinct. In the analysis above, the zones are all dissimilar at a level that far exceeds 0.15 indicating that they are distinct from each other and each is relatively homogeneous within its boundaries. These results suggest that sites within each zone are representative of other sites within the same zone with respect to soils, land use, and depth to groundwater. Sites would not be representative of other sites outside of their own zone.

Below is a description of each zone's land use, hydrology, precipitation, soil types and crop patterns.

Figure 4. Dendrogram of SJCDWQC zones based on dissimilarity. See text for details on variables used to construct the dendrogram.



Mokelumne River @ Bruella Rd Zone (Zone 1)

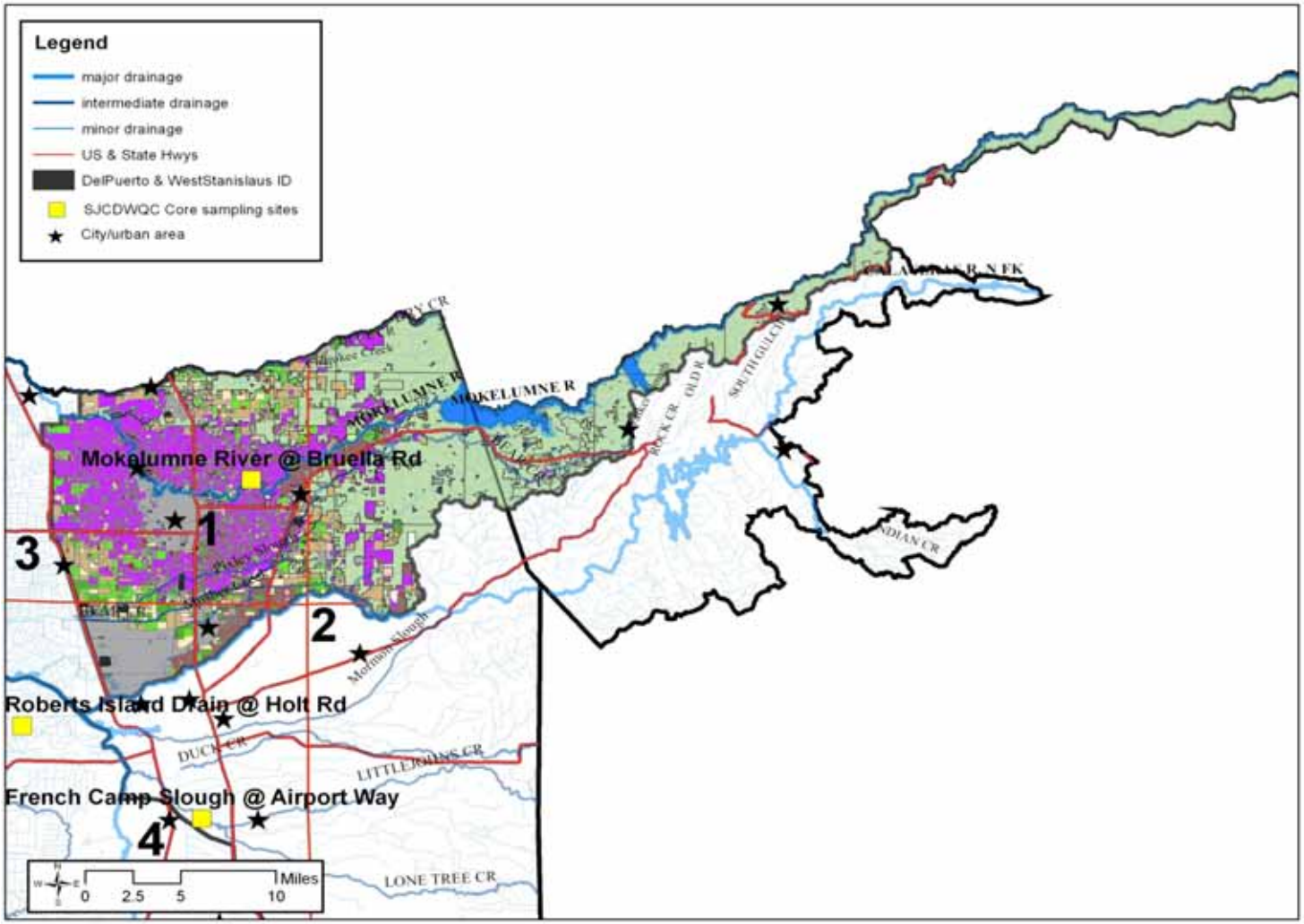
Climate and River Flows

The topography of this zone varies greatly from the valley floor in the Delta (elevation of 12 feet) to the Sierra Nevada Mountains to the east. The temperature and amount of precipitation on the valley floor are considerably different from higher elevations. The valley portion of Zone 1 around Lodi (elevation of 40 feet) winter temperatures range from 32˚-60 (˚F) and summer averages in the mid 70s (˚F). Summer highs reach 100˚F and lows around 50˚F. Rainfall occurs predominantly during the winter and is heterogeneously distributed throughout this period (typical for a Mediterranean climate). The average rainfall for this area is 18.22 inches per season (California Department of Water Resources). The middle portion of this zone is located in the foothills and at Lake Pardee (elevation of 658 feet) the weather varies only slightly from the valley floor. The eastern portions of Zone 1 are along the Mokelumne River into the Sierra mountain range. The Mokelumne River flows from the crest of the Sierras Nevada mountains to the Delta through Lake Pardee and Lake Comanche. The inflows into Lake Comanche are a direct release from Lake Pardee directly up River. The inflows are on average less than 1000 cfs with up to 10,000 cfs on very high precipitation years. The high inflows are most common in the months of May and June. Outflows into the lower river system are on average 200-2000 cfs in May and June, dependant on the inflows and the snow melt. The outflow for the rest of the year is generally 200-350 cfs.

Soil Types and Land Use

A majority of the soils within the Mokelumne River @ Bruella Rd Zone (51%) are dominated by sand with some silt (28%) and clay (21%) mixed in. Vineyards account for 45% of the land use. There is an additional mixture of pasture and deciduous fruits and nuts, as well as a smaller portion of field crops and grains and hay. The 474 dairies/feedlots within the zone make up 0.32% of the total zone acreage. Non-irrigated land uses constitute 17.2% of the Mokelumne River @ Bruella Rd Zone. Of the 158,305 irrigated acres in the zone, 31% are deciduous fruits and nuts (Table 2, Figure 5).

Figure 5. Land use for Mokelumne River @ Bruella Rd Zone (Zone 1). See Figure 11 for a land use legend.



French Camp Slough @ Airport Way Zone (Zone 2)

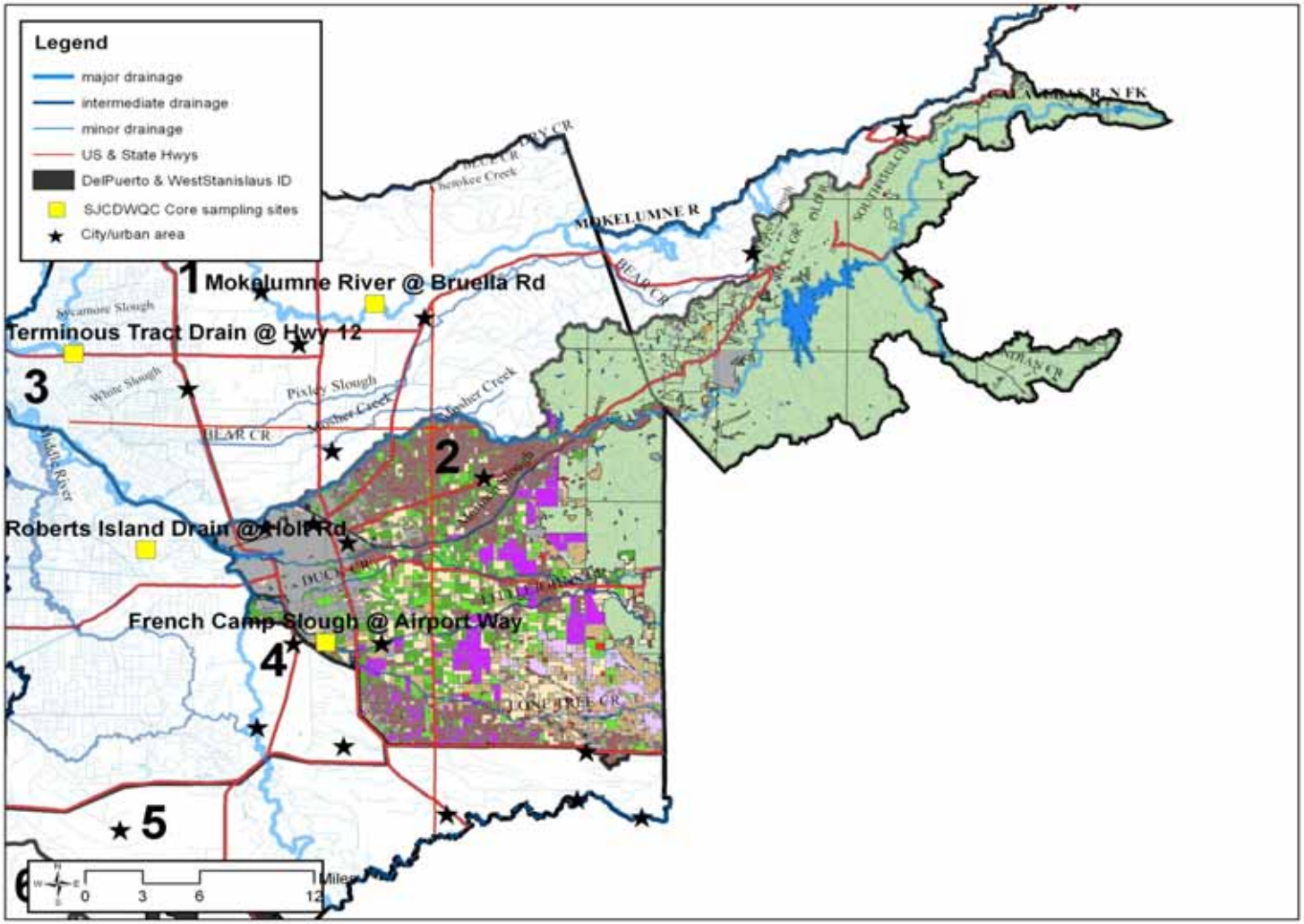
Climate and River Flows

Zone 2 covers from the eastern edge of the delta in Stockton to the foothills of the Sierras along the Calaveras River. The Stockton airport (elevation of 22 feet) experiences winter temperatures between 32˚F and 62˚F with infrequent freezing. The summer is warm and dry with temperatures between 60˚F and 100˚F. The Delta and vicinity are subject to pulses of cool coastal air that can provide relief from summertime highs and allow for the farming of cooler crops. The average precipitation for this area is 13.84 inches mostly during the winter months of November through March. The eastern portion of this zone is comprised of the foothills east of New Hogan Lake up the Calaveras River (elevation of 715 feet) the temperature is similar to the valley. The upland areas are slightly cooler at night but generally remain hot throughout the summer. The precipitation for this area is 22-30 inches per season. Eighty percent of the precipitation comes in November through March with many small storms and one to three larger storms. The Calaveras River flows through the northern portions of this zone and into the San Joaquin River west of Stockton. New Hogan Lake is the main reservoir for this river and controls the flows in the river. The inflow to New Hogan is highest in January and February with up to 4500 cfs during this time and about 400 cfs the rest of the year. The outflows are 200 cfs during March through September fairly consistently, and much less the rest of the season.

Soil Types and Land Use

The soils in the French Camp Slough @ Airport Way Zone are composed of sand (42%), silt (30%) and clay (28%) (Table 2). Deciduous fruits and nuts are the predominant crop in this zone with nearly one-third of the irrigated land. Field crops, grains and hay, pasture, and vineyards are all 10-15% of irrigated land. This zone has the largest number of dairies in the Coalition region (521) with approximately 0.53% of the acreage. Urban land is about 5.5% of the acreage in the zone (Table 2, Figure 6).

Figure 6. Land use for French Camp Slough @ Airport Way Zone (Zone 2). See Figure 11 for a land use legend.



Terminous Tract Drain @ Hwy 12 Zone (Zone 3)

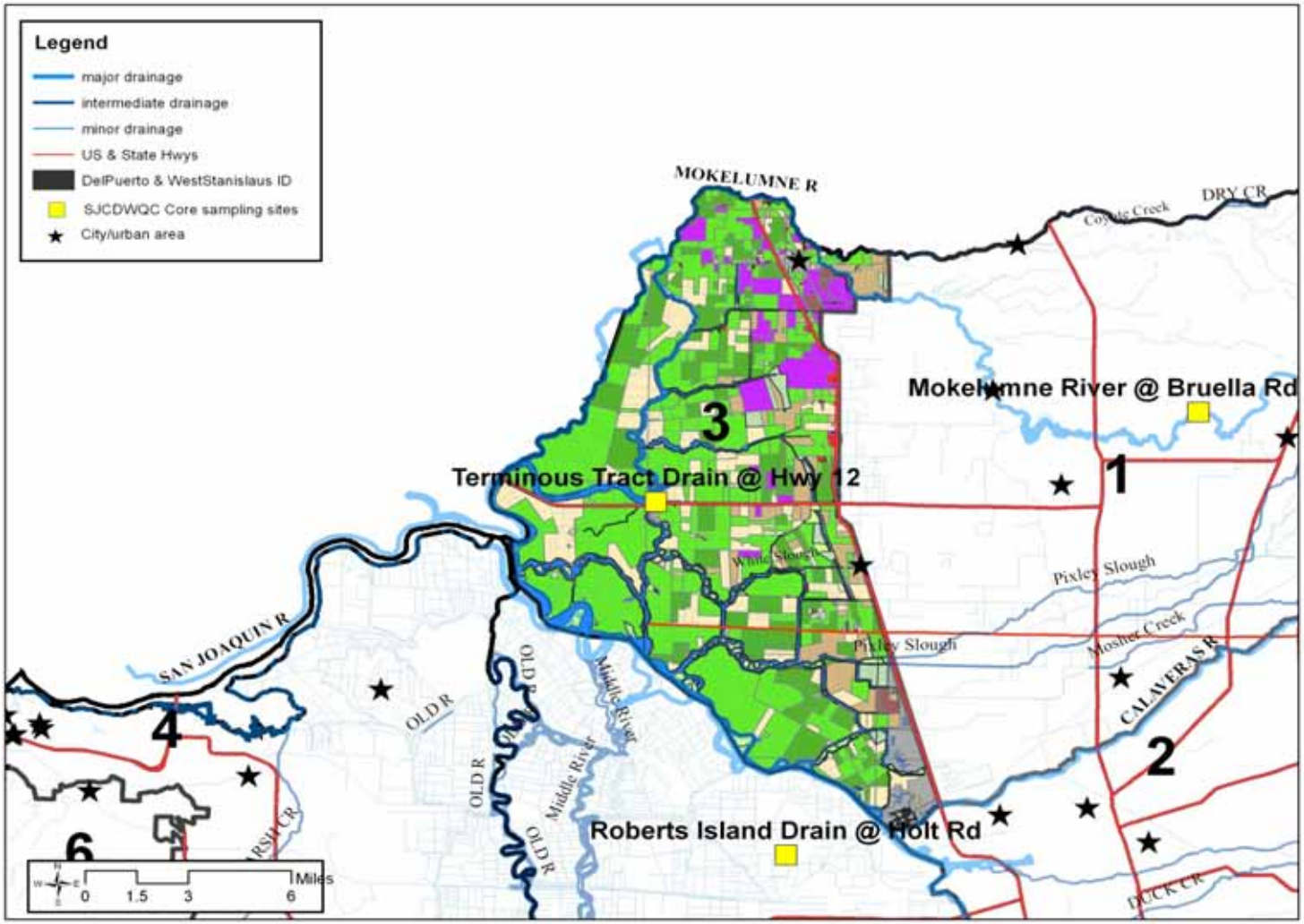
Climate and River Flows

Zone 3 is the Central Delta with much of the land at or below sea level and surrounded by water in canals and sloughs. Southern Stockton (elevation of 12 feet) has winter temperatures ranging from 32˚F to 62˚F. Freezing, although less likely in the Delta region, does occur preventing the farming of perennial crops susceptible to frost. The Delta areas are subject to light winds that can provide relief from summertime highs and allow for the farming of cooler crops. The summertime temperature averages around 70˚F with highs of 92˚F and night time lows in the 50's. The average precipitation is 16.6 inches with most of that falling in the winter months. The winter typically consists of many small storms and one to three larger storms.

Soil Types and Land Use

Soils in this zone consist of 42% sand, 32% silt, and 27.5% clay and some Delta islands have peat soils. Nearly 50% of the irrigated land in this zone is field crops with smaller percentages of grains, pasture, and vineyards. Deciduous fruits and nuts are less than 1% of the agriculture in the zone. This zone contains the largest portion of urban land (21%) and only 73 dairies (Table 2, Figure 7).

Figure 7. Land use for Terminous Tract @ Hwy 12 Zone (Zone 3). See Figure 11 for a land use legend.



Roberts Island Drain @ Holt Rd Zone (Zone 4)

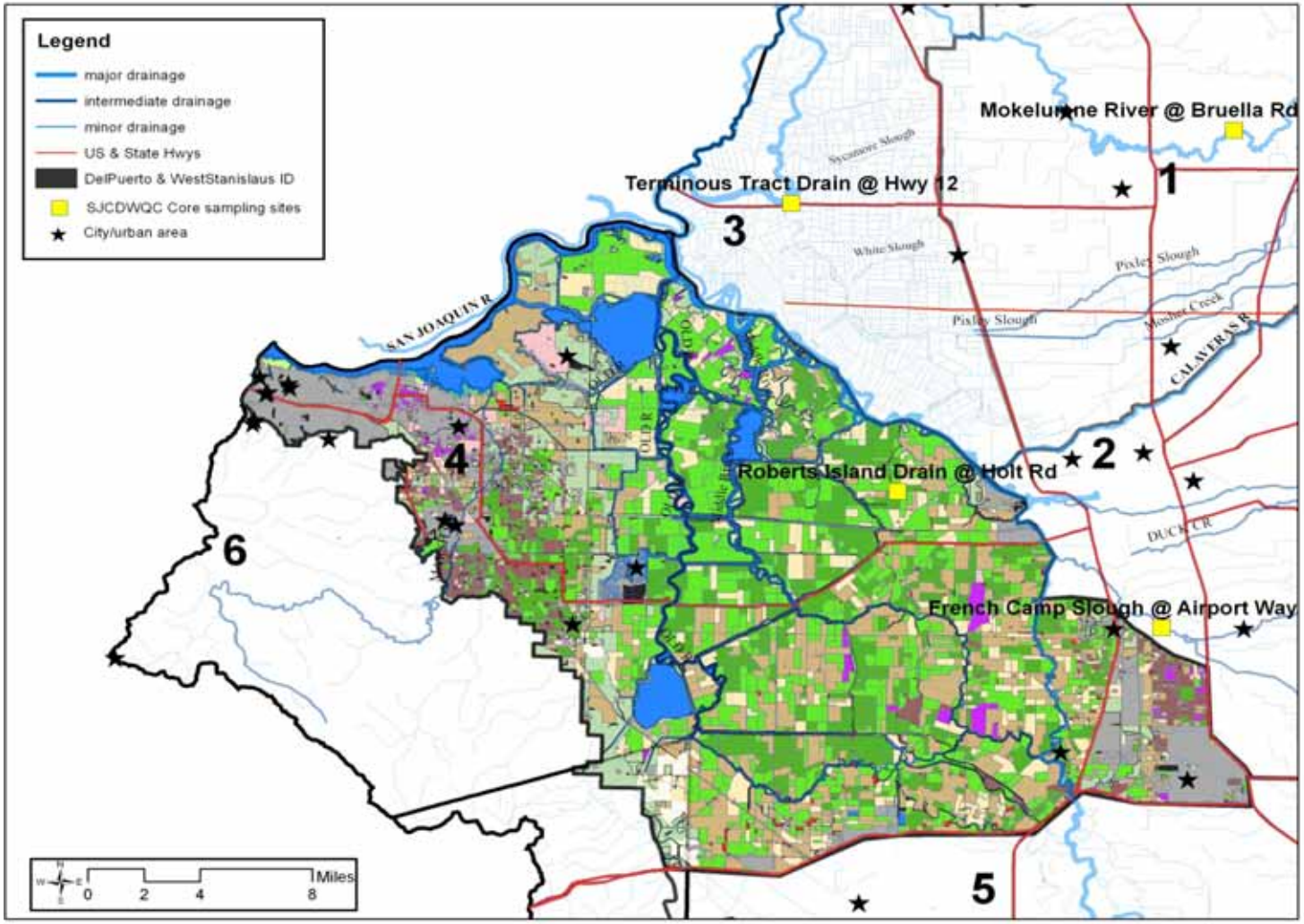
Climate and River Flows

Zone 4 is mostly comprised of the South San Joaquin Delta. This area is temperate with mild winters and warm summers with pulses of cool coastal air that can provide relief from summertime highs and allow for the farming of cooler crops. The winter time average is in the low 50's with a low of 31˚F with freezing a possibility. The summers have an average high of 98˚F cooling down in the evening due to the Delta breeze. The rainfall averages 12.51 inches annually with most precipitation from a few large storms.

