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EAST SAN JOAQUIN WATER QUALITY COALITION MONITORING AND REPORTING PROGRAM PLAN

March 8, 2006

INTRODUCTION

The East San Joaquin River Water Quality Coalition (hereafter referred to as the Coalition) was formed in 2003 to enhance and improve water quality in the East San Joaquin River watershed, while sustaining the economic viability of agriculture, associated values of managed wetlands and sources of safe drinking water.

This Monitoring and Reporting Program Plan (MRPP) is prepared as mandated by the Monitoring and Reporting Program Order No. R5-2005-0833 for Coalition Groups under the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Resolution No. R5-2003-0105. The Coalition MRPP provides the mechanism necessary to track progress in reducing the amount of waste discharged that affects the quality of the waters within the East San Joaquin Valley Watershed coalition boundaries. The accompanying Watershed Evaluation Report (WER) provides an assessment of the sources and impacts of waste in discharges from irrigated lands.

The MRPP has three main components. The first section of the report contains a description of the watershed characteristics and provides data and information describing the area's hydrology and drainage patterns, land use and crop data, chemical application, and programs and applicable management projects used to reduce or eliminate agriculture irrigation's adverse effects on water quality in the receiving water bodies. Information gathered for this section is based on data available on the California Department of Pesticide Regulation website (http://calpip.cdpr.ca.gov/cfdocs/calpip/prod/main.cfm), GIS data obtained from the California Department of Water Resources, and the relevant County Agricultural Commissioners 2002 Agricultural Crop and Livestock Reports. The information presented is based on the most updated data available at the time this report was written.

The second section of the report identifies the coalition's priorities with respect to Phase 1 and Phase 2 monitoring in specific subwatersheds. Priorities for sampled constituents are based on currently established water quality impairments as listed on the US EPA's 303d listed water bodies. Specific constituents and sampling information are provided, as are locations to be sampled. All locations are based on the status of the water body as an intermediate-sized drainage with irrigated agriculture located upstream. In many instances (see below), the proposed sampling locations are located a significant distance upstream of the confluence of the intermediate-sized drainage with the San Joaquin River. In these instances, the location of the proposed sample site is established to eliminate any urban runoff that may enter the water body.

The third section of the report provides preliminary information on the Quality Assurance Program Plan and monitoring protocols. We are currently in the process of modifying the QAPP. Modifications include the addition of specific sites and constituents to be monitored during the 2006 irrigation season. We are proposing the addition of 6 sites and are requesting that the Regional Board approve those sites. Once approved, we can add those sites and constituents to the QAPP and finalize that document.

EAST SAN JOAQUIN WATER QUALITY COALITION

General Characteristics

ESJWQC Area Overview

The East San Joaquin Water Quality Coalition (ESJWQC) area includes Stanislaus, Merced, Madera, Tuolumne, and Mariposa Counties and the portion of Calaveras County that drains into the Stanislaus River. The region that drains into the Coalition area is bordered by the crest of the Sierra Nevada on the east and the San Joaquin River on the west, the Stanislaus River on the North to the San Joaquin River on the South. The southern portion of the Coalition area has been expanded from last year's description to now include the area that was formerly within the Root Creek Coalition area. Additionally, there are landholdings in the vicinity of the Lone Willow Slough watershed (west of the Eastside Bypass) that have joined the Westside Coalition. We have retained that area as part of the coalition for mapping purposes as we do not know the actual parcels that are part of the Westside Coalition.

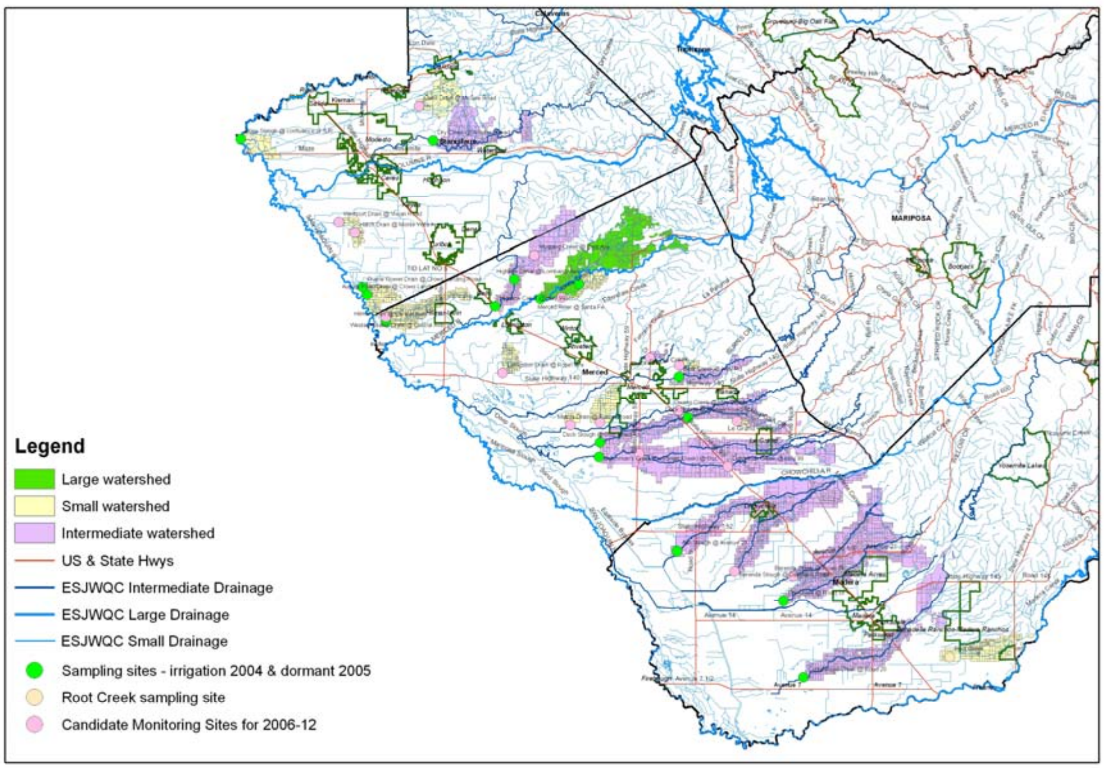
The only surface water export from the Coalition area is northward via the San Joaquin River (SJR). This river drains east and west side California Central Valley (Valley) watersheds, though only east side watersheds are relevant with respect to the Coalition area. San Joaquin River water is eventually either exported to the San Francisco Bay through the Delta, or conveyed southward via the State Water Project and the Delta Mendota Canal. The Coalition area also includes within its boundaries six irrigation districts: Oakdale Irrigation District, Merced Irrigation District, Turlock Irrigation District, Modesto Irrigation District, Chowchilla Irrigation District and Madera Irrigation District. Water bodies may have both irrigation district and Coalition jurisdiction only when they convey both irrigation supply and agriculture return water. All land within the boundaries of the irrigation districts is part of the coalition, and the growers in those areas may join the coalition if they want.

Apart from the San Joaquin River which forms the south and east boundary of the coalition, there are five major rivers in the watershed other than the San Joaquin River: Fresno River, Chowchilla River, Merced River, Tuolumne River and Stanislaus River. These east side tributaries of the San Joaquin River drain the relatively larger Sierra Nevada range from east to west. Typically, only the Stanislaus, Merced, and Tuolumne Rivers maintain flow during the summer months. Flow in the Chowchilla and Fresno Rivers are intermittent to nonexistent as the irrigation season progresses into the fall and remain dry unless major storm events produce sufficient precipitation in the immediate vicinity of the River. Intermediate sized water bodies in the Coalition area (e.g. Dry Creek, Duck Slough, and Highline Canal) originate either in the Sierra Nevada foothills or the Valley itself and are tributaries to the major rivers. The remaining water bodies small in size (e.g. Prairie Flower Drain, Jones Drain, Mustang Creek) are primarily agricultural canals and ditches that either convey water to one of the larger rivers or intermediate creeks/sloughs (Figure 1).

Figure 1. Drainage designation showing all subwatersheds in the coalition region.

The map provided here is in jpg format and consequently does not support a reasonable level of detail. These maps are available as an ArcGIS coverage and can be manipulated to provide any level of detail desired. ArcGIS coverage is provided electronically along with this report.

ESJWQC - Watershed size designation



Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains 1,186,889 acres that are considered irrigated agriculture (Table 1). For Stanislaus, Merced, Mariposa, Tuolumne, and Madera Counties, we used the DWR land use estimates for irrigated agriculture to determine total acreage. DWR does not provide land use data for Calaveras County. Instead, we used data from the County Agricultural Commissioner's office.

County land use statistics for Mariposa, Tuolumne, and the Stanislaus River watershed in Calaveras County are provided in Table 2. In the figures that are presented below, the irrigated agriculture is extremely difficult to find because the parcels are typically small and distributed throughout the foothills region of those three counties. Even using ArcGIS, the parcels are difficult to find, but can be identified on the coverages. Calaveras County does not have parcels with DWR land use data, so the location of the irrigated agriculture in the upper Stanislaus drainage was estimated by information on Pesticide Use Reports filed with the County Agricultural Commissioner using township, range and section.

Land use maps for the coalition counties are provided in Figures 2-8. The legend for the land use is provided in Figure 9.

Note that the estimates of irrigated acres are different from the estimates provided in the semi-annual report of January 3, 2006. The differences are the result of discussions with the Counties to gain a better understanding of exactly where and how much irrigated agriculture is present in the counties. We anticipate that as urban development increases over the next several years, the estimates will continue to change.

Table 1. Irrigated lands in ESJWQC - Stanislaus, Merced, Madera, Tuolumne, Calaveras and Mariposa Counties. Data from 2001 California Department of Water Resources (http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm)

County	Irrigated Land Area (acres)
Calaveras	976
Madera	295,000
Mariposa	297
Merced	510,500
Stanislaus	378,700
Tuolumne	1,416
Total	1,186,889

Table 2. Land use statistics for the upper Stanislaus drainage in Calaveras County, Mariposa and Tuolumne Counties.

	I/N	Mariposa County[1]	Tuolumne County[2]	Calaveras County - Stanislaus River watershed[3]
Citrus	I	9.4		
Deciduous nut and fruit	I	38.1	246.7	107.4
Deciduous nut and fruit	N	46.7	15.4	2.0
Field crop	I			2.0
Grain and hay	I			35.0
Grain and hay	N	14.1		
Idle	I			
Pasture	I			
Rice	I			
Truck, nursery, berry	I			
Riparian vegetation	N	344.1	654.7	
Wild vegetation	N	901,505.3	1,398,315.6	
Water surface	N	6,579.6	32,161.0	
Pasture	I	86.8	1,139.5	283.0
Pasture	N	3,278.8		
Rice	I			
Feedlot, dairy, farmstead	N	385.6	376.1	
Truck, nursery, berry	I		25.0	12.0
Urban	N	21,912.8	6,469.4	
Golf course, cemetery, landscape	N	419.9	487.6	
Vineyard	I	163.2	5.1	534.6
Total acres		934,784.3	1,439,896.1	
Irrigated acres		297.4	1,416.3	976.0

[1]Mariposa county land use information from DWR 1998 data
[2]Tuolumne county land use information from DWR 1997 data
[3]Calaveras County irrigated land information provided by Mary Mutz, Chief Deputy Agricultural Commissioner/Sealer (2005)

Figure 2. Land use for counties in ESJWQC.