Soil Types and Land Use

Soils in this zone are similar in composition to the Terminous Tract zone averaging 39% sand, 33% silt, and 28% clay. Soils become more mineral toward the southern end of the zone. Field crops are the largest class of irrigated agriculture at 32% with pasture covering 25% of the acreage. Grains/hay are 12%, deciduous fruits and nuts are 6%, vineyards are 2%, and urban land is 11% of the acreage. There are 512 dairies in this zone covering 0.5% of the zone (Table 2, Figure 8).

Figure 8. Land use for Roberts Island Drain @ Holt Rd Zone (Zone 4). See Figure 11 for a land use legend.



Lower San Joaquin Zone (Zone 5)

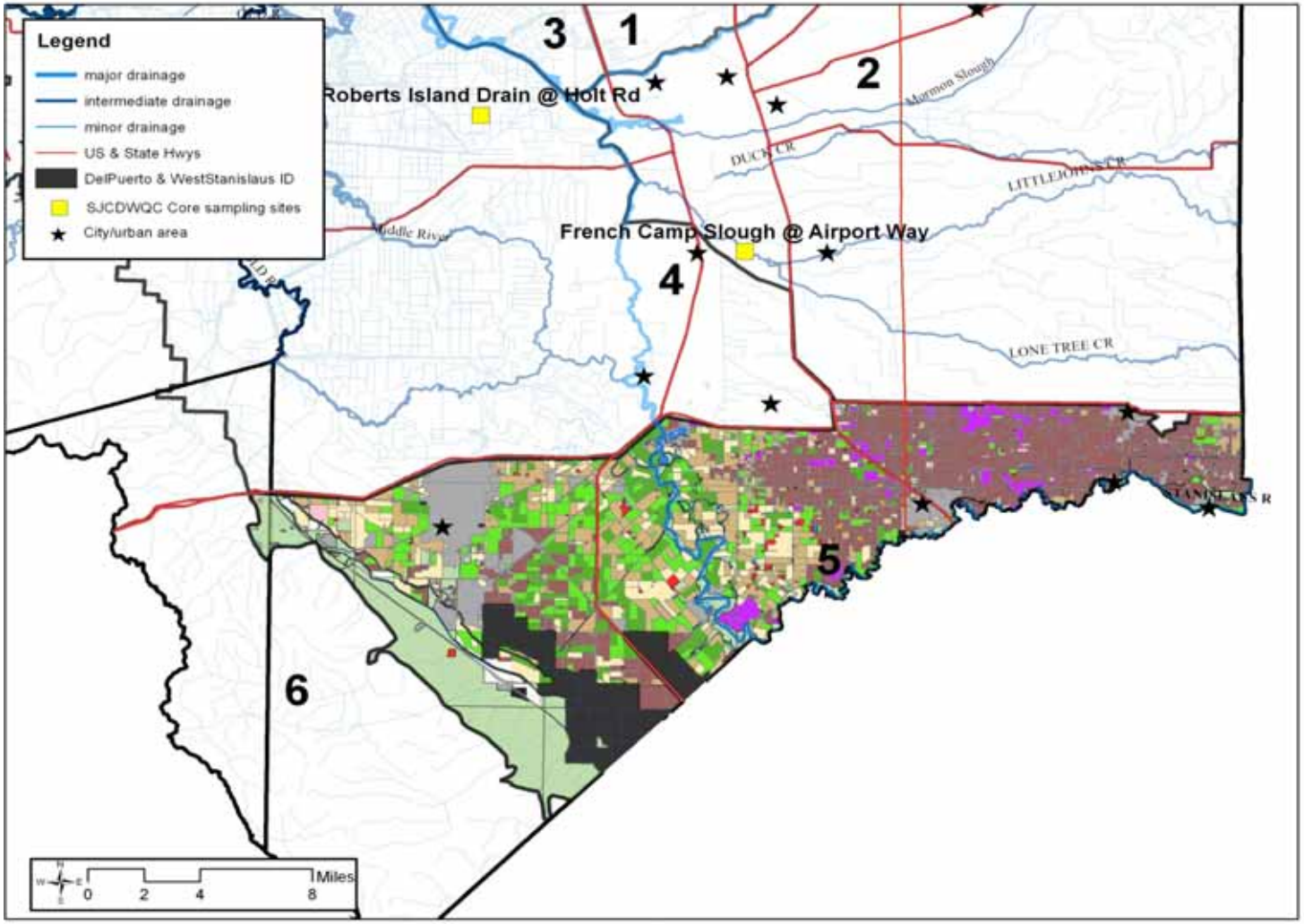
Climate and River Flows

Zone 5 is the southernmost zone in the SJCDWQC and has not previously contained any sampling sites. Due to the sandy soils of this area the Coalition has not focused any monitoring in this region due to low amount of agricultural discharge. This zone begins at the south end of the San Joaquin Delta along the edge of the foothills to the west, and east to the San Joaquin county line. The average winter temperature for this area is in the high 40's with a low of 31˚F. The summer time average temperature is in the 70's with a high of 100˚F. The rainfall for this area is somewhat less than other zones in the Coalition region due to the rain shadow effect of Mt. Diablo and the coastal range. The average rainfall for this area is 10.58 inches with most precipitation occurring during the winter months.

Soil Types and Land Use

As is common as one moves south through the valley, the soils of this zone are sandier than those to the north averaging 47% sand, 26% silt, and 26% clay. Deciduous fruits and nuts are 41% of the acreage in this zone, pasture is 16%, field crops are 14%, grains/hay are 12%, urban lands are 6%, and vineyards are 4% of the acreage. The deciduous orchards are almost the entire irrigated acreage in the eastern portion of this zone. Closer to the San Joaquin River, field crops, grains/hay and vineyards are the predominant agriculture. There are 285 dairies in this zone covering 0.6% of the acreage (Table 2, Figure 9).

Figure 9. Land use for Lower San Joaquin Zone (Zone 5). See Figure 11 for a land use legend.



Contra Costa Zone (Zone 6)

Climate and River Flows

Zone 6 is the western portion of the Coalition region. This area is comprised of the small amount (2,294 acres) irrigated agriculture that occurs between Mt. Diablo to the west and the Delta to the east. The winter temperature high is 65˚F with lows of 30˚F possible in the coastal hills. The summer in this area is warm and dry with an average temperature in the low 70's and highs at or near 100˚F. The average annual rainfall for this region is 13.33 inches. Most of the precipitation comes in the months of November through March.

Soil Types and Land Use

Soils in this region average 34% sand, 33% silt, and 33% clay. Deciduous fruits and nuts are nearly 50% of the irrigated agriculture in this zone, grains/hay are 11%, field crops are 12%, and pasture is 2.61% of the acreage. There are no vineyards in this zone. There are only 30 dairies in this zone covering 0.02% of the acreage (Table 2, Figure 10).

Figure 10. Land use for Contra Costa Zone (Zone 6). See Figure 11 for a land use legend.

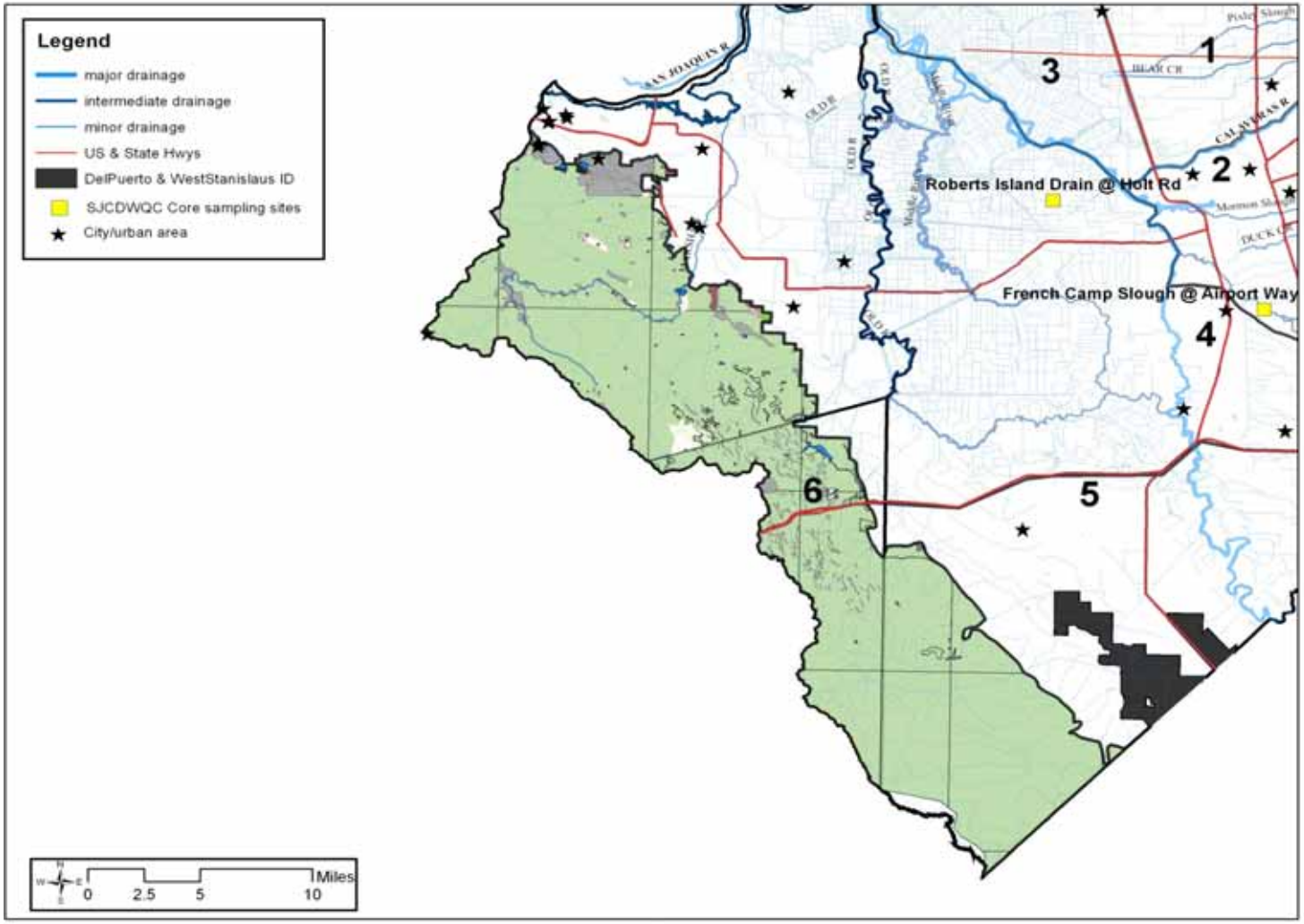


Figure 11. Land Use legend for SJCDWQC.

Source:
Land use survey data. CA Department of Water Resources (available for each county). Alameda (2006). Contra Costa (1995). Calaveras (2000). Alameda (2006). US Geological Survey. 1999. California Resources Agency. Statewide coverages. Obtained from California Spatial Information Library.

Valuable Aquatic Resources

Aquatic resources for water bodies within the Coalition area have been defined in part as those assigned as beneficial uses (BU) by the CVRWQCB. Using the tributary rule, BUs are applied to tributaries based on the BU currently assigned to the major downstream receiving water body (Table 3). Important aquatic resources exist in the Coalition area, including municipal and agricultural water use, cold water and warm water stream aquatic habitat, wetlands and fisheries resources. Several fisheries are considered important in the Coalition area including steelhead trout and Chinook salmon.

Wetlands are an important aquatic resource within the Coalition area. These habitats are associated with riparian areas along many of the water bodies in the region. Vernal pools are isolated catchments and are found heterogeneously distributed across the Coalition in upland areas. They receive winter rains and require an aquitard to maintain their characteristic pools into the spring. These wetlands maintain a unique flora and fauna and are protected by regulations specified in the Clean Water Act and the Endangered Species Act. Generally, vernal pools and irrigated agriculture are not found together, although there are exceptions.

Several fisheries are considered important in the Coalition region. Steelhead trout (*Oncorhynchus mykiss*) were common in the region prior to the construction of dams on all of the major tributaries of the San Joaquin River. Once the dams were built, historic spawning grounds were eliminated and with them, most of the wild salmonids in the San Joaquin Valley. Chinook salmon (*Oncorhynchus tshawytscha*) are present in the San Joaquin system and are found in all major tributaries in the region. All of the major tributaries are considered to be impaired for salmonid spawning and/or migration habitat as is the main stem of the San Joaquin River (Table II-1 of the Sacramento River and San Joaquin River Basin Plan). A large hatchery exists on the Mokelumne River to supplement salmon populations impacted by Comanche Reservoir.

Beneficial Uses

A table of beneficial uses for each of the sites monitored by the Coalition is provided below. The CVRWQCB has assigned beneficial uses (BU) to 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 those assigned to downstream water bodies listed in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basin (Basin Plan) (Table 3). Sites with number identifiers are Assessment Monitoring locations and sites with alphabetical identifiers are Core Monitoring locations. Exceedances were determined based on the BUs applied by the Coalition. Figure 12 is a map of the Coalition area with each water body color coded based on the applied BU.

Table 3. Primary water bodies that drain directly into the major rivers of the SJCDWQC region and the beneficial use for each of the major rivers. Sorted by site subwatershed.

ID	Site subwatershed (site name)	Immediate Downstream River	Beneficial Use of Immediate Downstream River*
1	Bacon Island Pump @ Old River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
2	Bear Creek @ North Alpine Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
3	Bouldin Island Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
4	Byron Tract @ Discovery Bay	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
5	Byron Tract Drain @ Old River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
6	Coyote Creek tributary @ Jack Tone Rd	Mokelumne River[1]	2, 3, 7-15
7	Drain @ Woodbridge Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
8	Drain to Bishop Cut @ North Rio Blanco Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
9	Drain to Hog Slough	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
10	Drexler Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
11	Duck Creek @ Highway 4	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
12	East Lower Jones Tract Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
13	East Palm Tract Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
14	Empire Tract @ 8 Mile Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
15	Empire Tract Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
A	French Camp Slough @ Airport Way	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
16	Grant Line Canal @ Clifton Court Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
17	Grant Line Canal near Calpack Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
18	Holland Drain @ Old River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
19	Jahant Slough @ Cherokee Ln	Mokelumne River[1]	2, 3, 7-15
20	Kellogg Creek along Hoffman Lane	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
21	King Island Drain along 8 Mile Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
22	Littlejohns Creek @ Jack Tone Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
23	Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
24	Mandeville Island Pump @ Middle River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
25	Mandeville Island Pump @ Old River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
26	McDonald Island Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
27	Medford Island Drain @ Middle River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
B	Mokelumne River @ Bruella Rd	Mokelumne River[1]	2, 3, 7-15
28	Mokelumne River Drain @ North Lower Sacramento Rd	Mokelumne River[1]	2, 3, 7-15
29	Mormon Slough @ Jack Tone Road	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16

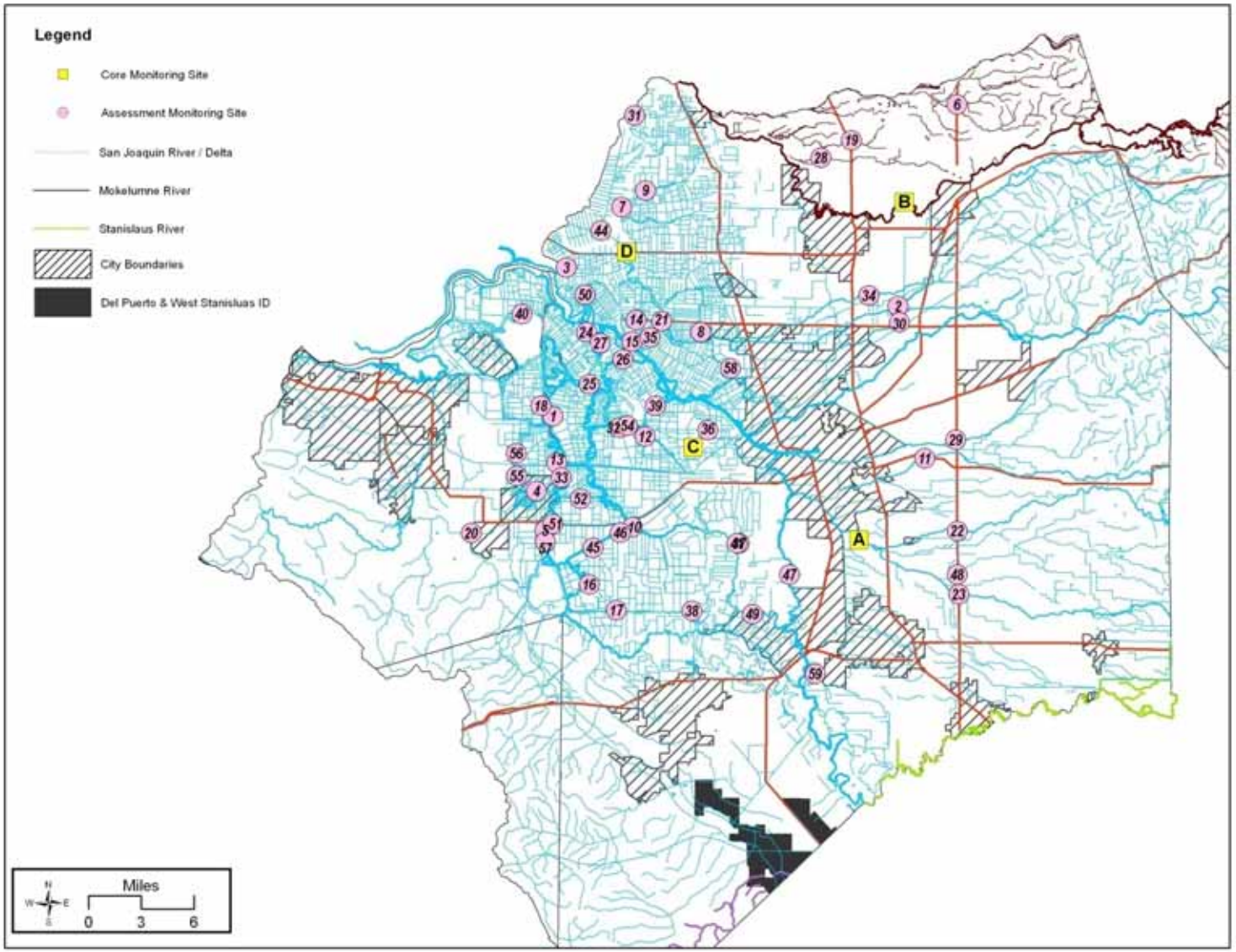
ID	Site subwatershed (site name)	Immediate Downstream River	Beneficial Use of Immediate Downstream River*
30	Mosher Creek @ North Alpine Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
31	New Hope Tract Drain @ Walnut Grove Ct	Mokelumne River[1]	2, 3, 7-15
32	North Lower Jones Tract Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
33	Orwood Tract Drain @ Old River	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
34	Pixley Slough @ Fury Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
35	Ridge Tract Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
C	Roberts Island Drain @ Holt Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
36	Roberts Island Drain along House Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
37	South East Roberts Island Drain @ Howard Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
38	South East Union Island Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
39	South McDonald Island Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
40	South Webb Tract Drain		
41	South West Roberts Island Drain @ Howard Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
44	Staten Island Drain @ Staten Island Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
D	Terminous Tract Drain @ Hwy 12	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
45	Union Island Drain @ Bonetti Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
46	Union Island Drain @ Klein Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
47	Unnamed Drain along West Mahilla Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
48	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
49	Upper Roberts Island Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
50	Venice Island Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
51	Victoria Drain along Hwy 4	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
52	Victoria Island Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
59	Walthall Slough @ Woodward Ave	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
54	West McDonald Island Pump	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
55	West Orwood Tract Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
56	West Palm Tract Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
57	West Victoria Island Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16
58	Wright Tract Drain	Sacramento San Joaquin Delta[2]	1-5, 7-13, 15, 16

[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).
[3] Goodwin Dam to San Joaquin River

[4] Mouth of Merced River to Vernalis
* See below Beneficial Use code list.
** Marsh Creek has been assigned only recreational beneficial uses

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
Hydropower Generation Water Contact Recreation - 6
Water Contact Recreation - 7
Non-contact Water Recreation - 8
Warm Freshwater Habitat - 9
Cold Freshwater Habitat - 10
Migration of Aquatic Organisms (warm) - 11
Migration of Aquatic Organisms (cold) - 12
Spawning, Reproduction, and/or Early Development (warm) - 13
Spawning, Reproduction, and/or Early Development (cold) - 14
Wildlife Habitat - 15
Navigation – 16

Figure 12. Beneficial uses of waterbodies in the SJCDWQC area. Due to the proximity of the sites to each other, site ID 41 and 38 overlap. Site IDs are listed in Table 3.



MONITORING STRATEGY

Ambient water and sediment quality monitoring for agricultural discharge will occur with three types of monitoring: Core Monitoring, Assessment Monitoring, and Management Plan Monitoring. Combined, these three levels of monitoring are designed to characterize the discharge from irrigated agriculture as a result of irrigation and storm water runoff. Core Monitoring will occur at sites that have undergone intensive monitoring in the past to assess general water quality trends over time. Assessment Monitoring will occur at sites that have not been well characterized by previous monitoring. Samples collected from Assessment Monitoring locations will be analyzed for a large suite of constituents to adequately characterize water quality at those sites. This monitoring strategy allows for comprehensive monitoring in the short term and general trend monitoring over successive years.

The Coalition area has been divided into six zones based on hydrology, crop types, land use, soil types, and rain fall. For a description of each zone in regards to land use, hydrology, precipitation, soil types and crop patterns refer to the Description of Coalition Area section of this MRPP. The zone names are based on the Core Monitoring location within that area and include: 1) Mokelumne River @ Bruella Zone, 2) French Camp @ Airport Way Zone, 3) Terminous Tract Drain @ Hwy 12 Zone, 4) Roberts Island Drain @ Holt Ave Zone, 5) Lower San Joaquin Zone, and 6) Contra Costa Zone. Prior to April 2009 each zone, except for Contra Costa, was monitored at one Core site and one Assessment site monthly. Starting in April 2009, the number of Assessment monitoring locations was reduced. The Coalition will now monitor at one Core site in each zone monthly and a single Assessment site monthly. The Assessment site will rotate through the five Coalition zones yearly (no Core or Assessment Monitoring will occur in the Contra Costa Zone). When possible, the rotating Assessment site will be sampled in a zone where the Core site is also being monitored for assessment constituents. Each Core site is scheduled for two years of Core Monitoring followed by one year of Assessment Monitoring. The Coalition has not previously sampled within the Lower San Joaquin Zone due to the limited amount of agricultural discharge and therefore one site will be monitored within this zone as an Assessment site from October 2008 to December 2010 to characterize irrigated agriculture for this entire zone. In 2011 the site will become the Core site for the Lower San Joaquin Zone. The Contra Costa Zone will not have any Core or Assessment sites due to the large amount of urban areas within this zone. The Coalition will continue to conduct Management Plan Monitoring within this zone for previously sampled locations (Sand Creek @ Hwy 4 Bypass).

Core Monitoring

Core sites have been selected from water bodies that have a history of monitoring and are suitable to track water and sediment quality trends over extended periods of time. A list of criteria used to select these sites is provided below. Core sites will undergo assessment monitoring every three years in order to evaluate the effects of changes in land-use and management practices and provide information about long-term trends and effectiveness of the management practices. Management plan monitoring may also occur at Core sites. Core

Monitoring is not limited to largest volume water bodies, but includes a diversity of water body sizes and flows. Data generated from the Core sites will be used to establish trend information about the effectiveness of the Coalition's efforts to reduce or eliminate the impact of irrigated agriculture on surface waters.

Core Monitoring Sites Selection Criteria:

1. Core sites have been monitored for at least three years (at least one full cycling of monitoring including irrigation and storm monitoring as per MRP Order R5-2005-0833 for all Assessment Monitoring constituents).
2. Core sites include small, intermediate and large site subwatersheds.
3. Core sites include site subwatersheds dominated by field crops and by orchards.
4. Core sites include areas with low flow (irrigation ditches that have flow only when pumps are on), medium flow (increases with irrigation or large storm events), and high flows (natural rivers).

Assessment Monitoring

Assessment Monitoring will focus on a diversity of monitoring sites that are representative of individual zones. Assessment sites were selected based on the sizes and flows of surface water bodies and land uses (e.g., agricultural activities, crops and pesticide use), and include water bodies that carry agricultural drainage into natural water bodies (see Table 3). Sites with known water quality impairments (such as, but not limited to those on the Clean Water Act 303(d) listing) and sites undergoing compliance monitoring for TMDLs will also be included in this monitoring. Assessment sites are selected in order to adequately characterize water quality for all waters of the State within the Coalition region. In conjunction with Core Monitoring for trends and Special Projects sampling focused on specific problems, Assessment Monitoring will help demonstrate the effectiveness of management practices and identify locations for implementation of new management practices, as needed.

The Assessment site will be rotated between the zones yearly (except for the Contra Costa Zone). If an Assessment site experiences more than one water quality exceedance for the same constituent within the year, it will become part of the SJCDWQC Management Plan monitoring which requires additional monitoring beyond the initial year. For site subwatersheds that are currently under a management plan, the Coalition will continue to monitor at those locations for the constituents within the management plan.

Special Project Monitoring

Special project monitoring will occur for the purpose of constituent-specific monitoring or targeted source identification studies as needed. This supplementary monitoring may include,

but is not limited to, specific targeted studies to source exceedances or monitoring to provide information about conditions of a water body that predate agricultural inputs that occurred prior to the formation of the Coalition. Pre-existing conditions may include legacy pesticides and metals use by agriculture in the past and which bind to sediments and settled into the bed of the water body. These compounds can result in current water contamination when sediment is mobilized into the water column. Additionally, there are natural background levels of salts and metals in the subwatershed that occur as a result of weathering of local soils. Special Project Monitoring is considered supplemental to the MRPP's requirements and will occur in specific site subwatersheds based on the actions described in the Coalition's Management Plan.

The SJCDWQC Management Plan includes a schedule for Management Plan monitoring based on the previous year's monitoring results. Each April, the Management Plan will be updated to include any new sites and/or constituents that will be included in that year's Management Plan process of sourcing, outreach and education. The SJCDWQC Management Plan includes the following eight requirements of the MRP and will be update yearly:

1. Identification of irrigated agriculture source.
2. Identification of management practices implemented to address exceedances.
3. Management practice implementation schedule.
4. Management practice performance goals with a schedule.
5. Waste-specific monitoring schedule.
6. A process and schedule for evaluating management practice effectiveness.
7. Identification of the participants and Coalition Group(s) that will implement the Management Plan.
8. An identified routine schedule of reporting to the Regional Water Board.

MONITORING SITES

Site Names and Locations

The SJCDWQC monitoring program originally included monitoring at 58 Assessment sites (Table 4), and four Core sites (Table 5). In April of 2009 the monitoring program was updated to five Core sites and one Assessment site monitored each year. Core sites will assess trends of water quality within each zone and will undergo assessment monitoring every third year. The Assessment site will rotate to a new location yearly to assess water quality across each zone ensuring that all subwatersheds are being fully characterized by the Coalition over time. Specific criteria used to select monitoring sites are provided in the previous section. In general, source identification sites are prioritized according to the size of the water body (intermediate sized water bodies are generally higher priority, although the Coalition attempted to select sites in all water body sizes) and the area of irrigated land in the site subwatershed. In some instances the proposed sampling locations are a significant distance upstream of the confluence of the intermediate-sized water body with the San Joaquin River. In these instances, the location of the proposed sample site is established in the most downstream position where agriculture is the predominant land use. Some water bodies cannot be sampled due to inaccessibility or safety concerns to the samplers.

Table 4. SJCDWQC sampling locations for Assessment Monitoring (sorted alphabetically).

ID	Zone	Monitoring Type	Site Name	Station Code	Latitude	Longitude
1	4	Assessment	Bacon Island Pump @ Old River	544BIPAOR	37.979350	-121.569450
2	1	Assessment	Bear Creek @ North Alpine Rd	531BCANAR	38.074310	-121.210900
3	3	Assessment	Bouldin Island Pump	544BIPXXX	38.101972	-121.558200
4	4	Assessment	Byron Tract @ Discovery Bay	544BTADBX	37.917370	-121.585410
5	4	Assessment	Byron Tract Drain @ Old River	544BTDAOR	37.885130	-121.575630
6	1	Assessment	Coyote Creek Tributary @ Jack Tone Rd	531CCTALR	38.240820	-121.151910
7	3	Assessment	Drain @ Woodbridge Rd	544DAWRXX	38.152560	-121.500950
8	3	Assessment	Drain to Bishop Cut @ North Rio Blanco Rd	544DBCRBR	38.050610	-121.416600
9	3	Assessment	Drain to Hog Slough	544DTHSXX	38.166590	-121.476600
10	4	Assessment	Drexler Drain	544DDXXXXX	37.889160	-121.484800
11	2	Assessment	Duck Creek @ Highway 4	531XDCAHF	37.949100	-121.181000
12	4	Assessment	East Lower Jones Tract Pump	544ELJTPX	37.964000	-121.472832
13	4	Assessment	East Palm Tract Drain	544EPTDXX	37.941090	-121.564770
14	3	Assessment	Empire Tract @ 8 Mile Rd	544ETAEMR	38.059720	-121.484030
15	3	Assessment	Empire Tract Pump	544ETPXXX	38.041760	-121.488380
16	4	Assessment	Grant Line Canal @ Clifton Court Rd	544XGLCCR	37.841400	-121.528800
17	4	Assessment	Grant Line Canal near Calpack Rd	544XGLCAA	37.820500	-121.499900
18	4	Assessment	Holland Drain @ Old River	544HDAORX	37.987720	-121.582170
19	1	Assessment	Jahant Slough @ Cherokee Ln	531XJSACL	38.210349	-121.261986
20	4	Assessment	Kellogg Creek along Hoffman Lane	544XKCAHL	37.881900	-121.652200
21	3	Assessment	King Island Drain along 8 Mile Rd	544KIDAEM	38.059063	-121.457557
22	2	Assessment	Littlejohns Creek @ Jack Tone Rd	531XLCAJR	37.889600	-121.146100
23	2	Assessment	Lone Tree Creek @ Jack Tone Rd	531XLTCJR	37.837600	-121.143800
24	4	Assessment	Mandeville Island Pump @ Middle River	544MIPAMR	38.048900	-121.535870
25	4	Assessment	Mandeville Island Pump @ Old River	544MIPAOR	38.006280	-121.532260
26	4	Assessment	McDonald Island Pump	544MDIPXX	38.027050	-121.497250
27	4	Assessment	Medford Island Drain @ Middle River	544MDIPMR	38.040258	-121.521340

ID	Zone	Monitoring Type	Site Name	Station Code	Latitude	Longitude
28	1	Assessment	Mokelumne River Drain @ North Lower Sacramento Rd	531MRDNLS	38.195573	-121.293620
29	2	Assessment	Mormon Slough @ Jack Tone Rd	544MSAJTR	37.964700	-121.148800
30	1	Assessment	Mosher Creek @ North Alpine Rd	531MCANAR	38.060880	-121.209130
31	3	Assessment	New Hope Tract Drain @ Walnut Grove Ct	544NHTDWG	38.228220	-121.489180
32	4	Assessment	North Lower Jones Tract Pump	544NLJTPX	37.970670	-121.499636
33	4	Assessment	Orwood Tract Drain @ Old River	544OTDAOR	37.928920	-121.559610
34	1	Assessment	Pixley Slough @ Fury Rd	531PSAFRXX	38.082560	-121.241470
35	3	Assessment	Ridge Tract Drain	544RTDXXX	38.045531	-121.469330
36	4	Assessment	Roberts Island Drain along House Rd	544RIDAHR	37.970200	-121.407400
37	4	Assessment	South East Roberts Island Drain @ Howard Rd	544SERIDH	37.877150	-121.372970
38	4	Assessment	South East Union Island Pump	544SEUIPX	37.820730	-121.421180
39	4	Assessment	South McDonald Island Pump	544SMDIPX	37.989280	-121.462850
40	4	Assessment	South Webb Tract Drain	544XXSWTD	38.063220	-121.603310
41	4	Assessment	South West Roberts Island Drain @ Howard Rd	544SWRIDH	37.877010	-121.375620
44	3	Assessment	Staten Island Drain @ Staten Island Rd	544SIDASI	38.132970	-121.522250
45	4	Assessment	Union Island Drain @ Bonetti Rd	544UIDABR	37.871700	-121.525510
46	4	Assessment	Union Island Drain @ Klein Rd	544UIDAKR	37.884322	-121.497352
47	4	Assessment	Unnamed Drain along West Mahilla Rd	544UDAWMR	37.851858	-121.320210
48	2	Assessment	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.853580	-121.145700
49	4	Assessment	Upper Roberts Island Drain	544URIDXX	37.818930	-121.358300
50	3	Assessment	Venice Island Pump	544VIPXXX	38.079830	-121.538060
51	4	Assessment	Victoria Drain along Hwy 4	544VDAHFX	37.890590	-121.567320
52	4	Assessment	Victoria Island Drain	544VIDXXX	37.911820	-121.539380
59	5	Assessment	Walthall Slough @ Woodward Ave	544WSAWAV	37.770460	-121.292270
54	4	Assessment	West McDonald Island Pump	544WMDIPX	37.972394	-121.491366
55	4	Assessment	West Orwood Tract Drain	544WOTDXX	37.929500	-121.606300

ID	Zone	Monitoring Type	Site Name	Station Code	Latitude	Longitude
56	4	Assessment	West Palm Tract Drain	544WPTDXX	37.948120	-121.606820
57	4	Assessment	West Victoria Island Drain	544WVIDXX	37.875870	-121.575200
58	3	Assessment	Wright Tract Drain	544WTDXXX	38.021160	-121.384830

Table 5. SJCDWQC sampling locations for Core Monitoring (sorted by zone number).

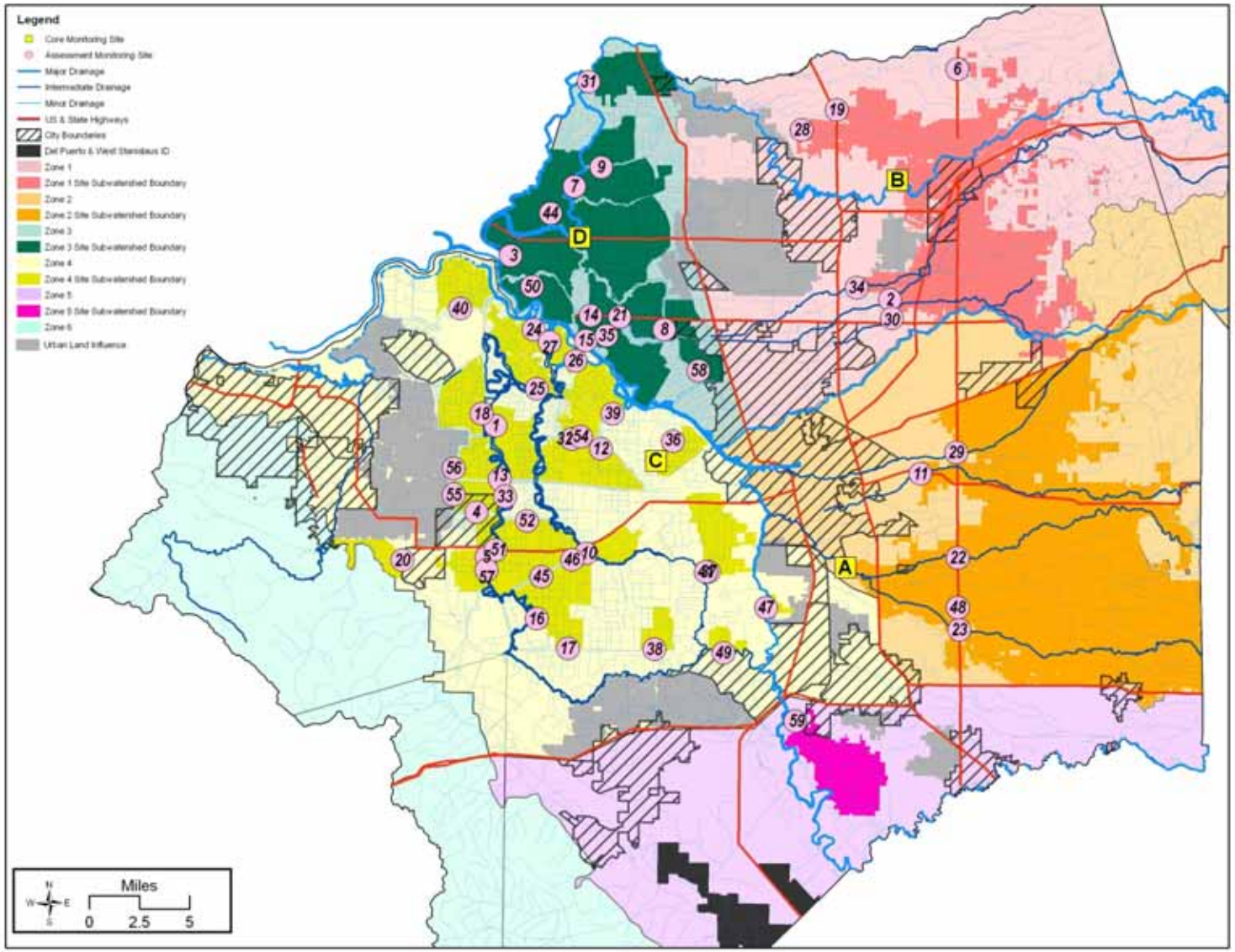
ID	Zone	Monitoring Type	Site Name	Station Code	Latitude	Longitude
B	1	Core	Mokelumne River @ Bruella Rd	531XMRABR	38.160100	-121.205100
A	2	Core	French Camp Slough @ Airport Way	531SJC504	37.881700	-121.249300
D	3	Core	Terminous Tract Drain @ Hwy 12	544XTTHWT	38.116600	-121.493600
C	4	Core	Roberts Island Drain @ Holt Rd	544RIDAHT	37.955600	-121.422300
NA	5	Core	NA	NA	NA	NA
NA	6	Core	NA	NA	NA	NA

NA – Not applicable; Zone 6 does not contain a core site due to the amount of urbanization and Zone 5 does not have a core site selected yet; Zone 5 will have an Assessment Site monitored until 2011 at which time the site will become the Core site for the zone.

Site Subwatershed Descriptions and Coalition Area Maps

The Coalition area has been divided into site subwatersheds that are monitored either through Assessment or Core Monitoring. Water and sediment quality monitoring within the Coalition area will rotate within a zone among the Assessment Monitoring locations to eventually characterize all agricultural discharge. Figure 13 shows all Assessment and Core Monitoring locations and their respective site subwatersheds. There are some areas of the Coalition region that do not have agricultural discharge, are dominated by urban land uses, or cannot be sampled due to logistic problems (e.g., lack of sampling locations, private property access) and therefore are being represented by another site subwatershed in the zone. Table 6 provides the land use for all site subwatersheds.