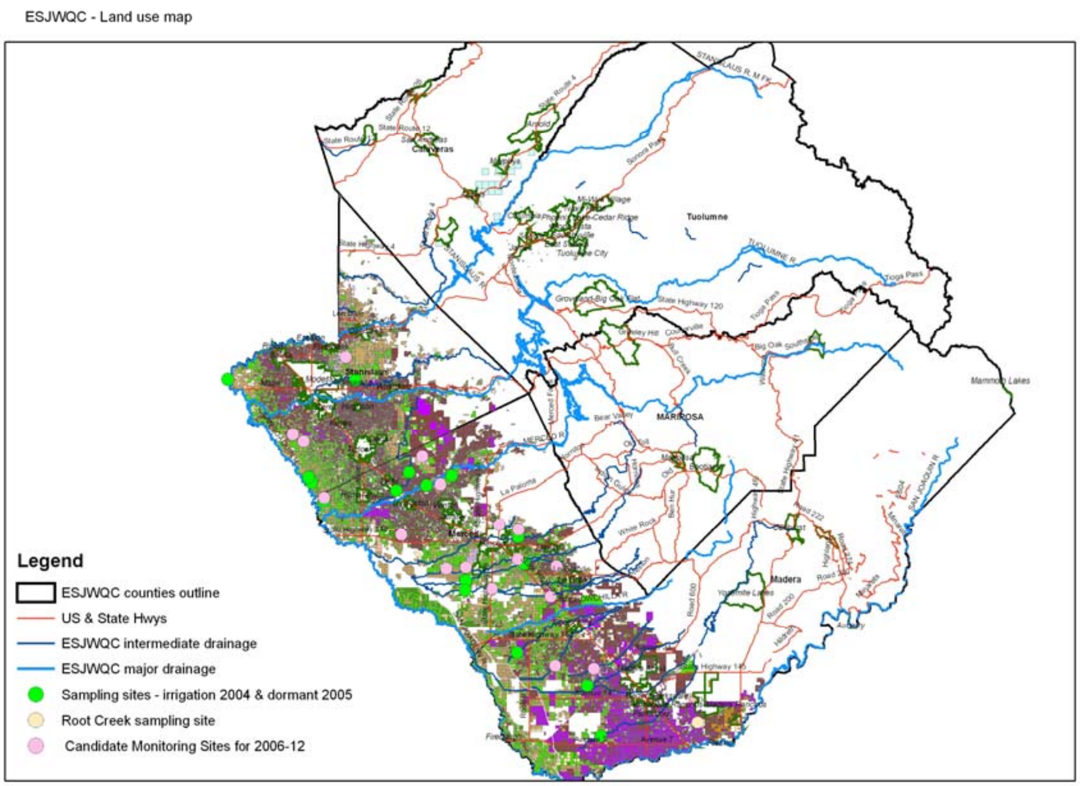


Figure 3. Land use for Stanislaus County.

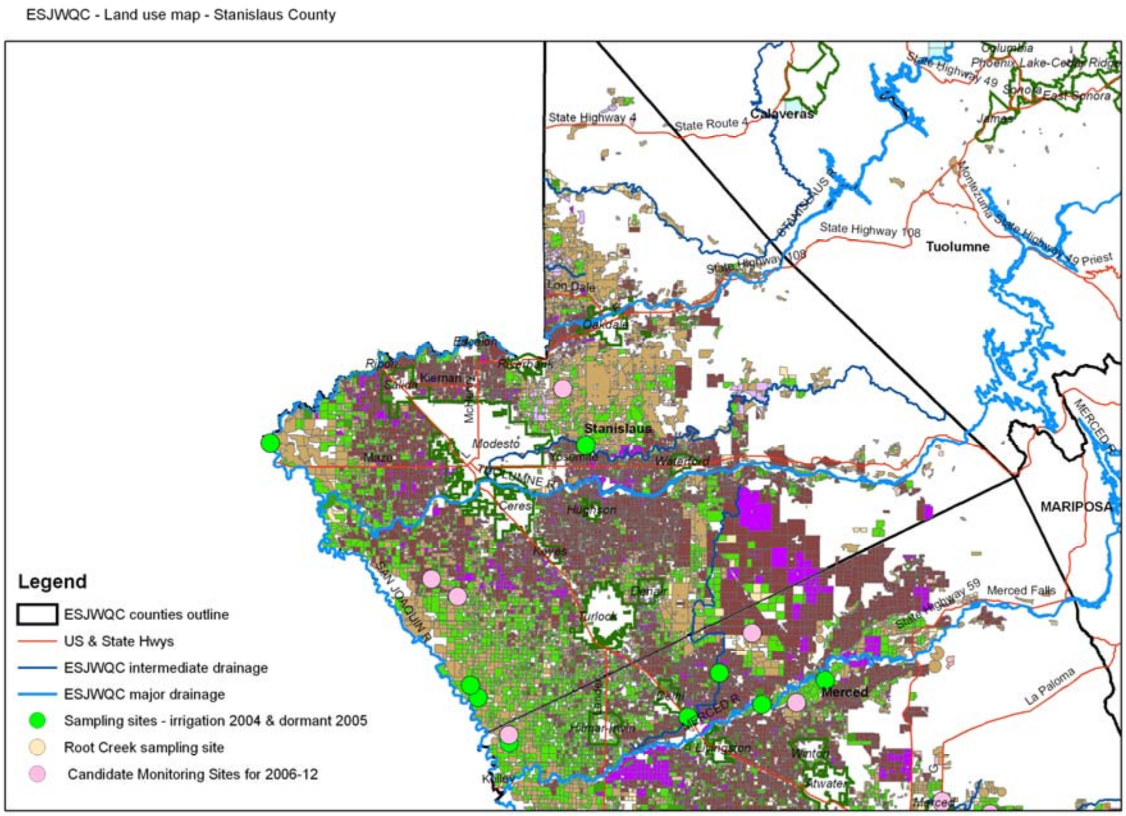


Figure 4. Land use for Merced County.

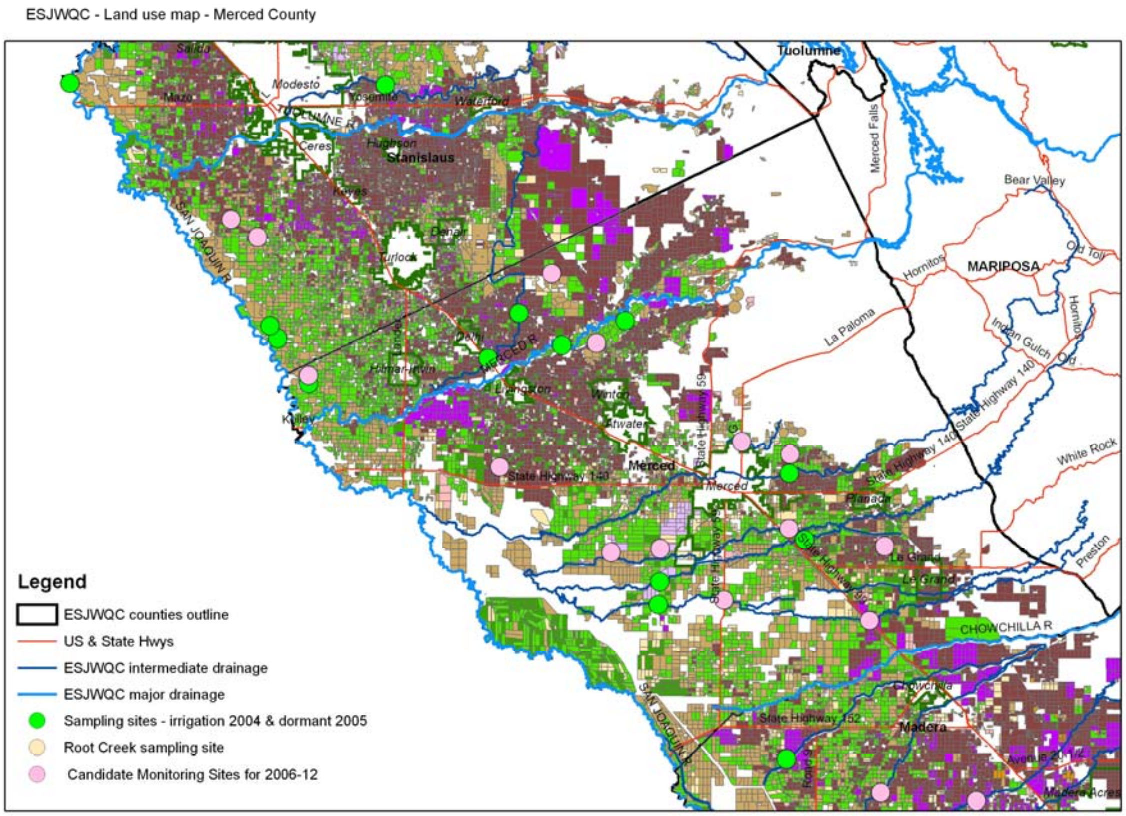


Figure 5. Land use for Madera County.

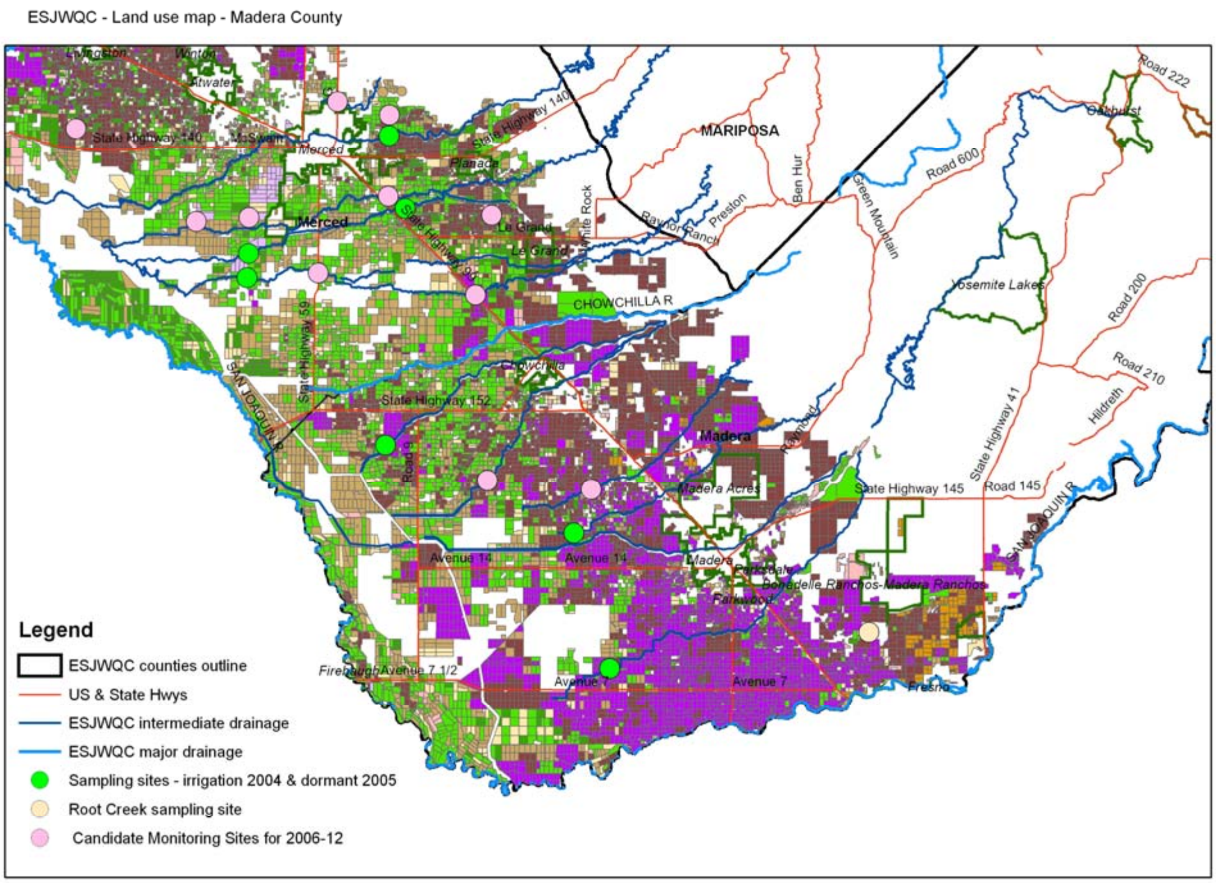


Figure 6. Land use for the upper Stanislaus River watershed in Calaveras County.