Figure 13. Site subwatershed size designation for all subwatersheds in the Coalition region. Due to the proximity of the sites to each other, site ID 41 and 38 overlap. Site IDs are listed in Table 3.



Descriptions of the proposed site subwatersheds are provided below alphabetically. Maps for each site subwatershed are included in Attachment I.

Bacon Island Pump @ Old River (3,608 irrigated acres) – This site is located west of the city of Stockton along Old River. Water in the drain can flow north or south, depending on the direction water is being pumped, but eventually drains to the Clifton Court Forebay to the South. Crops within the vicinity of the site subwatershed include field crops, truck/ nursery/berry crops and grains/hay. A small amount of land, adjacent to the drain, is also designated as feedlot/dairy/farmstead as is a scattering of acreage nearby.

Bear Creek @ North Alpine Rd (18,112 irrigated acres) – This site drains a relatively large portion of irrigated land on the eastern side of the Coalition region, between the Mokelumne and Calaveras River. Land use in the site subwatershed includes vineyards, deciduous fruit and nuts, field crops, truck/nursery/berry crops, pasture, grains/hay and dairy.

Bouldin Island Pump (5,351 irrigated acres) – This site is located west of the city Stockton, on the west side of Bouldin Island. The site drains the entire Island. Land use is field crops and grains/hay.

Byron Tract @ Discovery Bay (1,071 irrigated acres) – This site is located in the Central Delta, on the north side of Discovery Bay. The site drains land on the Byron Tract to the south and from there flows east to Old River. Land use upstream of the site includes field crops and truck/nursery/berry crops.

Byron Tract Drain @ Old River (2,148 irrigated acres) – This site is located in the Central Delta, on the east side of Byron Tract, adjacent to Old River. The site drains land on the Byron Tract to the west. Land use upstream of the site includes field crops and pasture. There is also a small portion of urban land use in the site subwatershed.

Coyote Creek Tributary @ Jack Tone Rd (392 irrigated acres) – This site is located on the northeast side of the Coalition region, just south of Dry Creek. The tributary flows west, reaching Dry Creek via Coyote Creek. Agricultural land in the site subwatershed includes vineyard and pasture.

Drain @ Woodbridge Rd (4,539 irrigated acres) – This site is located on the northern side of the Coalition region. Water from the drain is pumped to the Mokelumne River close to the sample location. The site drains an area of land to the east between Hog Slough and Sycamore Slough. Land use in the site subwatershed includes field crops, truck/nursery/berry crops, vineyards, pasture, grains/hay and dairy.

Drain to Bishop Cut @ North Rio Blanco Rd (1,632 irrigated acres) – This site is located to the northwest of the city of Stockton along Bishop Cut. Water in the drain can flow east or west, depending on the direction water is being pumped, but eventually drains to Bishop Cut. Crops

within the vicinity of the site subwatershed include truck/nursery/berry, field crops, grains/hay and pasture.

Drain to Hog Slough (2,819 irrigated acres) – This site is located on the northern side of the Coalition region. Water from the drain is pumped to Hog Slough and eventually reaches the Mokelumne River to the west. The site subwatershed includes land to the north of the site and is made up of mostly field crops, truck/nursery/berry crops, grains/hay, pasture and dairy.

Drexler Drain (1,973 irrigated acres) – This site is located close to the confluence of Trapper Slough and Middle River on the east side of Drexler Tract. Water from the drain is eventually pumped to the Clifton Court Forebay via the Victoria/North Canal. Land use in the site subwatershed to the east of the site includes field crops, truck/nursery/berry, pasture, grains/hay and a small portion of dairy.

Duck Creek @ Highway 4 (10,746 irrigated acres) – This site 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 is typically low in the creek. The creek channel was dredged over several months early in the 2007 irrigation season. The predominant land uses for irrigated agriculture are field crops and irrigated pasture. There is also a relatively large amount of deciduous nuts in the site subwatershed, and truck farm/nursery and berry crops are also grown.

East Lower Jones Tract Pump (1,665 irrigated acres) – This site is located west of the city of Stockton, on the northeast side of Lower Jones Tract along Whiskey Slough. The pump drains land on the tract to the south. Land use within the site subwatershed is predominantly field and truck/nursery/berry crops but also includes grains/hay and pasture.

East Palm Tract Drain (1,019 irrigated acres) – This site is located in the Central Delta, on the southeast corner of Palm Tract. The flow of water in the drain may vary depending on the activity of the State and Federal pumping facilities. Water from the drain enters Old River through Indian Slough, and eventually reaches the Clifton Court Forebay to the south. Land use upstream of the site includes field crops and grains/hay.

Empire Tract @ 8 Mile Rd (2,208 irrigated acres) – This site is located west of the city Stockton between White Slough and Disappointment Slough. The site drains land to the north and south of the tract. Crops within the site subwatershed include truck/nursery/berry, field crops and grains/hay.

Empire Tract Pump (1,220 irrigated acres) – This site is located west of the city Stockton, along the Deep Water Ship Channel. The site drains land on the north side of the pump. Land use within the site subwatershed is predominantly truck/nursery/berry, but also includes field crops and grains/hay.

French Camp Slough @ Airport Way (68,459 irrigated acres) – The main water bodies draining this site subwatershed are Littlejohns Creek and Lone Tree Creek, which merge to form French Camp Slough. This site was selected as a downstream companion site to the Littlejohns Creek @ Jack Tone Road and Lone Tree Creek @ Jack Tone Road sites. These water bodies drain agricultural land to the east of Manteca and Stockton and eventually flow through urban areas prior to their discharge to the San Joaquin River. This site represents all of the major types of agriculture present in the Coalition region including field crops, orchards, grains and hay, vineyards as well as irrigated pasture.

Grant Line Canal near Calpack Road (1,676 irrigated acres) – This site is located on the south west section of Union Island. The site is adjacent to Grant Line Canal at a pumping station and drains fields immediately north and east. The crops grown are primarily alfalfa, field crops, tomatoes and grain.

Grant Line @ Clifton Court Road (756 irrigated acres) – This site is located on the southwest section of Union Island. The site is west of the Grant line Canal @ Calpack Rd. site immediately south of Clifton Court and drains fields east and south. The crops are primarily alfalfa, field crops, tomatoes and grain.

Holland Drain @ Old River (1,929 irrigated acres) – This site is located west of the city of Stockton along Old River. Water in the drain can flow north or south, depending on the direction water is being pumped, but eventually drains to the Clifton Court Forebay to the South. Crops within the vicinity of the site subwatershed include field crops, grains/hay and pasture. A portion of land in the site subwatershed is idle irrigated land and wild vegetation.

Jahant Slough @ Cherokee Lane (1,800 irrigated acres) – Jahant Slough is located on the eastern side of the Coalition region, north of the Mokelumne River. The site receives input from irrigated land to the east. Land use in the side subwatershed includes vineyards, pasture, field crops, dairy, deciduous fruit/nuts.

Kellogg Creek along Hoffman Lane (2,116 irrigated acres) – This site is upstream from Kellogg Creek @ Hwy 4 which was sampled in 2004 and 2005. Kellogg Creek @ Hwy 4 is no longer sampled because of large urban inputs. Deciduous nuts are the predominant crop grown in the site subwatershed along with nursery, berry, and some field crops.

King Island Drain along 8 Mile Rd (3,041 irrigated acres) – This site is located to the northwest of the city of Stockton on the west side of King Island between White Slough and Disappointment Slough. Crops within the site subwatershed include truck/nursery/berry, field crops and grains/hay.

Littlejohns Creek @ Jack Tone Road (12,356 irrigated acres) – This site is upstream from the French Camp Slough @ Airport Way site. The crops grown in the site subwatershed represent all of the major types of agriculture present in the Coalition region including field crops, orchards, grains, and vineyards as well as irrigated pasture.

Lone Tree Creek @ Jack Tone Road (22,359 irrigated acres) – This site is upstream from the French Camp Slough @ Airport Way site. This site drains a large portion of the southern SJCDWQC region and confluences downstream with Littlejohns Creek and eventually French Camp Slough, flowing through urban areas before emptying into the Delta. The main agricultural land use upstream consists of deciduous nuts, field crops, irrigated pastures and dairies.

Mandeville Island Pump @ Middle River (2,120 irrigated acres) – This site is located west of the city of Stockton, on the north side of Mandeville Island. The site drains land to the south of the pump between the Stockton Deep Water Ship Channel and the Middle River. Land use within the site subwatershed includes truck/nursery/berry, field crops, pasture and grains/hay.

Mandeville Island Pump @ Old River (1,705 irrigated acres) – This site is located south of the Mandeville Island Pump @ Middle River site (above). The site drains land on the south side of the island between the Stockton Deep Water Ship Channel and the Middle River. Land use within the site subwatershed includes truck/nursery/berry, vineyard, pasture and grains/hay.

McDonald Island Pump (2,058 irrigated acres) – This site is located west of the city Stockton, on the north side of McDonald Island. The site drains land to the south of the pump between the Stockton Deep Water Ship Channel and the Middle River. Land use within the site subwatershed includes truck/nursery/berry, field crops, pasture and grains/hay.

Medford Island Drain @ Middle River (621 irrigated acres) – This site is located west of the city Stockton, on the west side of Medford Island. The site drains all irrigated land on the island. Land use includes truck/nursery/berry crops and field crops.

Mokelumne River @ Bruella Road (11,261 irrigated acres) – Upstream agriculture is primarily vineyards although some orchards are immediately adjacent to the site. Water released from Comanche Reservoir control the amount of flow at this site as the vineyards are primarily irrigated by drip and the orchards are irrigated by microspray. This site integrates the signal from a relatively large area.

Mokelumne River Drain @ North Lower Sacramento Rd (6,211 irrigated acres) – This site is located along a drainage ditch that runs north of the Mokelumne River, confluencing with the River east of the city of Lodi. Land use in the upstream site subwatershed is predominantly vineyards, but also includes orchards, pasture, field crops, truck/nursery/berry and dairy.

Mormon Slough @ Jack Tone Road (21,219 irrigated acres) – This site is located to the north of and runs parallel to the Duck Creek site subwatershed. Mormon Slough drains an area east of Stockton consisting mostly of agriculture, eventually flowing through Stockton and into the Delta. Vineyards and deciduous nuts make up over half of the irrigated agriculture in the site subwatershed with field crops, grains, truck farm/nursery/berry, and irrigated pasture contributing large acreages.

Mosher Creek @ North Alpine Rd (8,639 irrigated acres) – This site drains a portion of irrigated land on the eastern side of the Coalition region, along the north side of the Calaveras River. Land use in the site subwatershed includes deciduous fruit and nuts, vineyards, field crops, truck/nursery/berry crops, pasture, grains/hay and dairy.

New Hope Tract Drain @ Walnut Grove Ct (4,352 irrigated acres) – This site is located on the northern side of the Coalition region. Water from the drain is pumped directly to the Mokelumne River to the west. The site subwatershed includes land to the east of the site and is made up of field crops, truck/nursery/berry crops, vineyard, orchard, grains/hay, pasture and dairy.

North Lower Jones Tract Pump (5,380 irrigated acres) – This site is located west of the city Stockton, on the northern end of Lower Jones Tract along Empire Cut. The pump drains land on the tract to the south between Whiskey Slough and the Middle River. Land use within the site subwatershed is predominantly field and truck/nursery/berry crops but also includes grains/hay and pasture.

Orwood Tract Drain @ Old River (1,818 irrigated acres) – This site is located in the Central Delta, on the east side of Orwood Tract, adjacent to Old River. The flow of water in the drain is variable based on the operation of the pumping facilities on either side of the tract, but water from the drain eventually reaches Old River to the east. Land use upstream of the site includes field crops, pasture and truck/nursery/berry crops.

Pixley Slough @ Fury Rd (3,988 irrigated acres) – This site drains a portion of irrigated land on the eastern side of the Coalition region, on the north side of Bear Creek. Land use in the site subwatershed is predominantly vineyards and deciduous fruit and nuts, but also includes a small portion of land for truck/nursery/berry crops, pasture, grains/hay and dairy.

Ridge Tract Drain (4,490 irrigated acres) – This site is located west of the city Stockton, along Disappointment Slough. The site drains land to the south and east of the drain between Disappointment Slough and the Deep Water Ship Channel. Land use within the site subwatershed is predominantly truck/nursery/berry, but also includes field crops and grains/hay.

Roberts Island Drain @ Holt Road (1,171 irrigated acres) – This site subwatershed is a portion of Roberts Island that is drained by the pump west of the sample site along McDonald Rd. It is located south of Roberts Island Drain along House Rd. The primary agriculture upstream of the sample site is asparagus, field crops, grains, hay (alfalfa) and pasture.

Roberts Island Drain along House Road (1,229 irrigated acres) – This site subwatershed is located on the northeastern edge of Roberts Island. From the sample site, the water in the drain flows north. The primary agriculture in the site subwatershed is asparagus, followed by field crops and pasture.

Sand Creek @ Hwy 4 Bypass (185 irrigated acres) – Located northwest of Brentwood where Highway 4 Bypass crosses Sand Creek, this site subwatershed drains approximately 23 fields of deciduous nuts, fruits, grains and hay. The Roddy Ranch Golf Club is located upstream of the sampling site off Empire Mile Rd in Horse Valley, which is adjacent to one of the tributaries of Sand Creek.

South East Roberts Island Drain @ Howard Rd (3,263 irrigated acres) – This site is located on the west side of the San Joaquin River and south of the City of Stockton. The site subwatershed drains land to the north, bordered by the San Joaquin River on the east and the Roberts Island Drain on the west. Land use includes vineyard, pasture, truck/berry/nursery crops, field crops, grains/hay and dairy.

South East Union Island Pump (1,689 irrigated acres) – This site is located along Grant Line Canal on the southwest end of Union Island. The site subwatershed drains land to the north. Land use includes field crops, truck/nursery/berry crops, deciduous fruits and nuts, vineyard and pasture.

South McDonald Island Pump (1,328 irrigated acres) – This site is located west of the city of Stockton, along Turner Cut on the south side of McDonald Island. The site drains land to the north and east of the pump. Land use within the site subwatershed includes truck/nursery/berry, field crops and grains/hay.

South Webb Tract Drain (3,314 irrigated acres) – Webb Tract is a central Delta island located just north of Franks Tract near Discovery Bay. There are two pumps on the island, however the south pump moves a large portion of the water and the north pump runs only occasionally. This site subwatershed includes row crops, usually corn.

South West Roberts Island Drain @ Howard Rd (2,596 irrigated acres) – This site is located adjacent to the South East Roberts Island Drain @ Howard Rd sample site on the west side of the San Joaquin River and south of the City of Stockton. The site subwatershed drains a narrow tract of land to the north. Land use includes vineyard, pasture, truck/berry/nursery crops, field crops and grains/hay.

Staten Island Drain @ Staten Island Rd (5,607 irrigated acres) – This site is located on Staten Island, adjacent to the Mokelumne River and just north and east of the Terminous Tract Drain core monitoring site. Land use in the site subwatershed includes field crops, truck/nursery/berry crops and grains/hay.

Terminous Tract drain @ Hwy 12 (9,889 irrigated acres) – This site drains all of the acreage north of State Highway 12 and most of the acreage south of the Highway on Terminous Tract. This sampling site is located near the confluence of White Slough/Potato Slough and the Mokelumne River. The primary agricultural crops are field crops, turf, grains and hay.

Union Island Drain @ Bonetti Rd (4,055 irrigated acres) – This site is located on the north side of Union Island at a pumping station adjacent to North Canal. Water from the drain is eventually pumped through North Canal to Old River. Land use in the site subwatershed to the south includes field crops, truck/nursery/berry, pasture, grains/hay and a small portion of dairy.

Union Island Drain @ Klein Rd (1,534 irrigated acres) – This site is located on the north side of Union Island at a pumping station to the northeast of the Bonetti Rd site. Water from the drain is eventually pumped through North Canal to Old River. Land use in the site subwatershed to the south includes field crops, truck/nursery/berry, pasture, grains/hay and a small portion of dairy.

Unnamed Drain along West Mahilla Rd (453 irrigated acres) – This site is located along the San Joaquin River south of the City of Stockton. The site subwatershed drains a small area of land to the east. Land use includes field crops and pasture.

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

Upper Roberts Island Drain (1,066 irrigated acres) – This site is located along Old River on the southern end of Roberts Island. The site subwatershed drains a small area of land to the north. Land use includes vineyard, pasture and truck/nursery/berry crops.

Venice Island Pump (2,697 irrigated acres) – This site is located west of the city Stockton, on the north side of Venice Island. The site drains across the entire Island. Land use is almost entirely truck/nursery/berry crops.

Victoria Drain along Hwy 4 (4,207 irrigated acres) – This site is located in the Central Delta, on the west side of Victoria Island. There is a pumping station within close proximity to the sample site and the direction of flow in the drain will depend on the operation of the pump. Water is eventually pumped off the island into Old River. Land use within the site subwatershed includes field crops, truck/nursery/berry crops, pasture and grains/hay.

Victoria Island Drain (3,108 irrigated acres) – This site is located in the Central Delta, on the north side of Victoria Island. The direction of flow in the drain will depend on the operation of the water pumps on the island, but water from the drain is eventually pumped off the island into Old River. Land use within the site subwatershed to the south includes field crops, truck/nursery/berry crops and grains/hay.

Walthall Slough @ Woodward Ave (7,633 irrigated acres) – This site is located just upstream of the residential area which is at the confluence of Walthall Slough and the San Joaquin River.

The site subwatershed drains land to the south and east. Land use includes dairy, pasture, field crops, truck/nursery/berry crops, fruits/nuts and grains/hay.

West McDonald Island Pump (1,616 irrigated acres) – This site is located west of the city of Stockton, on the southwest side of McDonald Island. The site is located along Empire Cut across from the North Lower Jones Tract Pump site. The pump drains land to the north between the Turner Cut and the Middle River. Land use within the site subwatershed is predominantly field crops but also includes truck/nursery/berry, grains/hay, pasture and deciduous fruits and nuts.

West Orwood Tract Drain (1,719 irrigated acres) – This site is located in the Central Delta, on the west side of Orwood Tract, just north of Discovery Bay. The flow of water in the drain is variable based on the operation of the pumping facilities on either side of the tract, but water from the drain eventually reaches Old River to the east. Land use upstream of the site includes field crops, pasture and truck/nursery/berry crops.

West Palm Tract Drain (1,183 irrigated acres) – This site is located in the Central Delta, along the west side of Palm Tract. The flow of water in the drain may vary depending on the activity of the State and Federal pumping facilities. Water from the drain enters Old River through Indian Slough, and eventually reaches the Clifton Court Forebay to the south. Land use upstream of the site includes field crops, grains/hay and pasture. A portion of land in the site subwatershed is idle irrigated land and wild vegetation.

West Victoria Island Drain (3,333 irrigated acres) – This site is located in the Central Delta, on the southwest side of Victoria Island adjacent to Old River. A pump is located in close proximity to the sample site and drain water to Old River. Land use within the site subwatershed to the east includes field crops, truck/nursery/berry crops, pasture and grains/hay.

Wright Tract Drain (1,697 irrigated acres) – This site is located to the northwest of the city of Stockton just north of the sewage disposal site. The site drains land to the north and east. Crops within the vicinity of the site subwatershed include truck/nursery/berry, field crops, grains/hay, pasture and deciduous fruit and nut crops.

Site Subwatershed Land Use

Table 6. Acreage of crops grown in site subwatersheds of the SJCDWQC region showing irrigated (I) and non-irrigated (NI) acres.

Site Subwatershed	Citrus	Deciduous nut and fruit	Deciduous nut and fruit	Field crop	Grain and hay	Grain and hay	Idle	Idle	Wild vegetation*	Water surface	Pasture	Pasture	Rice	Feedlot, dairy, farmstead	Truck, nursery, berry	Urban	Golf course, cemetery, landscape	Vineyard	Total Acres	Total Irrigated Acres
	I	I	NI	I	I	NI	I	NI	NI	NI	I	NI	I	NI	I	NI	NI	I		
Beacon Island Pump @ Old River				2796	398		6		18					24	408	6			3657	3608
Bear Creek @ North Alpine Rd	2	2639	19	1237	1301	466	643	102	8366	350	5933			372	730	981	170	5625	28938	18112
Bouldin Island Pump				3520	1831				568										5919	5351
Byron Tract @ Discovery Bay				337										10	734				1081	1071
Byron Tract Drain @ Old River				1294	148		21		77		685					23			2249	2148
Coyote Creek Tributary @ Jack Tone Rd												863		6		1		392	1262	392
Drain @ Woodbridge Rd		5		2309	761				229		649			10	306	7		508	4784	4539
Drain to Bishop Cut @ North Rio Blanco Rd		5		487	75				77		554			4	510	49	7		1769	1632
Drain to Hog Slough				1269	479						116			11	955				2830	2819
Drexler Drain				474	320						300			3	879				1976	1973
Duck Creek @ Hwy 4		1619		1928	3452	31	65		91	12	1081			113	1551	101	18	1050	11111	10746
East Lower Jones Tract Pump				1316	145				123		204			17			1192		2997	1665
East Palm Tract Drain				611	371		38		25										1044	1019
Empire Tract @ 8 Mile Rd				1466	502										240	3			2210	2208
Empire Tract Pump				876	93										250				1220	1220
French Camp Slough @ Airport Way	11	10302		7369	14978	333	565	42	1446	81	15234		5974	2233	5811	1576	165	8216	74337	68459
Grant Line Canal @ Clifton Court Rd				443	313														756	756
Grant Line Canal near Calpack Rd				873	49						722			15	32				1691	1676
Holland Drain @ Old River					1253		447		670	12	228					9			2620	1929
Jahant Slough @ Cherokee Ln			20	315	168		82		763		790			55	3	38	5	443	2680	1800
Kellogg Creek along Hoffman Ln	4	847		218			123				52			30	872	10			2157	2116
King Island Drain along 8 Mile Rd		5		889	720									4	1427	30			3075	3041
Littlejohns Creek @ Jack Tone Rd		2392		1247	3315	327	109		226	17	1392			210	1267	292	9	2634	13437	12356
Lone Tree Creek @ Jack Tone Rd	11	4641		1832	4843	23	202		151	4	6352		3001	932	297	429	29	1178	23928	22359
Mandeville Island Pump @ Middle River				1288	617		35		248									180	2367	2120

Site Subwatershed	Citrus	Deciduous nut and fruit	Deciduous nut and fruit	Field crop	Grain and hay	Grain and hay	Idle	Idle	Wild vegetation*	Water surface	Pasture	Pasture	Rice	Feedlot, dairy, farmstead	Truck, nursery, berry	Urban	Golf course, cemetery, landscape	Vineyard	Total Acres	Total Irrigated Acres
	I	I	NI	I	I	NI	I	NI	NI	NI	I	NI	I	NI	I	NI	NI	I		
Mandeville Island Pump @ Old River				964	460		17		168	42	69			11	6	8		189	1934	1705
McDonald Island Pump				322	373				60	40	223			2	1140				2159	2058
Medford Island Drain @ Middle River				621					427										1048	621
Mokelumne River @ Bruella Rd	5	2590	4	518	98		480		1965	423	892			148	325	521	14	6352	14336	11261
Mokelumne River Drain @ North Lower Sacramento Rd	5	285		233			172		1761	7	577			79	82	88	3	4859	8149	6211
Mormon Slough @ Jack Tone Rd	6	9334		1309	2047	15	425		731	156	1462	21		233	2952	498		3684	22872	21219
Mosher Creek @ North Alpine Rd		3489		348	647	156	425		759	137	2062			60	475	25		1193	9775	8639
New Hope Tract Drain @ Walnut Grove Ct		46		2436	211		91	9	93	5	41			82	778	305	4	750	4851	4352
North Lower Jones Tract Pump				2318	184				123		446			23	2432				5526	5380
Orwood Tract Drain @ Old River				1091							95			16	632				1834	1818
Pixley Slough @ Fury Rd		658		311	121		37		294		237			55	477	177	220	2147	4734	3988
Ridge Tract Drain				3980	146				7	11				1	365				4509	4490
Roberts Island Drain @ Holt Rd	6			379	312						355			17	120				1188	1171
Roberts Island Drain along House Rd				543	43				27		644			13					1269	1229
South East Roberts Island Drain @ Howard Rd		4		326	194		82				1630			17	439	2		587	3282	3263
South East Union Island Pump		425		539							63			25	598			65	1714	1689
South McDonald Island Pump				639	165					7					524	31			1366	1328
South Webb Tract Drain				1993	1304		17		150	91									3555	3314
South West Roberts Island Drain @ Howard Rd				545	382		82				436			2	561			590	2598	2596
Staten Island Drain @ Staten Island Rd				3495	1124				30					2	988				5639	5607
Terminous Tract Drain @ Hwy 12				5101	2057		37		361		1067			19	1276	144		351	10413	9889
Union Island Drain @ Bonetti Rd				1547	547				3		541			25	1419				4082	4055
Union Island Drain @ Klein Rd				274	63						906			10	291				1545	1534
Unnamed Drain along West Mahilla Rd				161					9	5	293			4					471	453
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd		920		3137	5090		289		274	21	5626		2933	973	1415	182		3642	24501	23051
Upper Roberts Island Drain							16				532			20	20			497	1086	1066
Venice Island Pump				2690					399	27					6				3123	2697
Victoria Drain along Hwy 4				1473	378				59		677			5	1681	26			4299	4209
Victoria Island Drain				1509	459										1140				3108	3108
Walthall Slough @ Woodward Ave		768		1287	2239		27		252	86	2376			349	904	63		31	8412	7633

Site Subwatershed	Citrus	Deciduous nut and fruit	Deciduous nut and fruit	Field crop	Grain and hay	Grain and hay	Idle	Idle	Wild vegetation*	Water surface	Pasture	Pasture	Rice	Feedlot, dairy, farmstead	Truck, nursery, berry	Urban	Golf course, cemetery, landscape	Vineyard	Total Acres	Total Irrigated Acres
	I	I	NI	I	I	NI	I	NI	NI	NI	I	NI	I	NI	I	NI	NI	I		
West McDonald Island Pump		12		92	193		82		296	32	231			13	996	16		8	1972	1616
West Orwood Tract Drain				870							217			29	632				1748	1719
West Palm Tract Drain				671			154		17		357					5			1205	1183
West Victoria Island Drain				1102	177						1039			10	1016				3343	3333
Wright Tract Drain		284		299	279				16		789			2	47				1715	1697

*Wild vegetation includes native vegetation, riparian vegetation and barren wasteland.

WATER AND SEDIMENT QUALITY MONITORING PLAN

Assessment Monitoring

Assessment monitoring will take place at newly established monitoring sites or at sites that have not been fully characterized according to a three-year cycle. Assessment monitoring will be conducted on a monthly basis for 12 months of the year (Table 7).

Table 7. Assessment Monitoring schedule.

Parameters (See Table 11 for details)	Monitoring Frequency *
303(d) waste constituent to be monitored if Agriculture is identified as contributing source	Monthly
Water Column Toxicity	Monthly
Toxicity Identification Evaluation (as needed based on toxicity results)	Monthly
Pesticides	Monthly
Metals	Monthly
Nutrients	Monthly
General Physical Parameters (including flow)	Monthly
Pathogens	Monthly
Sediment Toxicity Sampling (all)	Twice per year **
Photo monitoring (digital)	Every monitoring site with every monitoring event

* Every third year Core Monitoring will include all Assessment Monitoring parameters and be conducted monthly.
**One sample will be collected between 15 August and 15 October and the second between 1 March and 30 April of each year.

Assessment monitoring will consist of monthly sampling for general water quality parameters, nutrients and pathogens. Assessment monitoring will also include water column and toxicity monitoring, as well as the series of pesticides, metals and nutrients. Monthly sampling events will be scheduled, if possible, to capture at least two storm runoff events per year. No more than one complete sample per month will be collected.

Core Monitoring

Core monitoring will be used to track compliance with specific regulatory water quality standards, ILRP WQTLs, and track trends in water conditions over time. The Core monitoring sites will include monthly monitoring as summarized in Table 8.

Table 8. Core Monitoring schedule.

Parameters (See Table 11 for details)	Monitoring Frequency*
Assessment Monitoring	Once every three years*
Nutrients	Monthly
General Physical Parameters (including flow)	Monthly
Pathogens	Monthly
Photo monitoring (digital)	Every monitoring site with every monitoring event
Parameter(s) of Concern**	Monthly

* Every third year Core Monitoring will include all Assessment Monitoring parameters and be conducted monthly for a period of 12 months.
**Parameters of Concern may be selected by the Regional Water Board Executive Officer from toxicity, pesticides or metals analyses that result in an exceedance or detection during Assessment Monitoring.

Core monitoring will consist of the general physical, pathogen and nutrient parameters that are listed in more detail in Table 11. Core monitoring parameters include general water quality measurements that may provide data indicative of impairment of water quality. The list of parameters described in Coalition Group assessment monitoring will be repeated at the Core sites during every third year of monitoring. The Coalition may submit written requests to the Executive Officer for the removal or addition of core monitoring sites.

Table 9 provides the sequential schedule for monitoring at each site, including assessment monitoring and core monitoring. Once all locations have been monitored within a zone, the schedule will repeat. Since Zone 4 contains a large number of sites due to islands within the Delta, the second round of site monitoring starts in the year 2031. These are noted by a break in the table and bolded "A" to distinguish them from those starting in 2008. In addition, many of the sites within Zone 4 have been grouped together if they drain the same area of island or tract. Since the direction of water flow in many of the Delta islands is unknown, all possible sampling locations are listed and the Coalition may choose to monitor one or more sites within a single island depending on the best approach for characterizing discharge.

Table 9. Assessment and Core Monitoring schedule. C = Core Monitoring. A = Assessment Monitoring.

ID	Zone	Monitoring Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
B	**1**	**Mokelumne River @ Bruella Rd**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**
2	1	Bear Creek @ North Alpine Rd			A																								
6	1	Coyote Creek Tributary @ Jack Tone Rd							A																				
19	1	Jahant Slough @ Cherokee Ln												A															
28	1	Mokelumne River Drain @ North Lower Sacramento Rd																A											
30	1	Mosher Creek @ North Alpine Rd																					A						
34	1	Pixley Slough @ Fury Rd																									A		
A	**2**	**French Camp Slough @ Airport Way**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**
11	2	Duck Creek @ Highway 4				A																							A
29	2	Mormon Slough @ Jack Tone Rd									A																		
22	2	Littlejohns Creek @ Jack Tone Rd													A														
23	2	Lone Tree Creek @ Jack Tone Rd																		A									
48	2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd																						A					
D	**3**	**Terminous Tract Drain @ Hwy 12**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**
7	3	Drain @ Woodbridge Rd		A																									
8	3	Drain to Bishop Cut @ North Rio Blanco Rd					A																						
9	3	Drain to Hog Slough								A																			
14, 15	3	Empire Tract @ 8 Mile Rd / Empire Tract Pump											A																
3	3	Bouldin Island Pump														A													
21	3	King Island Drain along 8 Mile Rd																	A										
31	3	New Hope Tract Drain @ Walnut Grove Ct																				A							
35	3	Ridge Tract Drain																							A				
44	3	Staten Island Drain @ Staten Island Rd																										A	
C	**4**	**Roberts Island Drain @ Holt Rd**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**
40	4	South Webb Tract Drain	A																										
1	4	Bacon Island Pump @ Old River						A																					
4, 5	4	Byron Tract @ Discovery Bay / Byron Tract Drain @ Old River										A																	
10	4	Drexler Drain															A												
12, 32	4	East Lower Jones Tract Pump / North Lower Jones Tract Pump																			A								
13	4	East Palm Tract Drain																								A			
59	**5**	**Walthall Slough @ Woodward Ave***	**A**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**	**C**	**A**	**C**
-	**6**	**Contra Costa Zone†**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

*After two years of Assessment Monitoring this site will become a Core Monitoring location for this zone.

†No Core or Assessment Monitoring will be conducted in the Contra Costa Zone. One site within this area remains in the SJCDWQC Management Plan.

Special Project Monitoring

Special project monitoring will include specific targeted studies for the implementation of a Management Plan that results from more than one exceedance within three years of either Core or Assessment Monitoring. Monitoring for Management Plans may include more extensive monitoring than what is required in the Core Monitoring or Assessment Monitoring schedules. The schedule for Special Project Monitoring will be determined as outlined in the SJCDWQC Management Plan which is updated on a yearly basis.

Special project monitoring may also occur in areas where targeted source identification studies must take place or Total Maximum Daily Load (TMDL) studies are required. Table 10 provides all water bodies currently listed for TMDLs as well as their EPA TMDL status. The six Coalition zones are distinct by land use, crop type, depth to ground water and climate, but homogeneous within each zone. Therefore, by monitoring for the TMDL constituents at any Assessment Monitoring site within the zone for which the TMDL water body is listed, the Coalition will be assessing the water quality for that pollutant across all water bodies within the Zone through the representativeness of that site within the zone. In addition, the Assessment Monitoring locations within each zone are tributaries to the 303(d) listed water body provided in Table 10. Currently, only Zone 6 (Contra Costa Zone) does not contain listed water bodies. The Coalition has monitored for all listed TMDL constituents at one or more locations within Zones 1-5 with the exception of Group A pesticides. Starting in October 2008, Group A pesticides will be monitored at sites listed in Table 10. Coalition zones and the designation of central, southern, eastern, and western portions of the Delta do not exactly coincide; there are multiple portions of the Delta within a single Zone. Consequently, the same Coalition monitoring site may function to cover monitoring requirements in more than one portion of the Delta.

Of all 303(d) listed causes of impairment, the Coalition has monitored for all constituents in all portions of the Delta with the exception of the Group A pesticides and diazinon in Zone 4 (which would be representative of the reach of Five Mile Slough from Alexandria Place to Fourteen Mile Slough). Both Five Mile Slough and Mosher Slough flow through the City of Stockton and have only a small reach downstream of I-5. Mosher Slough runs for approximately 1.8 miles and Five Mile Slough runs for 1.6 miles in their listed portions, and both have a significant urban influence. There is no apparent access at the downstream end of the listed reach. Consequently, the Coalition will need to monitor at a representative site for both of these water bodies.

The Coalition will monitor Group A pesticides at five sites: Mokelumne River @ Bruella Road, Duck Creek @ Highway 4, Drain @ Woodbridge Road, Roberts Island Drain @ Holt Road, and Walthall Slough @ Woodward Ave. Of these five, the Drain @ Woodbridge Road and Walthall Slough @ Woodward Ave are new sites and will have the full Assessment Monitoring. The other three sites are Core Monitoring sites and will have Group A pesticides added to the suite of constituents. These five sites will be representative of 303(d) listed sites in the four portions of the Delta in the Coalition region.

Group A pesticides are considered legacy pesticides and the most recent use of any Group A pesticide was in 2006 (endosulfan). Therefore, if the Coalition does not detect any Group A pesticides during 2008/2009 monitoring, the Coalition will have demonstrated that these pesticides are not negatively affecting water quality and will discontinue monitoring for Group A pesticides in 2010. The status of TMDLs and 303(d) listed water bodies and their associated constituents will be reviewed annually in the Annual Monitoring Report (refer to the most recent AMR for a table listing current water bodies that require TMDL monitoring).

Table 10. List of water bodies within the SJCDWQC that require TMDL monitoring.

WATER BODY NAME/SECTION	CONSTITUENT	PREVIOUSLY MONITORED (BY ZONE)	TMDL REQUIREMENT STATUS	Coalition Zone	2009 MONITORING SITE
Delta Waterways (central portion)	Unknown Toxicity	Yes	Requiring TMDLs	3, 4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (central portion)	Chlorpyrifos	Yes	Requiring TMDLs	3, 4	South Webb Tract Drain
Delta Waterways (central portion)	DDT	Yes	Requiring TMDLs	3, 4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (central portion)	Diazinon	Yes	Requiring TMDLs	3, 4	South Webb Tract Drain
Delta Waterways (central portion)	Group A Pesticides	No	Requiring TMDLs	3, 4	Roberts Island Drain @ Holt Rd
Delta Waterways (eastern portion)	Unknown Toxicity	Yes	Requiring TMDLs	1, 2, 3, 5	Mokelumne River @ Bruella Rd, Walthall Slough @ Woodward Ave
Delta Waterways (eastern portion)	Chlorpyrifos	Yes	Requiring TMDLs	1, 2, 3, 5	Walthall Slough @ Woodward Ave
Delta Waterways (eastern portion)	DDT	Yes	Requiring TMDLs	1, 2, 3, 5	Mokelumne River @ Bruella Rd, Walthall Slough @ Woodward Ave
Delta Waterways (eastern portion)	Diazinon	Yes	Requiring TMDLs	1, 2, 3, 5	Walthall Slough @ Woodward Ave
Delta Waterways (eastern portion)	Group A Pesticides	No	Requiring TMDLs	1, 2, 3, 5	Mokelumne River @ Bruella Rd, Walthall Slough @ Woodward Ave
Delta Waterways (southern portion)	Unknown Toxicity	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (southern portion)	Electrical Conductivity	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (southern portion)	Chlorpyrifos	Yes	Requiring TMDLs	4	South Webb Tract Drain
Delta Waterways (southern portion)	DDT	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (southern portion)	Diazinon	Yes	Requiring TMDLs	4	South Webb Tract Drain
Delta Waterways (southern portion)	Group A Pesticides	No	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (western portion)	Unknown Toxicity	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (western portion)	Electrical Conductivity	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (western portion)	Chlorpyrifos	Yes	Requiring TMDLs	4	South Webb Tract Drain
Delta Waterways (western portion)	DDT	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Delta Waterways (western portion)	Diazinon	Yes	Requiring TMDLs	4	South Webb Tract Drain
Delta Waterways (western portion)	Group A Pesticides	No	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
Five Mile Slough (Alexandria Place to Fourteen Mile Slough)	Diazinon	Yes	Requiring TMDLs	4	South Webb Tract Drain
Mosher Slough (downstream of I-5)	Diazinon	Yes	Requiring TMDLs	4	South Webb Tract Drain
Old River (San Joaquin River to Delta-Mendota Canal)	Low Dissolved Oxygen	Yes	Requiring TMDLs	4	Roberts Island Drain @ Holt Rd, South Webb Tract Drain
San Joaquin River (Stanislaus River to Delta Boundary)	Unknown Toxicity	Yes	Requiring TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	Boron	Yes	Being Addressed by USEPA Approved TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	Selenium	Yes	Being Addressed by USEPA Approved TMDLs	5	Walthall Slough @ Woodward Ave

WATER BODY NAME/SECTION	CONSTITUENT	PREVIOUSLY MONITORED (BY ZONE)	TMDL REQUIREMENT STATUS	Coalition Zone	2009 MONITORING SITE
San Joaquin River (Stanislaus River to Delta Boundary)	Electrical Conductivity	Yes	Being Addressed by USEPA Approved TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	Chlorpyrifos	Yes	Being Addressed by USEPA Approved TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	DDT	Yes	Requiring TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	Diazinon	Yes	Being Addressed by USEPA Approved TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	Group A Pesticides	No	Requiring TMDLs	5	Walthall Slough @ Woodward Ave
San Joaquin River (Stanislaus River to Delta Boundary)	Toxaphene	No	Requiring TMDLs	5	Walthall Slough @ Woodward Ave

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Monitoring Parameters

Monitoring data are used to characterize discharges from irrigated lands to surface waters and to evaluate the effectiveness of management practice implementation efforts. Water quality is evaluated by both field-measured parameters and laboratory analytical data. Field measured parameters include flow, pH, electrical conductivity (EC), water temperature, air temperature and dissolved oxygen (DO). Laboratory analytical data include the list of constituents, parameters, and tests in Table 11 below. Table 13 documents the specific collection and handling information for each of the analytical tests. Site conditions are documented by taking digital photos and recording weather, site conditions and water conditions at every monitoring site during each monitoring event.