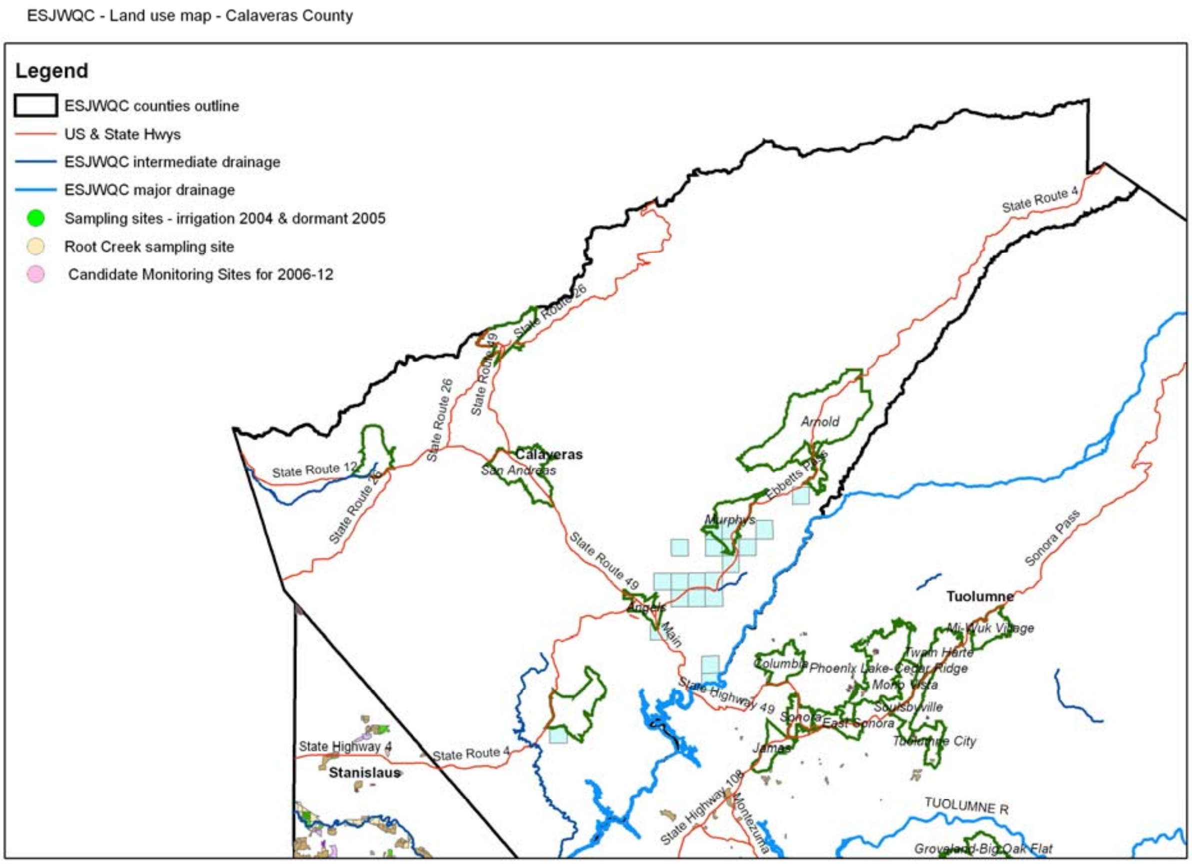


Figure 7. Land use for Tuolumne County. Because the parcels of irrigated agriculture are so small, they are almost impossible to see against the non-irrigated land within the county.

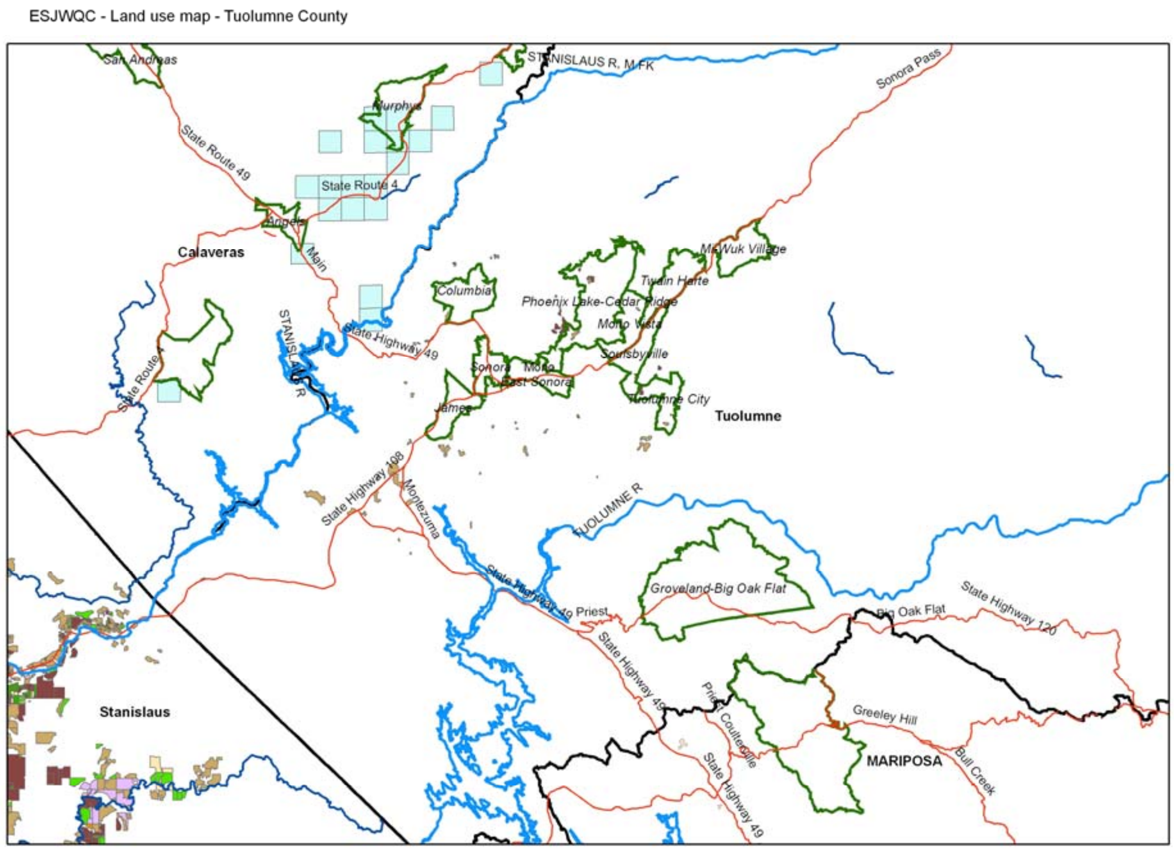


Figure 8. Land use for Mariposa County. Because the parcels of irrigated agriculture are so small, they are almost impossible to see against the non-irrigated land within the county.

ESJWQC - Land use map - Mariposa County

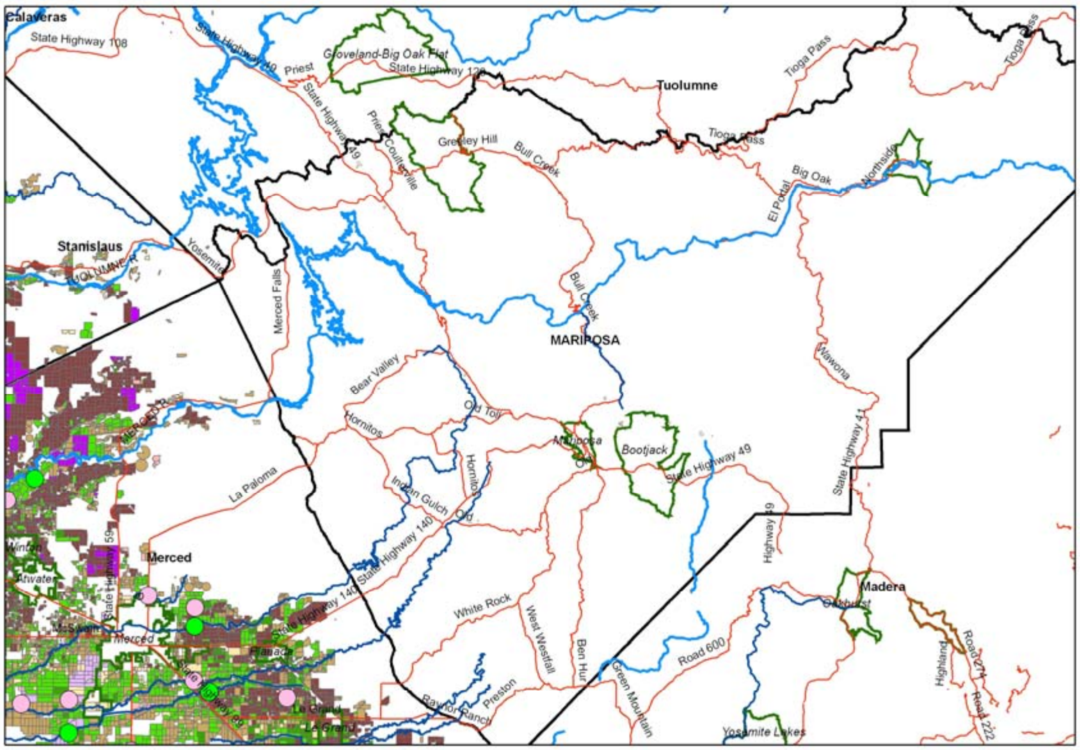
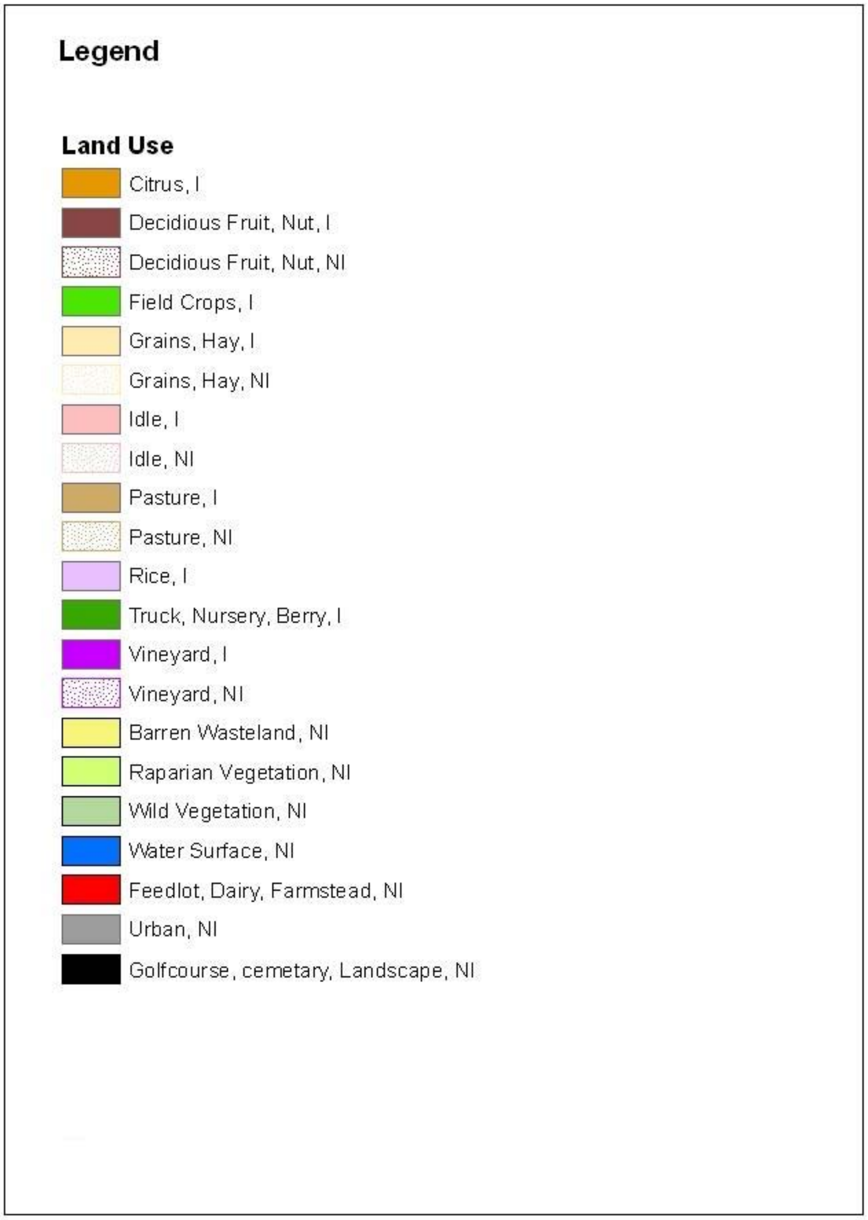


Figure 9. Legend for land use.



Land Use

Irrigated agriculture is the predominant land use in the Coalition area although growth of the urban areas in the Valley has been a significant factor impacting water quality. Non-irrigated land uses include primarily urban land uses with some acreage in feedlots and impoundments.

A variety of crops are grown and are often found in regions specific to microclimate, soil type, and local farming history. A more detailed discussion of crop type occurs in this report when each subwatershed is described. Over 50 types of commercial crops are produced within the coalition area (Table 3). The most common crops by acres are almonds, tomatoes, hay, sweet potatoes, cotton, silage, beans, wheat, peaches, melons, and grapes. In general agriculture varies geographically as one travels from the north to south and from east to west. In the eastern foothills, deciduous orchards and grapes are the dominant crops, though there is also considerable irrigated pasture and dairy farm. Crop type is more diverse in the northern Coalition area and includes row crops (e.g. tomatoes, sweet potatoes, melons, leafy green vegetables), alfalfa hay, and orchards. In the relatively drier southern area dominate crops include cotton, vineyard, and orchards (almonds and pistachios). The California Department of Pesticide Regulation database (http://calpip.cdpr.ca.gov/cfdocs/calpip/prod/main.cfm) is current through 2004.

Table 3. Crops grown in Coalition Counties. Crop information was developed from Pesticide Use Reports from the 2004 DPR PUR database. An X in the month column specifying that there were pesticide use permits filed in those months indicating that applications of chemicals to those crops occurred.

COUNTY	Crop	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
CALAVERAS													
	APPLE			x			x						
	BLUEBERRY		x		x						x	x	
	CHERRY			x	x		x		x			x	
	GRAPES, WINE	x	x	x	x	x	x	x	x			x	x
	NECTARINE		x										
	N-OUTDR CONTAINER/FLD GRWN PLANTS		x	x	x	x	x	x		x			
	OATS, GENERAL	x	x	x									
	OLIVE (ALL OR UNSPEC)	x		x			x	x	x	x			x
	PASTURES (ALL OR UNSPEC)		x	x	x	x							
	PEACH		x										
	PISTACHIO (PISTACHE NUT)			x	x	x		x	x				
	VEGETABLES (ALL OR UNSPEC)			x									
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)		x	x	x	x	x	x	x	x			
MADERA													
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	x	x	x	x	x	x	x	x	x	x	x	x
	ALMOND	x	x	x	x	x	x	x	x	x	x	x	x
	APPLE		x	x	x	x	x	x	x				
	APRICOT	x	x	x	x	x							x
	BARLEY (FORAGE - FODDER)	x	x	x									
	BARLEY, GENERAL	x	x	x									
	BEANS (ALL OR UNSPEC)						x	x	x				
	BEANS, DRIED-TYPE	x					x	x	x				
	BLUEBERRY											x	
	BOYSENBERRY (BOYSENS)												x
	CARROTS, GENERAL		x	x		x	x	x					

CHERRY	x	x	x	x	x	x	x			x	x	x
CHRISTMAS TREE PLANTATIONS					x							
CITRUS FRUITS (ALL OR UNSPEC)		x			x		x		x		x	
CORN (FORAGE - FODDER)			x	x	x	x	x	x	x		x	
CORN, HUMAN CONSUMPTION		x	x		x	x	x					
COTTON, GENERAL	x	x	x	x	x	x	x	x	x	x	x	x
FIG	x	x	x	x	x	x	x	x	x		x	x
GARLIC	x		x	x	x							
GRAPES	x	x	x	x	x	x	x	x	x	x	x	x
GRAPES, WINE	x	x	x	x	x	x	x	x	x	x	x	x
KIWI FRUIT	x	x	x		x		x	x	x			
MELONS			x									
NECTARINE	x	x	x	x	x	x	x	x	x	x	x	x
N-GRNHS GRWN CUT FLWRS OR GREENS	x	x	x	x	x	x	x	x	x	x	x	x
N-GRNHS GRWN PLANTS IN CONTAINERS						x				x		
N-OUTDR CONTAINER/FLD GRWN PLANTS	x	x	x		x	x	x	x	x	x	x	x
N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL		x	x	x	x	x	x	x	x			
OATS (FORAGE - FODDER)	x	x	x									x
OATS, GENERAL	x	x	x									x
OLIVE (ALL OR UNSPEC)	x	x	x		x	x	x	x	x	x	x	x
ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)			x	x						x	x	
ORANGE (ALL OR UNSPEC)	x	x	x	x	x	x	x	x	x	x	x	x
PASTURES (ALL OR UNSPEC)		x	x								x	x
PEACH	x	x	x	x	x	x	x	x	x	x	x	x
PEAR	x		x				x				x	
PECAN			x		x		x				x	
PERSIMMON			x		x		x	x	x			
PISTACHIO (PISTACHE NUT)	x	x	x	x	x	x	x	x	x	x	x	x
PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	x	x	x	x	x	x	x	x	x	x	x	x
POMEGRANATE (MISCELLANEOUS FRUIT)				x	x		x	x	x			x
PRUNE	x	x	x	x	x	x	x		x	x		x
SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)	x	x	x	x	x	x		x	x	x	x	x
STONE FRUITS (ALL OR UNSPEC)		x							x			

	STRAWBERRY (ALL OR UNSPEC)	x			x							x	
	SUGARBEET, GENERAL	x		x	x	x	x	x	x	x			x
	TANGELO		x	x	x	x	x	x	x	x	x	x	x
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)			x	x	x		x		x	x	x	
	TOMATO			x				x	x	x	x		
	TOMATOES, FOR PROCESSING/CANNING	x		x	x	x	x	x	x		x	x	
	UNCULTIVATED AGRICULTURAL AREAS (ALL OR UNSPEC)	x	x	x	x	x	x	x	x		x	x	x
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	x	x	x	x	x	x	x	x	x		x	
	WATERMELONS					x							
	WHEAT (FORAGE - FODDER)	x	x	x			x	x	x	x			x
	WHEAT, GENERAL	x	x	x	x							x	x
MARIPOSA													
	APPLE			x	x	x							
	GRAPES, WINE		x	x	x	x	x	x	x				
	N-OUTDR CONTAINER/FLD GRWN PLANTS	x	x	x	x	x	x	x	x	x	x	x	x
MERCED													
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	x	x	x	x	x	x	x	x	x	x	x	x
	ALMOND	x	x	x	x	x	x	x	x	x	x	x	x
	APPLE	x						x					x
	APRICOT	x	x	x	x	x	x	x	x		x		
	ASPARAGUS (SPEARS, FERNS, ETC.)				x			x	x		x		
	BARLEY (FORAGE - FODDER)												x
	BARLEY, GENERAL	x	x	x									x
	BEANS, DRIED-TYPE		x		x	x	x	x	x	x	x		
	BEANS, SUCCULENT (OTHER THAN LIMA)				x	x	x	x	x	x	x		
	BLUEBERRY		x	x	x		x	x			x	x	
	BOYSENBERRY (BOYSENS)				x		x						
	BROCCOLI										x	x	
	CANTALOUPE			x		x	x	x	x	x		x	x
	CAULIFLOWER							x	x	x			
	CHERRY	x	x	x	x	x		x				x	x
	CHICORY (ALL OR UNSPEC)				x				x	x	x		
	CHINESE CABBAGE (NAPPA, WON BOK, CELERY CABBAGE)				x						x		

CHINESE GREENS, CHINESE LEAFY VEGETABLES					x							
CHRISTMAS TREE PLANTATIONS	x	x					x					
CITRUS FRUITS (ALL OR UNSPEC)	x				x							x
COLE CROPS (ALL OR UNSPEC)												x
CORN (FORAGE - FODDER)	x	x	x	x	x	x	x	x	x	x	x	x
CORN, HUMAN CONSUMPTION	x	x	x	x	x	x	x	x	x			x
COTTON, GENERAL	x	x	x	x	x	x	x	x	x	x	x	x
CUCUMBER (PICKLING, CHINESE, ETC.)	x			x				x	x			
FIG		x	x	x	x	x	x	x	x		x	x
FORAGE - FODDER GRASSES (ALL OR UNSPEC) (HAY)	x	x	x									
GRAPES		x	x	x	x	x	x					
GRAPES, WINE	x	x	x	x	x	x	x	x	x	x	x	x
LEAFY VEGETABLES (ALL OR UNSPEC)								x	x	x	x	
LETTUCE, HEAD (ALL OR UNSPEC)				x								
MELONS							x	x				
MUSTARD, GENERAL									x			
NECTARINE	x	x	x	x	x	x	x				x	
N-GRNHS GRWN PLANTS IN CONTAINERS	x	x	x	x	x	x	x	x	x	x		
N-OUTDR CONTAINER/FLD GRWN PLANTS	x	x	x	x	x	x	x	x	x	x	x	x
N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	x	x	x	x	x	x	x	x		x	x	x
OATS (FORAGE - FODDER)	x	x	x	x	x			x	x		x	x
OATS, GENERAL	x	x	x								x	
OLIVE (ALL OR UNSPEC)											x	
ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)		x	x	x	x						x	x
ORNAMENTAL TURF (ALL OR UNSPEC)	x	x	x	x		x	x	x	x		x	
PASTURES (ALL OR UNSPEC)	x	x	x	x	x	x	x	x		x		
PEACH	x	x	x	x	x	x	x	x	x	x	x	x
PEAR	x			x		x	x					
PEAS, GENERAL	x	x	x									
PECAN					x	x	x		x			
PEPPERS (CHILI TYPE) (FLAVORING AND SPICE CROP)			x	x	x		x	x	x	x	x	
PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	x		x	x	x	x	x	x	x	x		
PISTACHIO (PISTACHE NUT)	x	x	x	x	x	x	x	x	x	x	x	x