Acceptable methods for laboratory field procedures, quantification limits, and quality control requirements are described in detail in the Coalition Quality Assurance Project Plan (QAPP).

All constituents listed in the MRP are included in Table 12 except for fecal coliforms. The Coalition has monitored for *E. coli* since 2004 using the WQTL of 235 MPN/100 mL (a fecal coliform WQTL number). *E. coli* is a sub-category of fecal coliform and therefore if the amount of *E. coli* detected in a sample is above the WQTL than it is assumed that the fecal coliform is also above the WQTL and the sample is treated as exceeding a fecal coliform WQTL. It is not necessary therefore to also collect a sample for fecal coliform analysis.

Some TMDL constituents listed in Table 11 are monitored at all assessment locations as per the MRP including unknown toxicity, chlorpyrifos, diazinon, boron, selenium, electrical conductivity (specific conductance), and DDT. Group A pesticides have been added to all Assessment Monitoring in Zones 1-5 as described in the section Special Project Monitoring.

Table 12 includes all monitoring locations (both Assessment and Core) that will be monitored in 2009 including which groups of constituents each site will be monitored for (refer to the AMR for the most recent monitoring schedule).

Table 11. Coalition monitoring parameters.

Constituents, Parameters, and Tests	Monitoring Type
TMDL/CWA 303(d) listed*	
Aldrin	As needed to characterize 303d listed waterbodies
Chlordane	As needed to characterize 303d listed waterbodies
Heptachlor	As needed to characterize 303d listed waterbodies
Heptachlor epoxide	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (including Lindane) (gamma-BHC)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (alpha-BHC)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (beta-BHC)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (delta-BHC)	As needed to characterize 303d listed waterbodies
Endosulfan I	As needed to characterize 303d listed waterbodies
Endosulfan II	As needed to characterize 303d listed waterbodies
Toxaphene	As needed to characterize 303d listed waterbodies
Photo Monitoring	
Photograph of monitoring location	With every monitoring event
WATER COLUMN SAMPLING	
Physical Parameters and General Chemistry	
Flow (field measure)	Assessment and Core
pH (field measure)	Assessment and Core
Electrical Conductivity (field measure)	Assessment and Core
Dissolved Oxygen (field measure)	Assessment and Core
Temperature (field measure)	Assessment and Core
Turbidity	Assessment and Core
Total Dissolved Solids	Assessment and Core
Total Suspended Solids	Assessment and Core
Hardness	Assessment and Core
Total Organic Carbon	Assessment and Core
Pathogens	
E. coli	Assessment and Core
Water Column Toxicity Test	
Algae -Selenastrum capricornutum	Assessment
Water Flea – Ceriodaphnia dubia	Assessment
Fathead Minnow - Pimephales promelas	Assessment
Toxicity Identification Evaluation**	As needed based on criteria described in MRP Part II.E
Pesticides	
Carbamates	
Aldicarb	Assessment
Carbaryl	Assessment
Carbofuran	Assessment

Constituents, Parameters, and Tests	Monitoring Type
Methiocarb	Assessment
Methomyl	Assessment
Oxamyl	Assessment
Organochlorines	
DDD	Assessment
DDE	Assessment
DDT	Assessment
Dicofol	Assessment
Dieldrin	Assessment
Endrin	Assessment
Methoxychlor	Assessment
Organophosphates	
Azinphos-methyl	Assessment
Chlorpyrifos	Assessment
Diazinon	Assessment
Dichlorvos	Assessment
Dimethoate	Assessment
Demeton-s	Assessment
Disulfoton (Disyton)	Assessment
Malathion	Assessment
Methamidophos	Assessment
Methidathion	Assessment
Parathion-methyl	Assessment
Phorate	Assessment
Phosmet	Assessment
Herbicides	
Atrazine	Assessment
Cyanazine	Assessment
Diuron	Assessment
Glyphosate	Assessment
Linuron	Assessment
Paraquat dichloride	Assessment
Simazine	Assessment
Trifluralin	Assessment
Metals	
Arsenic (total)	Assessment
Boron (total)	Assessment
Cadmium (total and dissolved)	Assessment
Copper (total and dissolved)	Assessment
Lead (total and dissolved)	Assessment
Nickel (total and dissolved)	Assessment

Constituents, Parameters, and Tests	Monitoring Type
Molybdenum (total)	Assessment
Selenium (total)	Assessment
Zinc (total and dissolved)	Assessment
Nutrients	
Total Kjeldahl Nitrogen	Assessment and Core
Nitrate plus Nitrite as Nitrogen	Assessment and Core
Total Ammonia	Assessment and Core
Unionized Ammonia (calculated value)	Assessment and Core
Total Phosphorous (as P)	Assessment and Core
Soluble Orthophosphate	Assessment and Core
SEDIMENT SAMPLING	
Sediment Toxicity	
Hyalella azteca	Assessment
Pesticides (as needed based on criteria described in MRP Part II.E.2)	
Bifenthrin	As needed based on criteria described in MRP Part II.E
Cyfluthrin	As needed based on criteria described in MRP Part II.E
Cypermethrin	As needed based on criteria described in MRP Part II.E
Deltamethrin: Tralomethrin	As needed based on criteria described in MRP Part II.E
Esfenvalerate	As needed based on criteria described in MRP Part II.E
Lambda-Cyhalothrin	As needed based on criteria described in MRP Part II.E
Permethrin	As needed based on criteria described in MRP Part II.E
Fenpropathrin	As needed based on criteria described in MRP Part II.E
Chlorpyrifos	As needed based on criteria described in MRP Part II.E
Other sediment parameters	
Total Organic Carbon	Assessment
Grain Size	Assessment

*303(d) constituents (GroupA pesticides) used by agriculture were last reported in 2006. The Coalition will monitor for these constituents in 2008/2009 at Assessment Monitoring locations in Zone 1, Zone 3 and Zone 5 and the Core Monitoring location in Zone 4; if there are no detections and no reported use for them these constituents will be dropped from monitoring in 2010.

** Specific TIE manipulations utilized in each test will be reported.

Table 12. Monitoring schedule for 2009 including site name, ID, zone and constituent groups. Table updated yearly; see AMR for most recent monitoring schedule.

ID	Zone	Monitoring Type	Monitoring Location	Group A Pesticides	Physical Parameters	Nutrients	Pathogens	Carbamates	Organochlorines	Organophosphates	Herbicides	Metals (total and dissolved)	Water Column Toxicity	Sediment Toxicity/Chemistry
B	1	C	Mokelumne River @ Bruella Rd	X	X	X	X		X					
A	2	C	French Camp Slough @ Airport Way	X	X	X	X	**X**	**X**	**X**				
D	3	C	Terminous Tract Drain @ Hwy 12	X	X	X	X		X					
C	4	C	Roberts Island Drain @ Holt Rd	X	X	X	X		X				**X***	
40	4	A	South Webb Tract Drain		X	X	X	X	X	X	X	X	X	X
59	5	A	Walthall Slough @ Woodward Ave	X	X	X	X	X	X	X	X	X	X	X

Bolded Xs are additional constituents added due to single exceedances that have occurred at Core Monitoring locations.
*only *Ceriodaphnia dubia*

MONITORING PROTOCOLS

Full descriptions of the monitoring protocols including sample collection methods, standard operating procedures (SOPs) for all measurements and laboratory quality assurance are available in the Coalition Quality Assurance Project Plan (QAPP). A summary of the sampling methods, protocols and quality assurance is provided below (Tables 13 and 14).

Sample Collection Methods

Ambient Water Sampling

Sampling generally occurs over one or two days per event, with one event occurring each month. For water sampling, a specified type and quantity of bottles are filled with ambient water samples based on the laboratory analysis and the requirements of the individual sampling site as described in the QAPP. After samples are collected, they are stored at a temperature less than 4°C, and are delivered the same evening or the next morning to their respective laboratories. The timeframe by which samples are delivered to the laboratories is based on the shortest holding time among the constituents analyzed. All bottles collected from a site are considered a single sample and share a common site ID and sample time. Although all bottles are considered a single sample, no volumes are homogenized. Field duplicates and samples for matrix spike analysis are filled as simultaneously as possible. Field blanks are collected in an identical bottle to the environmental sample using an identical process, but bottles are filled with deionized (DI) water and capped. Field quality control (QC) samples are stored at 4°C alongside environmental samples until extraction or analysis. After samples are collected and stored on ice, discharge is measured.

Sediment Sampling

Sediment is collected from the topmost 2 cm of bed substrate and the sample is placed into the appropriate containers for toxicity testing, grain size, total organic carbon (TOC) analysis, and any chemical analyses that may be necessary due to toxicity. Detailed sampling SOPs, collection containers, and holding times are included with the QAPP. Collection containers are rinsed with DI water, stored away from sunlight and chilled to 4°C. Sediment chemistry and total organic carbon samples are frozen within 48 hours; sediment toxicity and grain size samples are held at 4°C until analysis.

Field Measures

Field parameters are measured at the same time as sample collection. Supplemental field data are collected including weather observations, water and sediment characteristics and site descriptions at the time of sampling. Information that is supplemental to program requirements is maintained in a SWAMP-comparable database.

Quality Assurance

Water samples are collected during each month that water is discharged from agriculture, including storm season months. Samples will be analyzed for a variety of constituents based on the specific requirements for Assessment and Core Monitoring sites outlined in Table 11 and for those identified in Special Projects. Sediment quality monitoring will occur once during the irrigation season and once during the storm season of each monitoring year at all sites. All quality assurance (QA) criteria are described in the QAPP and include criteria for precision, accuracy, contamination, and completeness. Each is briefly described below. Failure to meet any of the criteria will result in notification of the QA Officer by either the field crew or laboratory and all associated data will be appropriately flagged and possibly rejected.

Precision and Accuracy

Precision is assessed through a combination of field and laboratory duplicate samples. Precision is measured as the relative percent difference (RPD) between a sample and it's duplicate. Laboratory duplicate samples include a laboratory control spike (LCS) and its associated duplicate (LCSD), a matrix spike sample (MS) and its associated duplicate (MSD) or an environmental sample that is split in the laboratory to create an associated duplicate. Field duplicate samples are two samples collected at the same time at the same location and in the same fashion. To assess precision, only one laboratory duplicate is required per batch which may be met by an LCSD, an MSD or a laboratory duplicate split from an environmental sample.

Accuracy is assessed by spiking a sample with a known quantity of the constituents to be analyzed and calculating the percent recovery (PR). This may be done on laboratory purified water (LCS) or environmental water (MS). The MS should not be used solely to assess precision due the likelihood of matrix interference however if an LCS does not fall within acceptance criteria an MS may be used to validate that batch if it is within criteria. Some constituents are difficult to spike (e.g. turbidity) and therefore a laboratory may chose to use a certified reference material (CRM). A CRM may be used in place of an LCS sample.

If results for any precision or accuracy analyses do not meet the data quality objectives listed in the QAPP, calculations and instruments must be checked and the analyst may be required to repeat the analysis to confirm the results. If the results repeatedly fail to meet the objectives (indicating inconsistent homogeneity, unusually high concentrations of analytes or poor laboratory precision) then the lab is obligated to halt the analysis of samples, identify the

source of the imprecision, and make corrections where appropriate before proceeding. If results for any field duplicates and associated environmental samples do not meet the data quality objectives listed in the QAPP, then the samplers must assess sampling practices and make corrections to their field procedures which will ensure homogeneity in the samples before proceeding.

Representativeness and Completeness

Sampling locations are selected to represent all discharges from a subwatershed and are collected during periods of agricultural discharge, including events during winter storm runoff and irrigation discharge.

Completeness is defined as the amount of valid data obtained from a measurement system as compared to the planned amount. Project completeness is divided into two areas: field and transport completeness and laboratory completeness. The completeness goal of 90% per year is based on the combination of these two areas. If the completeness criteria are not met, the Coalition will review each incomplete sampling event and make adjustments in field and/or laboratory procedures to ensure that completeness is met the following year.

Field and transport completeness requires that samplers successfully visit each site, document the visit, collect the field information and samples, as outlined in the QAPP, and successfully transport the samples to the laboratories. A properly documented dry site does not reduce the completeness of the event.

Laboratory completeness refers to the process of sample reception, COC documentation, storage and in-house preservation, extraction, analysis, and laboratory QA/QC.

Minimizing bias

Bias in sample timing is minimized by using a predetermined sample schedule that rigidly defines the sample dates for each site months in advance. In this way sampling at any given site will not be influenced by temporal factors that risk introducing intentional or unintentional bias, such as irrigation events or weather patterns.

Bias in field sampling quality control monitoring is minimized by randomly distributing QC samples among all sites throughout the year. Additionally, the samplers collecting the QC samples are randomly assigned to minimize the chances of a single site or single sampler exerting more influence on overall sample quality than randomness would predict.

Bias in analysis is minimized through the use of professional, private, objective third-party laboratories. Any potential bias that may be introduced by these labs is assessed with semi-lab-blind QC samples; field QC samples are not overtly identified to the lab. They are not truly lab-

blind, however, as they share a sample time with the environmental sample and are distinguished only by a two-letter suffix on their station code/sample ID.

Table 13. Field and laboratory analytical methods.

Constituent	Matrix	Analyzing Lab	WQTL	RL	MDL	Analytical Method		
						Method	SOP/ QAPP Appendix	Modified for Method
Physical Parameters								
Flow	Fresh Water	Field Measure	NA[1]	1 cfs	NA	USGS R2Cross streamflow Method	Appendix IV	Yes
pH	Fresh Water	Field Measure	6.5-8.5	0.1 pH units	NA	EPA 150.1	Appendix IX	No
Electrical Conductivity	Fresh Water	Field Measure	700 µmhos/cm	100 µmhos/cm	NA	EPA 120.1	Appendix IX	No
Dissolved oxygen	Fresh Water	Field Measure	7 mg/L	0.1 mg/L	NA	SM 4500-O	Appendix IX	No
Temperature	Fresh Water	Field Measure	NA[1]	0.1 °C	NA	SM 2550	Appendix IX	No
Turbidity	Fresh Water	Caltest	variable	0.05 NTU	0.020 NTU	EPA 180.1	SOPW-TURB-rev7, Appendix XXIX	No
Total Dissolved Solids	Fresh Water	Caltest	450 mg/L	10 mg/L	4.0 mg/L	SM2540C	SOP W-TDS-rev8, Appendix XXVI	No
Total Suspended Solids	Fresh Water	Caltest	NA[2]	3 mg/L	2.0 mg/L	SM2540D	SOP B-TSS-rev7, Appendix XXX	No
Hardness	Fresh Water	Caltest	NA[1]	5 mg/L	3.0 mg/L	SM2340C	SOP W-HARD-rev8, Appendix XXII	No
Total Organic Carbon	Fresh Water	Caltest	NA[1]	0.5 mg/L	0.30 mg/L	SM5310B	SOP W-TOC/DOC-rev10, Appendix XXVIII	No
Pathogens								
Escherichia coli	Fresh Water	Caltest	235 MPN/100 mL	1 MPN/100 mL	1.0 MPN/100 mL	SM 9223	SOP B-MMOMUG-REV11, Appendix XXI	No
Toxicity								
Water Column Toxicity	Fresh Water	AQUA-Science	No Toxicity	NA	NA	EPA 821-R-02-012	SOP 6.1A-5/Appendix XV, SOP 6.2A-5/Appendix XVI	No
	Fresh Water	AQUA-Science	No Toxicity	NA	NA	EPA 821-R-02-013	SOP 6.3C-4/ Appendix XVII	No
Sediment Toxicity	Sediment	AQUA-Science	No Toxicity	NA	NA	EPA 600/R-99-064	Appendix XVIII	No
Carbamates								
Aldicarb	Fresh Water	APPL Inc	3 µg/L	0.4 µg/L	0.20 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Carbaryl	Fresh Water	APPL Inc	2.53 µg/L	0.07 µg/L	0.050 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Carbofuran	Fresh Water	APPL Inc	ND	0.07 µg/L	0.050 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Methiocarb	Fresh Water	APPL Inc	0.5 µg/L	0.4 µg/L	0.20 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Methomyl	Fresh Water	APPL Inc	0.52 µg/L	0.07 µg/L	0.050 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Oxamyl	Fresh Water	APPL Inc	50 µg/L	0.4 µg/L	0.20 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Organochlorines								
DDD	Fresh Water	APPL Inc	0.00083 µg/L	0.01 µg/L	0.003 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
DDE	Fresh Water	APPL Inc	0.00059 µg/L	0.01 µg/L	0.004 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
DDT	Fresh Water	APPL Inc	0.00059 µg/L	0.01 µg/L	0.007 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Dicofol	Fresh Water	APPL Inc	NA[1]	0.1 µg/L	0.01 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Dieldrin	Fresh Water	APPL Inc	0.00014 µg/L	0.01 µg/L	0.005 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Endrin	Fresh Water	APPL Inc	0.036 µg/L	0.01 µg/L	0.007 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Methoxychlor	Fresh Water	APPL Inc	0.03 µg/L	0.01 µg/L	0.008 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Organophosphates								
Azinphos-methyl	Fresh Water	APPL Inc	0.01 µg/L	0.1 µg/L	0.02 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No

Constituent	Matrix	Analyzing Lab	WQTL	RL	MDL	Analytical Method		
						Method	SOP/ QAPP Appendix	Modified for Method
Chlorpyrifos	Fresh Water	APPL Inc	0.015 µg/L	0.015 µg/L	0.003 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Diazinon	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	0.004 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Dichlorvos	Fresh Water	APPL Inc	0.085 µg/L	0.2 µg/L	0.02 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Dimethoate	Fresh Water	APPL Inc	1.0 µg/L	0.1 µg/L	0.08 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Demeton-s	Fresh Water	APPL Inc	NA[2]	0.2 µg/L	0.01 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Disulfoton	Fresh Water	APPL Inc	0.05 µg/L	0.05 µg/L	0.02 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Malathion	Fresh Water	APPL Inc	ND	0.1 µg/L	0.05 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Methamidiphos	Fresh Water	APPL Inc	0.35 µg/L	0.2 µg/L	0.08 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Methidathion	Fresh Water	APPL Inc	0.7 µg/L	0.1 µg/L	0.04 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Parathion, methyl	Fresh Water	APPL Inc	ND	0.1 µg/L	0.075 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Phorate	Fresh Water	APPL Inc	0.7 µg/L	0.1 µg/L	0.07 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Phosmet	Fresh Water	APPL Inc	140 µg/L	0.2 µg/L	0.06 µg/L	EPA 8141A	SOP ANA8141A/Appendix XIII	No
Herbicides								
Atrazine	Fresh Water	APPL Inc	1.0 µg/L	0.5 µg/L	0.07 µg/L	EPA 619	SOP ANA619/Appendix XI	No
Cyanazine	Fresh Water	APPL Inc	1.0 µg/L	0.5 µg/L	0.09 µg/L	EPA 619	SOP ANA619/Appendix XI	No
Diuron	Fresh Water	APPL Inc	2 µg/L	0.4 µg/L	0.2 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Glyphosate	Fresh Water	NCL Ltd	700 µg/L	5 µg/L	2.77 µg/L	EPA 547	SOP ME075v08/Appendix XIX	No
Linuron	Fresh Water	APPL Inc	1.4 µg/L	0.4 µg/L	0.2 µg/L	EPA 8321	SOP HPL8321A/ Appendix XIV	No
Paraquat dichloride	Fresh Water	APPL Inc	3.2 µg/L	0.5 µg/L	0.08 µg/L	EPA 549.1	SOP ME019v10/Appendix XX	No
Simazine	Fresh Water	APPL Inc	4.0 µg/L	0.5 µg/L	0.08 µg/L	EPA 619	SOP ANA619/Appendix XI	No
Trifluralin	Fresh Water	APPL Inc	5 µg/L	0.05 µg/L	0.036 µg/L	EPA 8141	SOP ANA8141A/Appendix XIII	No
Metals								
Arsenic	Fresh Water	Caltest	10 µg/L	0.5 µg/L	0.01 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Boron	Fresh Water	Caltest	700 µg/L	10 µg/L	0.47 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Cadmium	Fresh Water	Caltest	Variable[3] (MUN=2.0 µg/L)	0.1 µg/L	0.011 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Copper	Fresh Water	Caltest	Variable[3] (MUN=170 µg/L)	0.5 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Lead	Fresh Water	Caltest	Variable[3] (MUN=2.0 µg/L)	0.5 µg/L	0.071 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Molybdenum	Fresh Water	Caltest	10 µg/L	0.25 µg/L	0.016 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Nickel	Fresh Water	Caltest	Variable[3] (MUN=12 µg/L)	0.5 µg/L	0.01 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Selenium	Fresh Water	Caltest	50 µg/L (5 µg/L 4 day average)	1 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Reaction Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No