	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	x	x	x	x	x		x	x	x		x	x
	PRUNE	x	x	x		x	x	x	x	x			x
	PUMPKIN						x	x	x	x			
	RADISH					x		x					
	RICE (ALL OR UNSPEC)					x	x	x	x				
	RYE (ALL OR UNSPEC)		x										
	SAFFLOWER, GENERAL	x											
	SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)	x	x	x								x	x
	SORGHUM (FORAGE - FODDER) (SORGO, ETC.)						x		x	x			
	SQUASH (ALL OR UNSPEC)							x	x				
	SQUASH (WINTER) (HUBBARD SQUASH, CALABAZA, ETC.)							x	x	x			
	STONE FRUITS (ALL OR UNSPEC)			x									
	STRAWBERRY (ALL OR UNSPEC)	x	x	x	x		x	x	x				x
	SUDANGRASS (FORAGE - FODDER) (SORGHUM SUDANESE)					x	x	x	x	x			
	SUGARBEET, GENERAL	x	x	x	x	x	x	x	x	x	x		
	SWEET POTATO	x	x	x	x	x	x	x	x	x		x	x
	TOMATILLO						x	x					
	TOMATO	x	x	x	x	x	x	x	x	x	x	x	x
	TOMATOES, FOR PROCESSING/CANNING	x	x	x	x	x	x	x	x	x	x	x	x
	UNCULTIVATED AGRICULTURAL AREAS (ALL OR UNSPEC)	x	x	x	x					x	x	x	x
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	x	x	x	x	x	x	x	x	x	x	x	x
	WATERMELONS			x	x	x	x	x	x		x	x	
	WHEAT (FORAGE - FODDER)	x	x	x							x	x	x
	WHEAT, GENERAL	x	x	x	x		x			x		x	x
STANISLAUS													
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	x	x	x	x	x	x	x	x	x	x	x	x
	ALMOND	x	x	x	x	x	x	x	x	x	x	x	x
	APPLE	x	x	x	x	x	x	x	x	x	x	x	x
	APRICOT	x	x	x	x	x	x	x	x	x	x	x	x
	ARRUGULA (ROQUETTE, ROCKET SALAD)							x					
	ASPARAGUS (SPEARS, FERNS, ETC.)						x		x				
	BARLEY (FORAGE - FODDER)		x										
	BARLEY, GENERAL										x		x

BASIL (BUSH, GARDEN, SWEET)		x	x	x	x	x	x	x	x	x	x	
BEANS, DRIED-TYPE	x	x	x	x	x	x	x	x	x	x	x	
BEANS, SUCCULENT (OTHER THAN LIMA)			x	x	x	x	x	x	x			
BEETS, GENERAL	x	x	x	x	x	x	x	x	x	x	x	x
BOK CHOY (WONG BOK)	x	x	x	x	x	x	x	x	x	x	x	x
BOYSENBERRY (BOYSENS)	x		x		x		x				x	
BROCCOLI	x		x	x	x	x	x	x	x	x	x	x
CABBAGE	x	x	x	x	x	x	x	x	x	x	x	x
CANTALOUPE			x		x	x	x	x	x			
CAULIFLOWER			x		x		x	x	x	x		
CELERIAC (CELERY ROOT)	x	x					x	x	x		x	
CELERY, GENERAL		x	x	x	x	x	x	x	x	x	x	x
CHERRY	x	x	x	x	x	x	x	x	x	x	x	x
CHESTNUT		x		x	x	x	x	x		x		x
CHICORY (ALL OR UNSPEC)	x							x	x	x	x	
CHINESE GREENS, CHINESE LEAFY VEGETABLES										x	x	
CHINESE RADISH/DAIKON (LOBOK, JAPANESE RADISH)	x	x	x	x	x	x	x	x	x	x	x	x
CILANTRO (CHINESE PARSLEY, CORIANDER LEAVES)	x	x	x	x	x	x	x	x	x	x	x	x
CITRUS FRUITS (ALL OR UNSPEC)		x	x	x	x	x	x	x		x	x	
COLLARDS	x	x	x	x	x	x	x	x	x	x	x	x
CORN (FORAGE - FODDER)		x	x	x	x	x	x	x	x	x		x
CORN, HUMAN CONSUMPTION						x	x				x	
COUNTY AG. COMM. SALES											x	
CUCUMBER (PICKLING, CHINESE, ETC.)			x	x	x	x	x	x				
DANDELION (CHINESE DANDELION, GOW GAY)	x	x	x	x	x	x	x	x	x	x	x	x
DILL	x	x	x	x	x	x	x	x	x			x
ENDIVE (ESCAROLE)	x								x		x	
FENNEL (ALL OR UNSPEC)		x	x	x	x	x	x	x	x			
FIG										x		
FLAVORING AND SPICE CROPS (ALL OR UNSPEC)				x		x		x		x		
FORAGE - FODDER GRASSES (ALL OR UNSPEC) (HAY)	x		x									
GRAPES	x		x	x	x	x	x	x		x	x	x
GRAPES, WINE	x	x	x	x	x	x	x	x	x	x	x	x

KALE	x	x	x	x	x	x	x	x	x	x	x	x
KIWI FRUIT		x	x		x			x	x			
KOHLRABI	x	x	x	x	x	x	x	x	x	x	x	x
LEEK			x	x	x	x	x	x	x	x	x	
LETTUCE, LEAF (ALL OR UNSPEC)	x	x	x	x	x	x	x	x	x	x	x	x
MELONS						x	x	x			x	
MINT (ALL OR UNSPEC)	x		x	x	x	x	x	x	x	x	x	
MUSTARD, GENERAL	x	x	x	x	x	x	x	x	x	x	x	x
NECTARINE	x	x	x	x	x	x	x		x	x	x	x
N-GRNHS GRWN PLANTS IN CONTAINERS	x	x	x	x	x	x	x	x	x	x	x	x
N-GRNHS GRWN TRNSPLNT/PRPGTV MTRL	x	x	x	x	x	x	x	x	x			
N-OUTDR CONTAINER/FLD GRWN PLANTS	x	x	x	x	x	x	x	x	x	x	x	x
N-OUTDR GRWN CUT FLWRS OR GREENS												x
N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	x	x	x	x	x	x	x	x	x	x	x	x
OATS (FORAGE - FODDER)	x	x	x	x		x	x			x	x	x
OATS, GENERAL		x	x									
OLIVE (ALL OR UNSPEC)					x	x	x	x	x			
ORNAMENTAL TURF (ALL OR UNSPEC)	x	x	x	x	x	x	x	x	x			
PARSLEY (LEAFY VEGETABLE)	x	x	x	x	x	x	x	x	x	x	x	x
PASTURES (ALL OR UNSPEC)	x	x	x	x	x	x	x	x	x	x		x
PEACH	x	x	x	x	x	x	x	x	x	x	x	x
PEAR		x					x			x	x	x
PEAS, GENERAL	x	x	x									
PECAN			x	x	x		x					x
PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	x		x	x	x							
PERSIMMON		x	x		x		x			x		
PISTACHIO (PISTACHE NUT)	x	x		x	x	x	x	x				x
PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	x	x	x	x	x	x	x	x		x	x	x
POMEGRANATE (MISCELLANEOUS FRUIT)							x			x		
PRUNE	x	x									x	x
PUMPKIN						x	x	x	x			
QUINCE											x	
RICE (ALL OR UNSPEC)			x	x	x	x	x					

	RYE (ALL OR UNSPEC)		x										
	RYEGRASS, PERENNIAL (FORAGE - FODDER)		x										
	SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)		x										
	SORGHUM (FORAGE - FODDER) (SORGO, ETC.)								x				
	SPINACH	x	x	x	x	x	x	x	x	x	x	x	x
	STRAWBERRY (ALL OR UNSPEC)		x	x	x			x	x	x			x
	SUDANGRASS (FORAGE - FODDER) (SORGHUM SUDANESE)							x	x				
	SUGARBEET, GENERAL			x	x	x	x		x	x			
	SWEET POTATO	x		x	x	x							x
	SWISS CHARD (SPINACH BEET)	x	x	x	x	x	x	x	x	x	x	x	x
	TOMATO				x	x	x	x	x	x	x	x	
	TOMATOES, FOR PROCESSING/CANNING	x	x	x	x	x	x	x	x	x	x		x
	TURNIP, GENERAL	x	x	x	x	x	x	x	x	x	x	x	x
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	x	x	x	x	x	x	x	x	x	x	x	x
	WATERMELONS				x	x	x	x	x	x			
	WHEAT (FORAGE - FODDER)	x	x	x	x							x	x
	WHEAT, GENERAL	x	x	x	x								
TUOLUMNE													
	APPLE		x	x	x	x	x	x					
	BLACKBERRY				x								
	BOYSENBERRY (BOYSENS)		x	x	x								
	CHERRY		x	x	x								
	GRAPES						x						
	GRAPES, WINE					x							
	NECTARINE				x								
	N-OUTDR CONTAINER/FLD GRWN PLANTS	x	x	x	x	x	x						
	N-OUTDR GRWN CUT FLWRS OR GREENS			x			x						
	PASTURES (ALL OR UNSPEC)			x	x	x	x	x					
	PEACH		x	x		x	x						
	PEAR		x	x	x		x						

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Hydrology

As indicated above, there are several main rivers that cross the Coalition area from east to west. These rivers have complex hydrologic systems due to both seasonal influence of precipitation, and management systems for water use (reservoirs, basin transfers, hydropower, municipal and irrigation supply, and anadromous fisheries, Table 4, Figure 1). In general flows are greatest during the winter and spring due to wintertime precipitation and subsequent springtime snowmelt. Summertime flows are now greater than historically due to reservoir releases during this period. The numerous small creeks that have their headwaters in the foothills and western portion of the Sierra Nevada mountain range are primarily ephemeral with no flow from early summer through the first rains of the winter. Later discussion of hydrology will be specific to each subwatershed.

There is an increased propensity for runoff with increased slope, soil water saturation, and volume of water, conditions that arise primarily due to large amounts of rainfall and are more likely in the relatively greater sloped valley margins. During the winter, runoff is drained through the myriad of creeks, rivers and drains for flood management and may be subject to efforts of larger geographic flood control programs. Runoff can also occur during the irrigation season if water entering the field is greater than the amount that can infiltrate the soil. Despite the fact that runoff may occur in both the winter and irrigation seasons, drainage patterns in the Coalition region do not always guarantee flow in the streams and sloughs. Recent sampling efforts indicate that many of the drainages in the southern portion of the Coalition region do not always carry runoff even during substantial rainfall events. Immediately after a storm in March of 2005, Ash Slough did not maintain sufficient flows to be sampled even when adjacent orchards were flooded. Also, the watersheds throughout the Coalition region tend to be "flashy" in that water from runoff events moves through the systems very quickly leaving very little flow shortly after the storm ends. For example, there was no flow remaining when crews visited the site for persistence sampling in the Lone Willow Slough watershed approximately a week after a winter 2005 storm event.

A complex system for water transfer, use, and re-use is utilized for irrigation purposes. Without precise methods of applying water for irrigation purposes some water may return to the source after being used on the field. In some cases, the volume of water applied to a field for irrigation may represent not only what is needed by the vegetative crop, but also a greater quantity used either to push the water over the field, or as a method of reducing the negative effects of evapotranspiration and consequent accumulation of salts. The system is designed to allow downstream irrigators to reuse the same water that was previously used upstream.

Table 4. Major river to which each subwatershed drains to, and the beneficial use for each of the major river reaches.

Subwatershed	Immediate Downstream River	Beneficial Use of Immediate Downstream River *
Cottonwood Creek @ Road 20** Root Creek ** Cottonwood Creek @ Six mile road	San Joaquin River[1]	1-4, 7-15
Ash Slough @ Avenue 21** Bear Creek @ Kibby Rd** Dry Creek @ Road 18** Duck Slough @ Gurr Road Duck Slough @ Pioneer Road Mattos Drain @ Range Road Black Rascal Creek @ Kibby road Berenda Slough @ Dairyland Road Mariposa Creek @ Simonson Way Deane Drain @ Gurr Road Owens Creek @ Kibby Road Dutchman Creek @ Highway 99 Berenda Creek @ Road 19** Deadman Creek @ Highway 59 Livingston Drain @ Robin Ave	San Joaquin River[2]	1-4, 7-9, 11-15
Mustang Creek @ East Ave Highline Canal @ Hwy 99 Highline Canal @ Lombardy Ave Hilmar Drain @ Central Ave Cavill Drain @ McGee Road Prairie Flower Drain @ Crows Landing Rd. Hatch Drain @ Monte Vista Ave Western States Drain @ Central Ave Westport Drain @ Vivian Road	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Dry Creek @ Wellsford Road	Tuolumne River[4]	1-3, 7-10, 12-15
Jones Drain @ Oakdale Road Merced River @ Santa Fe Silva Drain @ Meadow Drive	Merced River[5]	1, 3-15

[1] Friant Dam to Mendota Pool reach
[2] Sack Dam to Merced River reach (all waterbodies that drain to this reach enter via the East Side Bypass with the exception of Livingston Drain)
[3] Merced River to Delta reach
[4] New Don Pedro Reservoir to San Joaquin River reach
[5] McSwain Reservoir to San Joaquin River reach
* See below for Beneficial Use code list.

** Surface water flow in these water bodies terminates in subterranean flow except for periods of increased runoff during large winter storms.
Municipal and Domestic Supply - 1
Agriculture Supply (irrigation) - 2
Agriculture Supply (stock watering) - 3
Industrial Process Supply - 4
Industrial Service Supply - 5
Hydropower Generation - 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

There are 32 subwatersheds in the Coalition area that are classified by three types (large, intermediate or small) based on water flow and watershed size (Figure 1, Table 5). The large watersheds within the Coalition area are the five major rivers (Chowchilla River, Fresno River, Merced River, Tuolumne River and Stanislaus River). With the exception of the Merced River, none of the large rivers are sampled. The Merced River is sampled but relatively high in the watershed to allow the integration of the sampling results from smaller water bodies (e.g., Jones Drain) that drain into the river upstream. Though the irrigated agriculture area within these watersheds is similar or even less than some of the watersheds classified as medium sized, water flow in these relatively larger watersheds is primarily a function of source water originating upstream of irrigated agriculture. These rivers have relatively greater base water flow due to snowmelt and reservoir releases. There are 15 intermediate sized subwatersheds in the Coalition Region (see Table 4 for listing). These are primarily natural creeks and sloughs that drain a large portion of the Coalition area. The 16 smaller watersheds in the Coalition area are either small-sized natural creeks, or agriculture canals and drains (see Table 5).

The Coalition currently samples 9 of the 15 intermediate sized drainages. We will add two additional intermediate sized drainages in April 2006. Beginning in the irrigation season 2006, the Coalition will sample 73% of its intermediate sized drains, ahead of the 40% required by the MRP. By the irrigation season 2006, 59% of all watersheds identified for sampling will be in the monitoring program in either Phase 1 or Phase 2 sampling.

In addition to the monitoring sites established by the ESJWQC, we will be able to obtain data from the East San Joaquin Water Quality Framework from the sampling of their operational spill sites. These sites increase the geographic coverage within the Coalition region.

Table 5. Subwatersheds within the ESJWQC area, type (Large, Intermediate, Small) and total watershed size. The subwatershed is formed from the location of the sample site or proposed sample site (see below), not the location where the watershed has its confluence with a downstream water body. Also, some watersheds do not connect to downstream water bodies.

Subwatershed	Type	Watershed Size (irrigated acres)
Ash Slough @ Avenue 21	I	21,015
Bear Creek @ Kibby Rd	I	6,279
Cottonwood Creek @ Road 20	I	113,424
Dry Creek @ Road 18	I	15,448
Dry Creek @ Wellsford Road	I	12,110
Duck Slough @ Gurr Road	I	17,116
Duck Slough @ Pioneer Road	I	6,895
Highline Canal @ Hwy 99	I	14,585
Highline Canal @ Lombardy Ave	I	9,196
Hilmar Drain @ Central Ave	S	1,658
Jones Drain @ Oakdale Road	S	2,140
Merced River @ Santa Fe	L	23,402
Prairie Flower Drain @ Crows Landing Road	S	2,610
Owens Creek @ Kibby Road	S	4,828
Silva Drain @ Meadow Drive	S	476
Mustang Creek @ East Ave	I	12,400
Mattos Drain @ Range Road	S	1,130
Black Rascal Creek @ Kibby road	S	1,406
Berenda Slough @ Dairyland Road	I	19,834
Mariposa Creek @ Simonson Way	S	496
Deane Drain @ Gurr Road	S	4,701
Cavill Drain @ McGee Road	S	13,751
Dutchman Creek @ Highway 99	I	8,734
Deadman Creek @ Gurr Road	I	25,626
Cottonwood Creek @ Sixmile road	S	442
Hatch Drain @ Monte Vista Ave	S	1,411
Berenda Creek @ Road 19	I	16,789
Deadman Creek @ Highway 59	I	22,354
Livingston Drain @ Robin Ave	S	2,418
Western States Drain @ Central Ave	S	6,109
Westport Drain @ Vivian Road	S	755
Root Creek	S	8,378[1]

[1]Watershed documents have been requested from the Root Creek Coalition to determine if our estimates of area are similar to theirs. At this time, the total acreage for the Root Creek watershed is an estimate.

Narrative Description of subwatersheds within the Coalition region

Narrative descriptions of each subwatershed identified in Table 5 were provided in the Watershed Evaluation Report and will not be repeated here.

Historical Data and Ongoing Monitoring

Historical Water Quality Data

The region has a long history of water quality studies on a variety of constituents. Sampling has been conducted on chemical water quality, toxicity, and benthic macroinvertebrate communities by several agencies and academic institutions including the Central Valley Regional Water Quality Control Board (CVRWQCB), California Department of Pesticide Regulation, California Department of Water Resources, California Department of Transportation, University of California Davis, and the U.S. Geological Survey. Constituents sampled for include organophosphate pesticides, metals, drinking water constituents, nutrients, and dissolved oxygen. An overwhelming majority of programs have monitored for organophosphate pesticides. The Coalition watershed area will continue to be monitored as part of programs such as the organophosphate Total Maximum Daily Load monitoring program, and the Agricultural Waiver Phase II monitoring program, both performed by the CVRWQCB. Some of the monitoring programs and locations are associated with monitoring storm water runoff from urban areas or transportation corridors and are not relevant when addressing runoff from irrigated agriculture other than to provide baseline information.

Current Monitoring and Water Quality Status

Eleven water bodies within the Coalition area are listed on the EPA 303d list as impaired water bodies. Generally these locations are along the mainstem of the San Joaquin River, but also occur along the lower reaches of the main tributaries. Essentially the entire San Joaquin River through the Coalition area is on the 303d list. Listings include (but are not limited to) numerous constituents from selenium and boron to legacy pesticides (DDT), ammonia, electrical conductivity, and diazinon and chlorpyrifos. Unknown toxicity is also listed as a cause of impairment for several water bodies. Despite the fact that all listed water bodies are located downstream of urban regions known to discharge organophosphate pesticides, metals, and numerous other constituents, municipal discharge is listed as the source of impairment for only one site, Harding Drain. Agriculture is listed as a source of impairment for all sites on the 303d list, and 10 of the 11 sites are listed for either or both chlorpyrifos and diazinon.

Given the listings above, the region has a long history of water quality studies on a variety of constituents. Sampling has been conducted on chemical water quality, toxicity, and benthic macroinvertebrate communities by several agencies and academic institutions including the Central Valley Regional Water Quality Control Board (CVRWQCB), California Department of Pesticide Regulation, California Department of Water Resources, California Department of Transportation, University of California Davis, and the U.S. Geological Survey. Constituents sampled for include organophosphate pesticides, metals, drinking water constituents, nutrients, and dissolved oxygen. An overwhelming majority of programs have monitored for organophosphate pesticides. The Coalition watershed area will continue to be monitored as part of programs such as the organophosphate Total Maximum Daily Load monitoring program, and the Agricultural Waiver Phase II monitoring program, both performed by the CVRWQCB. Some of the monitoring programs and locations are associated with monitoring storm water runoff from urban areas or transportation corridors and are not relevant when addressing runoff from irrigated agriculture other than to provide baseline information.

The Department of Pesticide Regulation's (DPR) Surface Water Database was used to investigate pesticide concentrations in the Coalition region. This database was created in 1997 by DPR under agreement with the State Water Resources Control Board. This database contains the results from approximately 34,500 samples collected from 40 different sites in Stanislaus and Merced Counties from August 1991 through September 2003. This database was supplemented with information available to the Coalition through recent OP TMDL sampling programs. Data from TMDL sampling for 2003 and 2004 are available for analysis. The EPA 303d list of impaired water bodies was used to establish potential causes of impairment, and these were compared to the data available from the two databases.

In an effort to prioritize monitoring locations in the ESJWQC watershed, this report examines four causes of water quality impairment: the pesticides diazinon, chlorpyrifos, and sediment binding pesticides (pyrethroids), and general toxicity. A similar analysis was performed in the 2004 MRPP submission. Diazinon and chlorpyrifos were selected for monitoring because of their inclusion in the CVRWQCB MRPP order. The additional group of pesticides examined was the sediment binding pesticides identified in the Regional Board's Phase 2 monitoring program. This group included pyrethroids (esfenvalerate, permethrin, cypermethrin and lamba-cyhalothrin). These pesticides were targeted as an emerging class of pesticides with increasing use in the Coalition region. General toxicity is listed as a source of impairment in the 303d list and will be a focus of monitoring at those sites that will be added as Phase 1 sites. We will continue to monitor for toxicity at sites with toxicity exceedances.