Constituent	Matrix	Analyzing Lab	WQTL	RL	MDL	Analytical Method		
						Method	SOP/ QAPP Appendix	Modified for Method
Zinc	Fresh Water	Caltest	Variable[3.] (MUN=5000 µg/L)	1 µg/L	0.8 µg/L	EPA 200.8 (ICPMS Collision Cell)	SOP M-2008-3MODErev2, Appendix XXIII	No
Nutrients								
Total Kjeldahl Nitrogen	Fresh Water	Caltest	NA[1]	0.1 mg/L	0.07 mg/L	SM4500NH3 C	SOP W-NH3-TKN-rev10, Appendix XXVII	No
Nitrate (as N)+ Nitrite (as N)	Fresh Water	Caltest	10,000 µg/L	0.05 mg/L	0.05 mg/L	EPA 353.2	SOP W-NNO3-rev2, Appendix XXIV	No
Total Ammonia	Fresh Water	Caltest	1.5 mg/L or variable[4]	0.1 mg/L	0.060 mg/L	SM4500NH3 C	SOP W-NH3-TKN-rev10, Appendix XXVII	No
Total Phosphorus	Fresh Water	Caltest	NA[1]	0.01 mg/L	0.040 mg/L	SM4500P E	SOP W-PHOS-rev8, Appendix XXV	No
Soluble Orthophosphate	Fresh Water	Caltest	NA[1]	0.01 mg/L	0.010 mg/L	SM4500P E	SOP W-PHOS-rev8, Appendix XXV	No
Sediment								
Bifenthrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.1 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Cyfluthrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.11 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Cypermethrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.1 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Deltamethrin: Tralomethrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.12 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsnciev1, APPENDIX XXXII	No
Esfenvalerate	Sediment	Caltest	NA[5]	0.33 µg/kg	0.13 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Lambda-Cyhalothrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.06 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Permethrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.11 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Fenpropathrin	Sediment	Caltest	NA[5]	0.33 µg/kg	0.07 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Chlorpyrifos	Sediment	Caltest	NA[5]	0.33 µg/kg	0.12 µg /kg	GCMS-NCI-SIM	SOP O-Pyrethroidsncirev1, APPENDIX XXXII	No
Total Solids	Sediment	Caltest	NA	0.1%	0.1%	SM2540B	SOP W-RESIDUE-rev7, APPENDIX XXXI	No
Total Organic Carbon	Sediment	Caltest[6]	NA[1]	200 mg/kg	100 mg/kg	Walkley Black	PTS SOP #4, Appendix XXXIV	No
Grain Size	Sediment	Caltest[6]	NA[1]	1% sand, silt, clay, gravel	0.4 µm	ASTM D-422-63, ASTM D4464M-85	PTS SOP #3, Appendix XXXIII	No

[1] Not available until completion of evaluation studies or no Water Quality Trigger Limit applicable.
[2]Currently these constituents do not have a WQTL designated by the Regional Board however this may change in the future.
[3] Variable WQTLs based on hardness. Municipal and domestic supply WQTLs in parenthesis are regardless of hardness.
[4] Variable WQTLs based on pH and temperature. Municipal and domestic supply WQTLs in parenthesis are regardless of pH and temperature.
[5] Sediment chemistry result reported if positive sediment toxicity is measured.
[6] Subcontracted to PTS Laboratories.

Table 14. Laboratory analytical methods of constituents monitored for CWA 303(d) compliance.

Constituent	Matrix	Analyzing Lab	WQTL	RL	MDL	Analytical Method		
						Method	SOP/Appendix	Modified for Method
Aldrin	Fresh Water	APPL Inc	0.00013 µg/L[1] 3 µg/L[2]	0.01 µg/L	0.009 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Chlordane	Fresh Water	APPL Inc	0.00057 µg/L[1] 0.0043 µg/L[2]	0.01 µg/L	0.007 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Heptachlor	Fresh Water	APPL Inc	0.00021 µg/L[1] 0.0038 µg/L[2]	0.01 µg/L	0.008 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Heptachlor epoxide	Fresh Water	APPL Inc	0.0001 µg/L[1] 0.0038 µg/L[2]	0.01 µg/L	0.007 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Hexachlorocyclohexane (alpha-BHC)	Fresh Water	APPL Inc	0.0039 µg/L[1,3] 0.95 µg/L[2,3]	0.01 µg/L	0.005 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Hexachlorocyclohexane (beta-BHC)	Fresh Water	APPL Inc	0.0039 µg/L[1,3] 0.95 µg/L[2,3]	0.01 µg/L	0.008 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Hexachlorocyclohexane (gamma-BHC; Lindane)	Fresh Water	APPL Inc	0.0039 µg/L[1,3] 0.95 µg/L[2,3]	0.01 µg/L	0.005 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Hexachlorocyclohexane (delta-BHC)	Fresh Water	APPL Inc	0.0039 µg/L[1,3] 0.95 µg/L[2,3]	0.01 µg/L	0.005 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Endosulfan I	Fresh Water	APPL Inc	110 µg/L[1,4] 0.056 µg/L[2,4]	0.01 µg/L	0.005 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Endosulfan II	Fresh Water	APPL Inc	110 µg/L[1,4] 0.056 µg/L[2,4]	0.01 µg/L	0.004 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No
Toxaphene	Fresh Water	APPL Inc	0.00073 µg/L[1] 0.0002 µg/L[2]	0.5 µg/L	0.380 µg/L	EPA 8081A	SOP ANA8081A/Appendix XII	No

[1] Municipal and domestic supply
[2] Cold freshwater habitat, spawning
[3] WQTL is total Hexachlorocyclohexane
[4] WQTL is total Endosulfan

Quality Control

This project will comply with all current Surface Water Ambient Monitoring Program (SWAMP) QC guidelines to maintain comparability of data quality throughout the ILRP SWAMP Comparable database. Field QC frequencies are calculated to insure that a minimum of 5% all analyses are for QC purposes. All analytical QCs must be analyzed at a frequency of 5% or 1 per batch whichever is more frequent. A comprehensive summary of QC activities and requirements for this project are provided in the Coalition QAPP.

When control limits are exceeded, the lab QA officer and Project QA Officer must agree on a potential cause and develop an appropriate response. Detections in field or lab blank samples will be sourced to the best of the project's ability and field, analytical, or cleaning practices will be modified to reduce the risk of further contamination. Excessive RPD values or low recovery rates may also require a change of field or laboratory practices. Exceedances of analytical control limits will be reported in the appropriate lab report allowing the data to be flagged as it is entered into the database. These exceedances will also discussed in the appropriate report from MLJ-LLC to the CVRWQCB together with an assessment of the control actions developed from more recent analyses, if available.

REPORTING PLAN

The Coalition will provide information on monitoring results and Coalition activities to the CVRWQCB over the course of each monitoring year in various reports. There are four types of reporting: Exceedance Reports, Quarterly Monitoring Data Reports, Annual Monitoring Reports and Management Plan Report updates. Immediate reporting on results will occur as Exceedance Reports which will be submitted for every exceedance of water quality trigger limits within five business days of receiving results. Reporting on outreach and actions as follow-up to exceedances will occur through the Coalition's Management Plan update which will be submitted each year for sites that experience more than one exceedance of any water quality trigger limit within a three year period. The Coalition will submit Quarterly Monitoring Data Reports which will include all new data received by the Coalition since the last Quarterly Monitoring Report. Once a year an Annual Monitoring Report will be submitted which will include an in depth analysis of the monitoring and reporting from the previous year.

Exceedance Reports

The Coalition will submit an exceedance report for all monitoring results that show exceedances of water quality standards or trigger limits. The site name, sample date, constituent, exceedance data, the estimated flow at the monitoring location and photographs of the site will be included in all exceedance reports. Laboratory results will be reviewed and exceedances will be summarized within five business days from the time they are received, and an Exceedance Report will be submitted by email within 24 hours thereafter. The Exceedance Report will include a description of the exceedance(s), the follow-up monitoring, and the analysis or other actions the Coalition may take to address the exceedance(s).

For exceedances involving pesticides or toxicity, a description of the investigation of pesticide use within the watershed area that is physically associated with the exceedance location will be provided; including all pesticides applied within the area that drains to the monitoring site during at least the four weeks prior to the exceedance date. Results of the pesticide use investigation will also be summarized and discussed in the Annual Monitoring Report. The development of an approved Management Plan may supersede this requirement.

Quarterly Data Deliverables

Each quarter the Coalition will submit the monitoring results from the previous quarter in electronic format. The time schedule for quarterly submittals is provided in Table 15. The Quarterly Submittal of Monitoring Data Reports will be submitted as electronic copies in Surface Water Ambient Monitoring Program (SWAMP) comparable format. The submittal will also include copies of all field and laboratory data as well as all quality control and quality assurance information as required by the Coalition MRP.

Table 15. Quarterly monitoring data submittal schedule.

Due Date	Type	Reporting Period
1 March	Annual Report*	1 January to 31 December of previous year
1 June	Quarterly Monitoring Data Report*	1 January through 31 March of same calendar year
1 September	Quarterly Monitoring Data Report*	1 April through 30 June of same calendar year
1 December	Quarterly Monitoring Data Report*	1 July through 30 September of same calendar year

*Submitted electronically.

Annual Monitoring Report

The Annual Monitoring Report will be submitted each year by March 1st, covering the monitoring period from the previous calendar year, up to December 31st. Each monitoring report will include all of the components outlined in the Coalition MRP, including:

1. Signed Transmittal Letter;
2. Title page;
3. Table of contents;
4. Executive Summary;
5. Description of the Coalition Group geographical area;
6. Monitoring objectives and design;
7. Sampling site descriptions and rainfall records for the time period covered under the AMR;
8. Location map(s) of sampling sites, crops and land uses;
9. Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible (example table is included in (MRP Order Attachment C);
10. Discussion of data to clearly illustrate compliance with the Coalition Group Conditional Waiver, water quality standards, and trigger limits;
11. Electronic data submitted in a SWAMP comparable format;
12. Sampling and analytical methods used;
13. Copy of chain-of-custody forms;
14. Field data sheets, signed laboratory reports, laboratory raw data (as identified in Attachment C);

15. Associated laboratory and field quality control samples results;
16. Summary of Quality Assurance Evaluation results (as identified in Attachment C for Precision, Accuracy and Completeness) ;
17. Specify the method used to obtain flow at each monitoring site during each monitoring event;
18. Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled with site ID and date;
19. Summary of Exceedance Reports submitted during the reporting period and related pesticide use information;
20. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;
21. Status update on preparation and implementation of all Management Plans and other special projects; and
22. Conclusions and recommendations.

Specific information required for each of these components is outlined in the Coalition MRP and will be addressed in the AMR.

Management Plans

Water quality of waters of the State within the Coalition boundaries will be assessed to determine if they are getting better or worse as a result of the implementation of the Coalition Management Plan. If more than one exceedance of the same parameter at the same location occurs within a three-year period, then a schedule for Management Plan development and implementation will be provided to the Regional Board staff within 10 business days. The Executive Officer can require a written Management Plan for an exceedance of any constituent at any time. Management Plans may also be required when monitoring from other Water Board programs result in exceedances. The SJCDWQC Management Plan will be updated on an annual basis on April 1 of each year. In the Management Plan Report, all data collected and any actions taken under the Management Plan from the previous year will be reported and reviewed. Any location and constituent combination that resulted in a second exceedance will be added to the Management Plan with a specific site subwatershed assessment.

If a contaminant addressed by the Management Plan can be reasonably assumed through source identification to be caused in whole or in part by irrigated agriculture, then additional Management Plan components will include the following eight requirements identified in Board Order R5-2008-005:

1. Identification of irrigated agriculture source -- general practice or specific location -- that may be the cause of the water quality problem, or a study design to determine the source.
2. Identification of management practices to be implemented to address the exceedances.
3. Management practice implementation schedule. Implementation may occur through another Water Board regulatory program designed to address the specific exceedances.
4. Management practice performance goals with a schedule.
5. Waste-specific monitoring schedule.
6. A process and schedule for evaluating management practice effectiveness.
7. Identification of the participants and Coalition Group(s) that will implement the Management Plan.
8. An identified routine schedule of reporting to the Regional Water Board.

The SJCDWQC has created a prioritization scheme for constituents of concern in coordination with the CVRWQCB which is included as part of the Coalition Management Plan. Sources of exceedances will be investigated using one or more of the following: Pesticide Use Reports (PURs), Toxicity Identification Evaluations (TIEs), review and analysis of historical pesticide applications, or additional monitoring. Prioritization of exceedances will be used to focus outreach. Depending on the priority of the exceedance, the Coalition will identify management practices that will be effective to reduce or eliminate exceedances in the future. Individual grower contacts will occur if necessary to determine current management practices and inform growers of management practices that can be implemented to improve water quality. Management Plans provide information on each of the site subwatersheds outlining the Coalition actions that will be performed in the subsequent monitoring year. The Coalition will keep track of all meetings and contacts and monitoring the following year will evaluate the effectiveness of the outreach and management practice implementation. Management Plan Reporting will occur annually and provide information regarding achievement of the performance goals, stages when evaluations will occur to determine the effectiveness of the management practice implementation, and if the Management Plan strategies need to be revised. Water quality conditions in waters of the State within the Coalition boundaries will be assessed to determine if they are getting better or worse through implementation of the Coalition Management Plan.

For exceedances that the Coalition determines are not likely to be remedied or addressed by a Management Plan, the Coalition will submit a request of exemption from the development of a Management Plan to the Executive Officer. The Coalition may also submit additional Management Plans and/or monitoring within a current Management Plan as requested by the Executive Officer.

WATER QUALITY STATUS

Water Quality Status and Monitoring Background

Nineteen water bodies within the Coalition region are on the EPA 303(d) list as impaired water bodies. These water bodies are located across the region but are concentrated along the main stem of the San Joaquin River, Delta, and along the lower reaches of the main tributaries. Listings include (but are not limited to): selenium, boron, legacy pesticides (DDT), ammonia, electrical conductivity, organic enrichment, pathogens, diazinon and chlorpyrifos. Unknown toxicity is also listed as a cause of impairment for several water bodies. Agriculture is listed as a source of impairment on five water bodies on the 303(d) list, and those water bodies are listed for either or both chlorpyrifos and diazinon.

Monitoring performed as part of this program over the past two years indicate that exceedances of water quality objectives have occurred in water bodies within the Coalition area. Exceedances for *E. coli*, Specific Conductance (SC), Total Dissolved Solids (TDS) and toxicity (both sediment and water column) are of particular concern. While *E. coli* was observed in samples taken from nearly all sample sites, EC and TDS appear to be a problem primarily within the Delta. Toxicity is found across the Coalition region. Ongoing and proposed assessments are aimed at understanding these water quality issues.

Coalition monitoring results from 2004-2007 are summarized in Table 16 and include results for toxicity tests, pesticide detections and detections of metals.

Additional monitoring in the Coalition region was conducted under the auspices of the ILRP and the TMDL program by the CVRWQCB. Sampling for both programs was conducted by UC Davis Aquatic Ecosystems Analysis Laboratory. Monitoring was conducted across the entire Central Valley. The ILRP monitoring program, termed the Ag Waiver program, was initiated in July 2004 and was conducted periodically until 2007 although monitoring in the Coalition region was performed only in 2004 and 2005. Sampling was conducted for a larger number of chemical constituents than the Coalition monitored including disinfection byproducts. Water column and sediment toxicity, field parameters, and physical parameters were also monitored. Fifteen sites within the Coalition region were monitored although only one site, Mormon Slough @ Jack Tone Road was monitored by both the Coalition and the Ag Waiver program.

In the Ag Waiver program, 2 of 68 *Ceriodaphnia* toxicity tests (3%), 0 *Pimephales* toxicity tests, 9 of 68 *Selenastrum* toxicity tests (13%), and two of 10 *Hyalella* tests (20%) exhibited significant toxicity (Table 17). Detections occurred in 185 of 1240 tests for organophosphates (15%), 11 of 868 tests for organochlorines (1%), 5 of 310 tests for carbamates (2%), 83 of 599 tests for herbicides (14%), 0 of 239 tests for pyrethroids, and 767 of 792 tests for metals (97%). Compared to Coalition sampling using the same constituents, 7% of the *Ceriodaphnia* tests, 3% of the *Pimephales* tests, 8% of the *Selenastrum* tests and 39% of the *Hyalella* tests were significant. Detections occurred in 5% of the organophosphate tests, 2% of the organochlorine

tests, <1% of the carbamate tests, 6% of the herbicide tests, <1% of the pyrethroid tests, and 85% of the metals tests. The Coalition detected fewer organophosphates and herbicides and had greater percentages of all significant toxicity tests, and the remaining constituents were relatively similar between the two programs.

Sampling for the TMDL program occurred at six sites in the Coalition region (Table 18), and Littlejohns Creek @ Jack Tone Road was the only site in common between the two programs. TMDL monitoring was for a much reduced suite of constituents including only organophosphates, carbamates, and herbicides. There were detections in 73 of 340 organophosphate samples (21%), 0 of 120 carbamate samples, and 11 of 70 herbicide samples (16%). The results of the TMDL sampling were consistent with the ILRP Ag Waiver program and consequently, differed slightly from the Coalition monitoring results.

These results indicate that multiple pesticides and metals can be detected at individual sites. Effects of multiple chemicals on toxicity are poorly understood, particularly for those constituents that have different modes of action. Chemicals within the same chemical class, e.g. organophosphates, can be additive in their action. Often, the combined toxicity of two organophosphate chemicals, e.g. chlorpyrifos and diazinon can be estimated using a toxic unit approach where one toxic unit is the concentration of the chemical at its LC_{50}. Unfortunately, for those chemicals that do not have the same mechanism of action, the toxic unit approach is not generally applicable. Consequently, it is unknown if these chemicals are additive or synergistic in their toxicity. A more in-depth discussion of joint toxicity for specific chemicals will be provided in the Management Plan.

Table 16. Summary tally of historical water quality monitoring data including toxic samples, pesticide detections and metal detections.