The DPR Surface Water Database was searched for records in the four target pesticide categories. Diazinon samples were collected at 39 sites listed in the database. Of the total 1370 individual samples tested for either diazinon or the metabolite diazoxon, 197 (14%) samples contained concentrations greater than 80 ng/l, which is the California Department of Fish and Game Quantitative Response Limit (QRL) guideline for short-term exposure (criteria maximum concentration). The 197 samples with concentrations greater than the guideline occurred at most of the 39 sites sampled. There have been exceedances in all years except 2003. The overwhelming majority of exceedances occurred in samples collected during the winter season, but samples collected during the summer also had exceedances.

Based on the DPR database, chlorpyrifos was monitored at 38 sites in the watershed. A total of 1486 samples were collected and analyzed for chlorpyrifos or chlorpyrifos OA. 147 (9.9%) of the samples had concentrations over 20 ng/l, which is the CDFG QRL for acute exposure. The 147 samples with concentrations that exceeded the guideline occurred at 22 different sites. There was no measured concentration of chlorpyrifos in 1200 samples. There have been exceedances of the chlorpyrifos criteria in the DPR database in almost every year. Exceedances in the database occurred during almost every month of the year. Many of the sample locations are downstream of urban influences and the chlorpyrifos signals at those locations can't be definitively attributed to agricultural sources.

Permethrin was monitored for in 366 water column samples collected from 26 sites. All results were non-detects with a LOQ 0.5 ng/l. Esfenvalerate was tested in 60 samples with all readings listed as non-detects with a LOQ of 50 ng/l at all sites except a single sample with a concentration of 0.0566 µg/l. Cypermethrin and lamda-cyhalothrin were monitored for in 17 samples, all were nondetects.

The Coalition initiated its monitoring program in July 2004 and has continued to monitor surface waters during the summer irrigation seasons and the winter storm water runoff season. This program is probably the most comprehensive yet undertaken in the Coalition region to characterize water quality. The results have been provided to the Regional Board in two monitoring reports submitted in April 2005 (includes results from the 2004 irrigation season monitoring) and December 2005 (includes the 2005 winter storm water runoff season and the 2005 irrigation season monitoring). We summarize those results below for the sampling that occurred in 2005.

Summary of exceedances of water quality objectives observed in 2004-2005

A summary of the exceedances is presented in Table 6.

Pesticides

Two pesticides (diazinon and chlorpyrifos) were detected in 13 samples in the ESJWQC region during the dormant and irrigation seasons of 2005. This is approximately 15 % of the samples tested. Of these, 6 samples had detections of chlorpyrifos exceeding the water quality standards (7%), and 1 sample had a detection of diazinon exceeding the water quality standard (1%). There were no detections of any pyrethroids in the water samples collected for analysis.

Toxicity

Overall, 12 water column toxicity exceedances (4% of all tests) were documented. Seven of these were for *Ceriodaphnia dubia*, and five were for *Selenastrum capricornutum*. There were no toxicity exceedances for *Pimephales promelas*. Overall there were 5 sediment toxicity exceedances documented for *Hyalella azteca* survival.

E. coli

Exceedances of *E. coli* standards were the most numerous type of exceedance in the ESJWQC region. There were 41 exceedances that had values above 200 MPN/100 mL and the only subwatersheds that did not have any exceedances were Highline Canal @ Highway 99 and Merced River @ Santa Fe. A proposal is being developed to determine the extent to which *E. coli* may be attributed to agriculture discharge.

Dissolved Oxygen

Determining exceedances of dissolved oxygen is difficult because it is not completely clear which beneficial uses should be applied to all water bodies in the region. Based on criteria outlined in the most recent semi-annual monitoring report (submitted January 3, 2006), there were 3 exceedances of dissolved oxygen during the year indicating that dissolved oxygen is not a major water quality issue within the Coalition.

pH

There were 8 exceedances of the pH standard during the year. The majority of these exceedances was within 0.2 pH units from the upper pH limit and thus may not be actual exceedances because meter precision is 0.2 pH units. This indicates that pH is not a major water quality issue within the Coalition. Despite this, the coalition will attempt to determine the source of pH exceedances.

TDS

There were a total of 13 TDS exceedances all from two subwatersheds, Hilmar Drain and Prairie Flower Drain. All samples collected from Hilmar Drain @ Central Avenue during 2005 had TDS water quality exceedances and six out of the seven collected samples from Prairie Flower Drain @ Crows Landing Road had TDS water quality exceedances. TDS does not appear to be a widespread water quality issue within the Coalition. However, the Coalition will design and perform a study to determine the source of the TDS problems in the two watersheds with exceedances.

Table 6. Water quality exceedances observed at each subwatershed for the first year of Coalition monitoring.

An X indicates that there was an exceedance of a water quality objective for that constituent at some point during 2005. For organophosphates, Y denotes detection below the exceedances level.

Watershed	E. coli	pH	DO	EC	TDS	Organophosphates	Water Column Toxicity	Sediment Toxicity
Ash Slough @ Ave. 21	X					X		
Bear Creek @ Kibby Rd	X		X				X	
Cottonwood Creek @ Rd 20	X					Y		X
Dry Creek @ Rd 18	X	X						
Dry Creek @ Wellsford Rd	X	X				Y	X	X
Duck Slough @ Gurr Rd	X							X
Duck Slough @ Pioneer Rd	X					X	X	
Highline Canal @ Highway 99							X	X
Highline Canal @ Lombardy Rd	X	X		X	X	X		X
Hilmar Dr @ Central Ave	X			X	X		X	X
Jones Drain @ Oakdale Rd	X	X	X			Y	X	
Merced River @ Santa Fe	X	X					X	
Prairie Flower Dr @ Crows Landing Rd			X	X	X	Y		X

Monitoring Phases

As required by the CVRWQCB MRP Order, a three-phased monitoring approach is proposed for this MRPP. This phased approach is both scientifically valid and cost effective. Phase 1 involves both water column and sediment toxicity testing, measurements of water quality and physical parameters, measurement of drinking water constituents, and pesticide use evaluations. If significant toxicity or exceedances of chemical water quality standards are reported from Phase 1, then Phase 2 is initiated. Phase 2 monitoring includes additional chemical analyses of constituents of concern (COCs) that were identified as possible causative agents resulting from the toxicity testing conducted in Phase 1. These constituents may include pesticides, metals, nutrients and other parameters as originally identified in the MRP. Phase 3 monitoring includes an evaluation of the effectiveness of management practices in reducing toxicity and implementation tracking.

Phase 1 Monitoring

Phase 1 monitoring will be conducted at all sites during both the storm season (December - February) and irrigation season (March – August). Phase 1 monitoring at all sites during the storm season will include: (1) acute water column toxicity tests with *Ceriodaphnia dubia, Pimephales promelas,* and *Selenastrum capricornutum*, (2) surface water analyses for diazinon, chlorpyrifos, and selected pyrethroids, (3) measurement of water quality and physical parameters, including drinking water constituents, as described in the original MRP; and (4) evaluation of pesticide use information in the subwatershed using the most current Pesticide Use Reports (PUR) from California Department of Pesticide Regulation (DRP). Phase 1 monitoring at all sites during the irrigation season will include all of the above and sediment toxicity testing using the amphipod *Hyaella azteca*.

The suite of both water column and sediment toxicity tests will provide an indication of toxicity in the water column resulting from water soluble pesticides while sediment testing will indicate toxicity resulting from hydrophobic pesticides. The three-species water column testing approach is a standard approach in the Central Valley of California. Sediment toxicity testing has been conducted less frequently in this area. Recent results from sediment toxicity tests with pyrethroids have shown that the amphipod *Hyalella azteca* is probably more sensitive than *Chironomus tentans.* Therefore, *Hyalella* is proposed as the sediment test species for this study.

Measurements of the various water quality parameters, physical parameters, and drinking water constituents may be useful for identifying non-pesticide stressors potentially toxic to the test species. The evaluation of pesticide use information by subwatershed will determine the pesticide use patterns in areas upstream of the monitoring sites if toxicity is reported. This information will be useful for identifying potential sources of toxicity if reported.

For all the initial screening toxicity tests at each site, 100% ambient water and a control will be used for the acute water column tests. If 100% mortality with a test species is reported within 24 hours during the initial screening toxicity test, then a multiple dilution test - including a minimum of five sample dilutions - will be conducted with the same water sample to determine the magnitude of toxicity. If any measurement endpoint from any of the three toxicity tests is significantly different from the control, then two concurrent actions will take place. First, an additional sample from the site will be collected to determine if toxicity is persistent. Resampling will occur within 48 hours after notification from the laboratory that the sample is toxic. Second, an Exceedance Report will be filed with the CVRWQCB. If the survival of the *Ceriodaphnia* or *Pimephales*, or growth of the *Selenastrum* is 50% less than the control samples, a Toxicity Identification Evaluation (TIEs) will be conducted to determine the cause of toxicity. The Phase 1 TIE will be conducted to determine the general class of constituent (i.e., metal, non-polar organics) causing toxicity. Phase 2 TIEs may also be utilized to identify specific constituents causing toxicity. Sediment toxicity testing at each site will be conducted three times during the year to determine the potential toxicity associated with sediment bound constituents.

The Coalition will perform a GIS analysis of crop types and pesticide use to determine the potential sources(s) of the toxicant in the watershed. This will involve investigating several of the largest contributing areas within a subwatershed and may also include considering both site and event specific factors.

Phase 2 Monitoring

Phase 2 monitoring will be conducted at a site one year after the initiation of Phase 1. Note that in the past, the Coalition has initiated Phase 2 sampling two years after the initiation of Phase 1 sampling. In the future, the Coalition will initiate Phase 2 monitoring after a single dormant and irrigation season. Phase 2 monitoring will include analysis of the following: (1) general physical parameters; (2) pesticides, metals and nutrients suspected in causing toxicity; and (3) pesticide use in the subwatershed upstream of the monitoring site. These parameters are as outlined in the August 15, 2005 MRP, Table 1 (Table 13 - 15 below). Phase I constituents will continue to be monitored if there were exceedances during Phase I monitoring.

Pesticide use information will be compiled for the drainage where toxicity has been reported. This information will be used to determine the pesticide use patterns and any changes in land areas upstream of the monitoring sites. A record of pesticide use by drainage will identify any additional or new pesticides used in the drainage. The list of pesticides in Phase 2 will be used to identify potential sources and loads in discharges from irrigated lands to surface waters. Pesticides suspected of causing toxicity will be the primary constituents measured for both concentrations and loads. Representative flow measurements at the monitoring sites will be used to calculate the pesticide loads.

When monitoring indicates toxicity, it will be the Coalition's responsibility to notify the affected subwatershed landowners and operators about problems and work to solve those problems. Depending on the causes of toxicity, solutions could include a targeted outreach program with landowners and operators to promote the adoption of best management practices or modifying uses of specific farm inputs to prevent movement of the constituent of concern into the impacted surface water.