Monitoring Site	Significant Toxicity Results								Pesticide Detections by Group										Metals Detections	
	Ceriodaphnia dubia		*Pimephales promelas*		*Selenastrum capricornutum*		*Hyalella azteca*		Organo-phosphates		Organo-chlorines		Carbamates		Herbicides		Pyrethroids		Metals	
	Number of Significant Toxicity Results	Number of Tests	Number of Significant Toxicity Results	Number of Tests	Number of Significant Toxicity Results	Number of Tests	Number of Significant Toxicity Results	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests
Calaveras River @ Belota Intake	0	2	0	2	0	2	NA	NA	0	4	NA	NA	NA	NA	NA	NA	0	8	NA	NA
Delta Drain- Terminous Tract off Glasscock Rd	0	9	1	10	0	9	2	4	1	18	NA	NA	NA	NA	NA	NA	0	42	NA	NA
Delta Drain- Terminous Tract off Guard Rd	0	8	0	8	1	9	1	3	1	16	NA	NA	NA	NA	NA	NA	0	36	NA	NA
Duck Creek @ Hwy 4	1	16	0	15	1	16	0	4	11	148	0	91	0	78	6	117	0	86	NA	NA
French Camp Slough @ Airport Way	2	24	0	22	1	23	2	8	22	163	1	91	0	78	13	117	2	120	87	103
Grant Line Canal @ Clifton Court Rd	0	22	0	22	0	22	2	6	8	161	3	91	2	78	10	117	1	120	96	102
Grant Line Canal near Calpack Rd	3	26	0	22	4	25	6	8	11	163	1	91	0	78	12	117	0	120	95	100
Kellogg Creek @ Hwy 4	1	10	2	11	1	12	2	4	1	18	NA	NA	NA	NA	NA	NA	1	42	NA	NA
Kellogg Creek along Hoffman Ln	2	18	0	18	0	16	2	3	0	149	6	91	0	78	6	117	0	96	81	100
Littlejohns Creek @ Jack Tone Rd	0	25	1	25	3	28	2	9	9	166	0	91	0	78	6	117	0	128	81	100
Lone Tree Creek @ Bernnan Rd	1	4	1	4	3	4	0	1	3	6	NA	NA	NA	NA	NA	NA	2	18	NA	NA
Lone Tree Creek @ Jack Tone Rd	0	24	1	25	3	27	2	7	16	167	2	91	0	78	8	117	0	128	80	100
Marsh Creek @ Balfour Ave	2	11	0	9	0	9	4	4	2	18	NA	NA	NA	NA	NA	NA	1	42	NA	NA
Marsh Creek @ Concord Ave	1	9	1	8	0	8	2	3	1	61	4	35	1	30	3	45	1	48	38	40
Mokelumne River @ Bruella Rd	5	31	0	24	4	27	0	7	0	165	0	91	0	78	1	117	0	128	75	100
Mokelumne River @ Fish Hatchery	0	1	0	1	0	1	NA	NA	0	2	NA	NA	NA	NA	NA	NA	0	6	NA	NA
Mormon Slough @ Jack Tone Rd	1	14	0	13	1	14	1	3	5	143	0	91	0	78	2	117	0	78	NA	NA
Potato Slough @ Hwy 12	3	13	0	11	0	11	0	1	0	23	NA	NA	NA	NA	NA	NA	0	50	NA	NA
Roberts Island Drain @ Holt Rd	1	14	0	13	1	14	2	4	3	143	3	91	0	78	1	117	2	80	NA	NA
Roberts Island Drain along House Rd	0	13	0	13	0	13	2	4	1	143	1	91	0	78	2	117	5	79	NA	NA
Sand Creek @ Hwy 4 Bypass	3	19	1	15	0	14	6	6	3	144	10	93	3	78	3	117	2	78	NA	NA
Storm Drain to Marsh Creek @ Sand Creek Rd	0	2	0	2	0	2	NA	NA	0	20	NA	NA	0	12	0	14	NA	NA	NA	NA
Terminous Tract Drain @ Hwy 12	0	22	1	23	1	24	0	7	4	161	0	91	1	78	8	117	0	120	87	100
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1	13	0	12	4	14	1	4	12	134	1	84	1	72	14	108	0	72	NA	NA

NA- Not applicable; no monitoring was conducted for those constituents.

Table 17. Summary tally of CVRWQCB Ag Waiver monitoring within the SJCDWQC area.

Zone	Monitoring Site	Significant Toxicity Results								Pesticide Detections by Group										Metals Detections	
		Ceriodaphnia dubia		*Pimephales promelas*		*Selenastrum capricornutum*		*Hyalella azteca*		Organo-phosphates		Organo-chlorines		Carbamates		Herbicides		Pyrethroids		Metals	
		Number of Significant Toxicity Results	Number of Tests	Number of Significant Toxicity Results	Number of Tests	Number of Significant Toxicity Results	Number of Tests	Number of Significant Toxicity Results	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests
1	Bear Creek at Alpine Road	1	4	0	4	0	4	0	2	18	130	0	91	0	20	13	73	0	13	28	32
	Bear Creek at Harney Lane	0	4	0	4	0	4	NA	NA	0	40	0	28	0	20	0	28	0	4	30	32
	Paddy Creek at Jack Tone Road	0	4	0	4	0	4	NA	NA	0	40	0	28	0	20	0	28	0	4	30	32
	Pixley Slough at Eightmile Road	0	9	0	9	1	9	0	2	61	230	0	161	1	45	28	133	0	44	182	184
	Pixley Slough at Ham Lane	0	4	0	4	0	4	NA	NA	2	40	0	28	0	20	0	28	0	4	32	32
1, 2	Calaveras River at Clements Road	0	4	0	4	0	4	NA	NA	0	40	0	28	0	20	2	28	0	4	25	32
	Calaveras River at Pezzi Road	1	8	0	8	3	8	1	1	20	190	0	133	0	20	8	48	0	19	28	32
2	Mormon Slough on Jack Tone Road	0	5	0	5	5	5	NA	NA	11	50	0	35	1	25	8	35	0	26	37	40
3	Unnamed Canal at west end of Woodbridge Road	0	5	0	5	0	5	NA	NA	0	50	0	35	0	25	2	35	0	26	39	40
4	Drain to Grant Line off Wing Levee Road	2	7	0	7	0	7	1	1	29	120	10	84	1	20	9	38	0	28	96	96
	Drain to North Canal at South Bonetti Road	0	4	0	4	0	4	0	2	18	120	0	84	1	20	5	38	0	28	96	96
	Drain to San Joaquin River off South Manthey Road	0	4	0	4	0	4	NA	NA	23	130	1	91	1	25	7	45	0	33	96	96
	Mid Roberts Island Drain at Woodsbro Road	0	2	0	2	0	2	0	1	2	20	0	14	0	10	1	14	0	2	16	16
	Unnamed Canal at Howard Rd	0	4	0	4	0	4	0	1	1	40	0	28	0	20	0	28	0	4	32	32

NA- Not applicable; no monitoring was conducted for those constituents.

Table 18. Summary tally of results from the Regional Board Organophosphate TMDL during 2006 and 2007.

Zone	Monitoring Site	Pesticide Detections by Group									
		Organophosphates		Organochlorines		Carbamates		Herbicides		Pyrethroids	
		Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests	Number of Detections	Number of Tests
1	Mosher Creek at Thornton Road	8	40	NA	NA	0	20	1	16	NA	NA
	Pixley Slough at Ham Lane	30	80	NA	NA	0	20	1	12	NA	NA
2	Littlejohns Creek at Jack Tone Road	9	80	NA	NA	0	20	1	12	NA	NA
	Lone Tree Creek at Austin Road	23	80	NA	NA	0	40	8	20	NA	NA
	Mormon Slough at Copperopolis Road	3	60	NA	NA	0	20	0	10	NA	NA

Protection of Beneficial Uses

The table of beneficial uses applied to waterbodies in the Coalition is included in Table 3. Water quality trigger limits (WQTLs) are used to determine if and to what magnitude exceedances of water quality parameters or constituents occur at Coalition monitoring sites. Table 19 lists all sites monitored between 2004 and 2007, providing the current assessment status with regards to the protection of assigned beneficial uses. The Coalition has developed a method to protect beneficial uses of water bodies within its boundaries by creating a monitoring program to assess water quality in all water bodies that receive agricultural discharge. The monitoring plan includes rotating Assessment locations, determining trends and overall status of zones through Core locations, notifying growers of exceedances within their areas, identifying for growers possible management practices that can be used to protect beneficial uses of their waterways, and monitoring the effect of newly initiated management practices through additional monitoring and in some cases special studies. The Coalition has actively pursued grant monies (including Proposition 50 and Proposition 84 grants) to supplement costs to the Coalition for determining suitable management practices for this area and to aid growers in implementing structural management practices.

The SJCDWQC Management Plan does not provide for management of single exceedances that have occurred at Core sites. Although outside the required constituents to be monitored during Core Monitoring years, constituents in Table 20 will be monitored during the next year at core sites. If no additional exceedances occur in a three year period, the Coalition will cease to monitor for these additional constituents during Core Monitoring years.

Table 19. Assessment of beneficial uses protection at Coalition monitoring sites.

Monitoring Site	Immediate Downstream Water Body	Beneficial Use Immediate Downstream Water Body	Assessment Status 2004-2007 Meets Bus?
Duck Creek @ Hwy 4	Sacramento San Joaquin Delta	MUN	No
		AG	Yes
		REC 1	No
		AQ Life	No
French Camp Slough @ Airport Way	Sacramento San Joaquin Delta	MUN	No
		AG	Yes
		REC 1	No
		AQ Life	No
Grant Line Canal near Calpack Rd	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No
Grant Line Canal @ Clifton Court Rd	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No
Kellogg Creek along Hoffman Ln	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No
Littlejohns Creek @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No
		AG	Yes
		REC 1	No
		AQ Life	No
Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No
		AG	Yes
		REC 1	No
		AQ Life	No
Marsh Creek @ Concord Ave	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	Yes
Mokelumne River @ Bruella Rd	Mokelumne River (Comanche Res to Delta Reach)	MUN	NA
		AG	Yes
		REC 1	Yes
		AQ Life	No

Monitoring Site	Immediate Downstream Water Body	Beneficial Use Immediate Downstream Water Body	Assessment Status 2004-2007 Meets Bus?
Mormon Slough @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No
		AG	Yes
		REC 1	No
		AQ Life	No
Roberts Island Drain @ Holt Rd	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No
Roberts Island Drain along House Rd	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No
Sand Creek @ Hwy 4 Bypass	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No
Terminous Tract Drain @ Hwy 12	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	Yes
Unnamed Drain to Lone Tree Cr @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No
		AG	No
		REC 1	No
		AQ Life	No

AG- Agricultural beneficial uses.
AQ Life- Aquatic life beneficial uses (includes both cold/warm water spawning and habitat).
MUN- Municipal beneficial uses; for *E. coli* a WQTL of 235 MPN/100mL was used to assess MUN status.
NA- Not Applicable; beneficial use is not applicable to downstream water body.
REC 1- Recreation beneficial uses.

Table 20. Core Monitoring sites and additional constituents due to previous exceedances of WQTL.

Site Name	Toxicity				Metals					Pesticides									Constituents to Add to Core Monitoring Locations
	Ceriodaphnia	*Pimephales*	*Selenastrum*	*Hyalella*	Arsenic	Cadmium	Copper	Lead	Nickel	Azinphos methyl	Chlorpyrifos	Carbofuran	DDE	DDT	Dieldrin	Diazinon	Diuron	Methidathion	
Mokelumne River @ Bruella Rd			MP				MP							1*					None
French Camp Slough @ Airport Way	MP		**MP**	MP		MP	MP	MP	1	1	MP	**1**			1	**MP**	**MP**	**1**	Organophosphates, organochlorines and carbamates
Terminous Tract Drain @ Hwy 12		1**	**MP**		MP	MP													None
Roberts Island Drain @ Holt Rd	1		**MP**	MP		**MP**					MP		MP				**MP**		*Ceriodaphnia* toxicity testing

*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.
**Single exceedance from September 2005; no toxicity in last three years.
Bolded MP or 1 are due to exceedances occurring between September 2007 and June 2008 and will be assessed in the 2009 Management Plan Report
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SOURCES OF DISCHARGE

Agricultural Drainage

There are five possible sources of discharge within the Coalition region: urban storm runoff, waste water treatment plant discharge, irrigation discharge, agricultural storm water discharge, and discharge to groundwater by agriculture. Waterbodies in the SJCDWQC region receive agricultural discharge from storm and irrigation runoff. Tiled drains, ditches and sloughs drain agricultural runoff by gravity, and in the Delta pumps move tail water to the Delta channels. During the winter, hydrostatic pressure pushes water into the Delta islands where it must be removed to lower the water table and allow agriculture. During the irrigation season, pumps move irrigation tail water off the island when water levels inside the main drains island become elevated relative to the surrounding crop land.

Impacts of agriculture on water quality include direct agricultural discharge of storm water and irrigation tail water, contributions from spray drift, and effects due to water diversions. The SJCDWQC region has been engineered to move water from sources to end users as well as to lower water tables within the Delta islands using a series of canals and pumps. Due to the tidal influence within the Delta, the surrounding water may push salts into the soils. This salt is removed by flooding and pumping to allow for farming. Many of the urban centers contribute discharge seasonally as winter storm water and summer dry weather discharge. Urban inputs may mix with agricultural inputs especially as the cities of Lodi, Stockton, Brentwood, Lathrop, and Tracy continue to grow. Canals used for delivery of irrigation water can accept discharges which are transferred downstream where the water may be reused. Consequently, water bodies can carry clean irrigation water exclusively, a combination of clean water and agricultural discharge, or primarily agricultural discharge depending on the season.

Pesticide Use Report Data

Information gathered for this section is based on data available from the California Department of Pesticide Regulation (DPR) website (http://calpip.cdpr.ca.gov/cfdocs/calpip/prod/main.cfm), GIS data obtained from the California Department of Water Resources (DWR), and the relevant County Agricultural Commissioner (CAC) 2002 Agricultural Crop and Livestock Reports. The information presented is based on the most updated data available at the time this report was written (Attachment II).

AGRICULTURAL PRACTICES SUMMARY

Agricultural practices are targeted at reducing either discharge of sediment and the associated absorbed constituents, or reducing the discharge of water that contains dissolved constituents. Whether these constituents are pesticides, nutrients, or pathogens, management of water and sediment discharges are primarily focused on retaining constituents on the fields rather than moving them to surface waters. The Coalition developed a survey for growers to complete and provide information on their management practices. The surveys were sent to growers during the spring and summer of 2007 and were summarized for the entire Coalition region in the December 31, 2007 SAMR. Growers were allowed to select from a list of management practices used on their operations and were also given an option to provide a written response. Many of the written responses appear to be variations of the listed options and, consequently, a complete, detailed analysis is difficult to provide. Failure of growers to provide survey responses was due to one or more of the following reasons: 1) the grower was not a member of the Coalition, 2) the grower was unable to respond (i.e. wrong address, did not receive mail, did not have enough information to respond) or 3) the grower was unwilling to respond. A review of the survey responses that were received was performed to determine the general status of the management practices in the region.

The Coalition distributed management practices surveys to selected growers in the Coalition region (both coalition members and non members). The surveys were sent to landowners who the coalition identified as having fields directly adjacent or near a waterway monitored by the coalition and where exceedances occurred in 2006. Many surveys were returned with no information about the location of the farming operation. This could be because many growers farm parcels throughout the Coalition region and provided answers for multiple operations, not a single location. Growers may also have wanted to remain anonymous and consequently provided no information about location.

Of the returned surveys, only a small number of growers indicated that there was no discharge from their property during either the storm or irrigation season as a result of local conditions or lack of proximity to waterways. However, 1666 responses indicated that there was no drainage system for their operation suggesting that there were many more growers who retained discharge on their own property. Of those who indicated discharge was a possibility, only four respondents indicated that they discharged directly to surface waters although 1276 growers indicated that they discharged to a drainage ditch which presumably reaches surface waters of the state. Growers often indicated that several different management practices were utilized to control discharge. Drainage management systems included holding basins (260 responses), recirculation systems (301 responses), and sediment settling basins (322 responses). Many growers indicated that they allowed vegetation to grow in drainage ditches either partially (534 responses) or completely (1199 responses) in either winter or summer, or both as a means of trapping sediment. There were few responses (59) that indicated irrigation tail water was reduced or eliminated by the use of drip or microspray irrigation systems. Given the large number of vineyards and new orchards, it is unlikely that drip irrigation is as rare as the survey

indicates. Vineyards cover an extremely large amount of acreage and almost all of that acreage utilizes drip irrigation. Additionally growers attended commodity-specific training sessions (1189 responses), obtained a soil nutrient analysis (1804 responses), followed a crop nutrient management plan (1272 responses), received an agronomist's advice on practices (1187 responses), laser leveled their fields (1221 responses), obtained PCA recommendations (2280 responses), obtained Certified Crop Advisor recommendations (1509 responses), or performed sprayer calibrations (1961 responses).

Management Practices to Reduce Water Use and Waste Discharge

One of the primary goals of the Coalition is to gather information on management practice(s) that are demonstrated to benefit water quality and to provide information and support to growers to facilitate the implementation of these management practices. Over the last several years, the Coalition has collaborated with many groups including the University of California Agricultural Cooperative Extension, the Coalition for Urban and Rural Environmental Stewardship (CURES), pesticide registrants and pest control advisors to gather information on the most up-to-date management practices to reduce the potential of pesticide runoff. Information is provided to growers regularly throughout the year by means of Coalition outreach meetings, mailings, personal communication and the Coalition website. Each management practice is viewed as one tool in a collective tool box and the management practices (tools) that are most beneficial to a particular farm will depend on factors such as the size of the farm, the drainage system, soil type, crop type and the agricultural pests that must be controlled.

A working list of management practices is provided in Table 21 below. Management practices are described based on the goal (e.g. water conservation, waste discharge reduction) and the mechanism of the practice. Management practices are continually developing and changing and therefore the information will be updated in the SJCDWQC Management Plan.

Table 21. Table of management practices, target constituents, mechanism and possible improvements to water quality.

Management Practice	Endpoint	Target(s)	Mechanism	Effected water/sediment quality monitoring parameter(s)
Sediment basin	Reduce discharge	PI, PS, K, S, NP	Settling of sediment, pesticides bound to sediments; allow time for biodegradation of pesticides	Color, turbidity, EC, TDS, metals, short half-life pesticides, high Koc pesticides, total phosphorous
Vegetated buffers	Reduce discharge	PI, PS, K, S, NP, NN	Filter sediment, nutrients, pesticides bound to sediments, or any contaminants with low solubility	Color, turbidity, EC, TDS, metals, pesticides, nutrients
Cover crop, dormant season vegetation	Reduce discharge	K, S, NP	Filter sediment, pesticides bound to sediments, or any contaminants with low solubility; protect soils and soil nutrients for growing season	Color, turbidity, EC, TDS, metals, pesticides, nutrients
Sprayer calibration	Reduce discharge	D	Reduce potential for spray drift	All pesticides
Polyacrylamide (PAM)	Reduce discharge	PI, K, S, NP	A surfactant that drops sediment out of the water column, thus pulling out pesticides bound to sediments	Color, turbidity, metals, pyrethroid pesticides, total phosphorous
Dormant season field retainers	Reduce discharge	PS, S	Reduce/eliminate storm runoff	Color, turbidity, EC, TDS, copper, pyrethroid pesticides, organophosphate pesticides
Micro irrigation	Reduce water use & discharge	D,W	Increase water efficiency, eliminate potential for spray drift	All pesticides, copper
Tail water return	Reduce water use & discharge	PI , PS, K, S, W, NP, NN	Re-use of irrigation water, eliminate discharge completely	Color, turbidity, EC, TDS, metals, all pesticides, all nutrients

Targets Code:

D: Chemical (pesticide) drift
PS: Dormant spray pesticide storm runoff
S: Sediment runoff
NP: Nutrients: phosphorous
PI: Pesticide runoff from irrigation
K: High K_{oc} pesticide runoff
W: Water use efficiency
NN: Nutrients: nitrate, nitrite or Kjeldhal nitrogen

Management Practices Implementation

Over the course of monitoring, when exceedances occur at a sample site more than once, the Coalition is required to formulate a Management Plan to address those exceedances. The SJCDWQC Management Plan contains goals and actions that are designed to address the problems specific to a site subwatershed; outreach and implementation are important components of the plan. The Management Plan provides a prioritization scheme and sequence by which management actions occur. Based on this plan, management practices are recommended to growers through outreach at county and/or subwatershed meetings and in higher priority subwatersheds on an individual grower and/or grower group basis. In some cases, Coalition representatives are able to conduct site visits to individual farms in order to investigate sources of exceedances and to speak with growers or applicators in person. After outreach or contact occurs, management practices are implemented by growers on a voluntary basis. In particular, where exceedances are experienced in a small site subwatershed, it is possible to work closely with growers to encourage the implementation of management practices at an individual site.

The Coalition will attempt to document the implementation of management practices in the Coalition region. Conversations with growers indicate that they are changing practices but often do not report the changes to the Coalition. Changing chemicals, application practices (e.g. timing of application, calibrating nozzles), or implementing structural management practices are occurring in the Coalition region but are difficult to track. The Coalition is developing a process to track new management practices that are implemented in the region. Information regarding management practices will be more completely developed in the Management Plan.

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