County Agricultural Commissioners (CAC) participating in the Coalition have committed to using their existing regulatory authority to assist in solving water quality problems identified through monitoring. The CAC will examine the pesticide use reports from upstream locations to insure that all label requirements are being followed. Continuing education programs for growers and crop consultants offered through the CAC office (e.g., annual worker safety information seminars and private applicator certification (PAC) examinations) are already in place and will be adjusted to address problems detected through monitoring. If a pesticide-related problem persists in an area, the CAC has the authority to require specific permit conditions when a pesticide is applied near a sensitive area or used in a way that could lead to water quality problems. The decision to use such authority will be based on conditions specific to the area and determined on a case by case basis.

In problem drainages, the Coalition will collect information from landowners on the type of management practices being used and the level of implementation within the drainage. The effectiveness of many management practices in reducing toxicity is currently being evaluated through several programs in the Central Valley and the Coalition will regularly communicate results of that research to land owners and the Regional Water Board.

Previously, we indicated that we would be developing an analysis to provide information on areas within the coalition region with the potential for high discharge of chemicals and the crops associated with those areas. The Coalition will no longer be undertaking this analysis because the information available to the coalition is not adequate to provide any additional insight into potential runoff from individual parcels than is examination of the pesticide use reports. This analysis is not required under the MRP Order.

Phase 3 Monitoring

Phase 3 monitoring will be used to determine the effectiveness of management practices in reducing toxicity (narrative water quality objective) at a monitoring site. Phase 3 monitoring will begin no later than two years from the start of Phase 2 monitoring. Continued toxicity testing will be conducted at a site to determine if management practices have successfully reduced the toxicity. Although reducing toxicity at a site is the primary goal of management practices, concentrations of constituents (i.e., pesticides) suspected in causing toxicity will also be monitored over time to determine if concentrations have been reduced.

Pesticide use information will be collected for drainages where toxicity has been reported to determine pesticide use patterns and changes in land areas upstream of the monitoring sites. Specific information will be collected from land owners or operators dischargers on the type of management practices that are being used and the degree of implementation within the drainage. The effectiveness of many management practices in reducing toxicity is currently being evaluated through several programs in the Central Valley and the Coalition will regularly communicate results of that research to land owners and the Regional Water Board. It is anticipated that multiple years of effort will be needed to evaluate the effectiveness of management practices due to various land use patterns and rainfall/runoff factors.

The following types of data will be collected in drainages where management practices are used to reduce toxicity: (1) pesticide mixing, loading, and application practices; (2) pest management practices; (3) management practices to address field runoff containing waste (salt, sediment, nitrogen etc.); (4) other data collected as part of the management practices implementation plan will be useful for determining the effectiveness of management practices in reducing waste loads. Other available data such as BMP testing and evaluation in other regions will be useful for determining the effectiveness of management practices in reducing waste loads.

Statistical comparisons of data between pre- and post-management practices implementation periods will be difficult to achieve. Sample sizes will generally be small, and numerous covariates such as (but not limited to) antecedent rainfall, storm event rainfall, and flow (for winter storms), irrigation patterns, temperature, and pest outbreaks (for irrigation season) will use up precious degrees of freedom in statistical analyses. Despite this, we will attempt to apply a statistical test such as a Before-After-Control-Impact (BACI) design with relevant covariates, to analyze the data after sampling in Phase 3 is complete.

Monitoring Sites

The discussion below briefly describes each subwatershed currently monitored or proposed for monitoring with respect to hydrology and agricultural production. Maps for sites monitored during the dormant season and the 2005 irrigation season were provided in East San Joaquin Water Quality Coalition Semi-Annual Report of Monitoring and Outreach Activities, January 3, 2006. The maps provided as Figures 10-13 provide more detail on the crops grown on each of the parcels in the subwatershed and the hydrology within the subwatershed that drains through those parcels in sites to be monitored starting in the 2006 irrigation season. The legend is presented in Figure 7. ArcGIS coverage of all subwatersheds will be provided electronically along with this report. Tables of crop acreages are provided in the Watershed Evaluation Report but are repeated below.

Figure 10. Land use for subwatersheds in Stanislaus County: Cavill Drain @ McGee Rd., Hatch Drain @ Monte Vista Ave., and Westport Drain @ Vivian Rd. Riley Slough was abandoned after the 2004 irrigation season due to access problems.

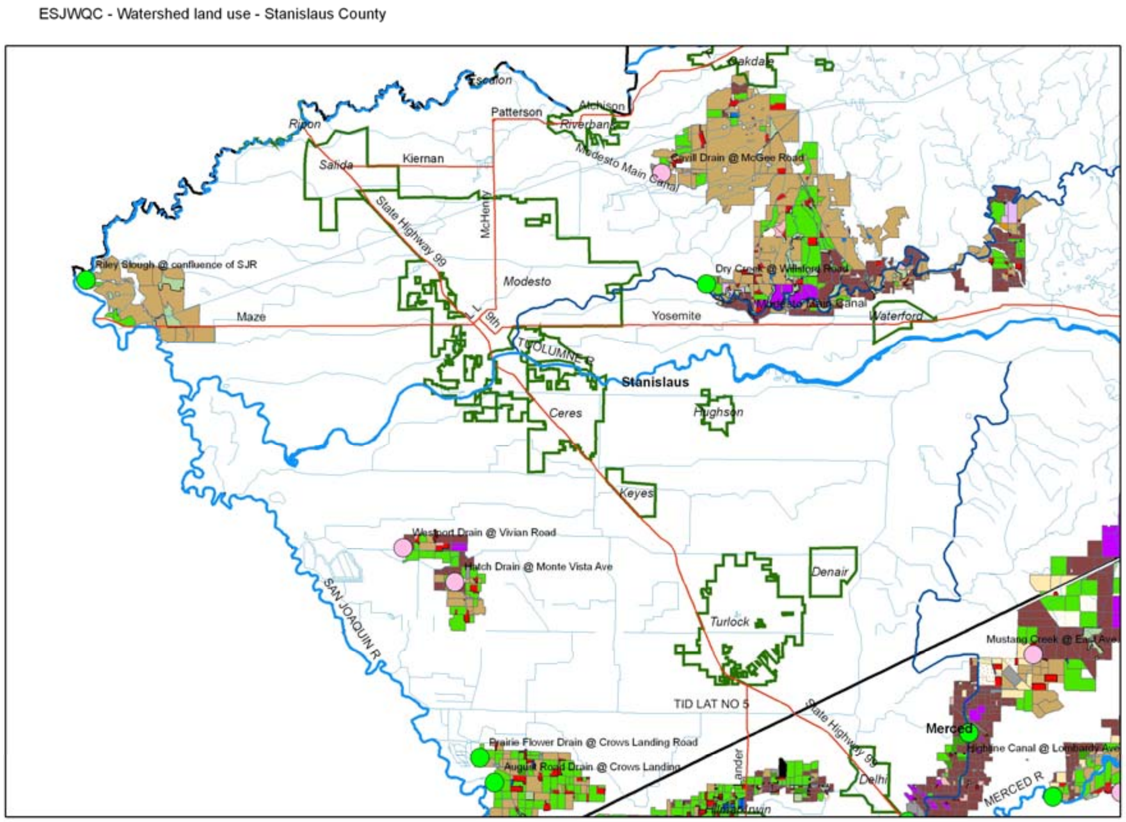


Figure 11. Land use for subwatersheds in northern Merced County: Mustang Creek @ East Ave., Livingston Drain @ Robin Ave., Western States Drain @ Central Ave., and Silva Drain @ Meadow Drive.

ESJWQC - Watershed land use - Merced County north

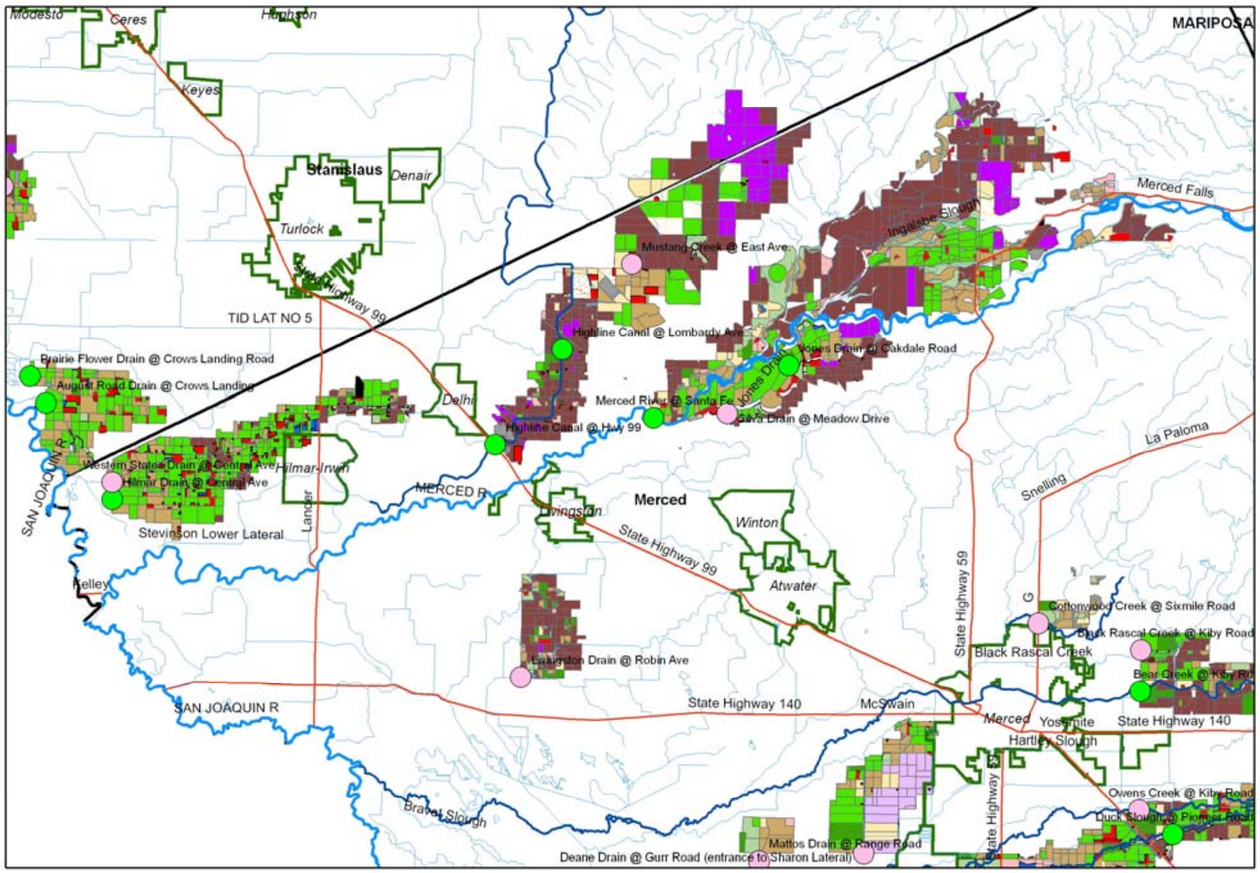


Figure 12. Land use for subwatersheds in southern Merced: Owens Creek @ Kibby Rd., Mariposa Creek @ Simonson Way, Mattos Drain @ Range Rd., Black Rascal Creek @ Kibby Rd., Dutchman Creek @ Hwy 99, Cottonwood Creek @ Six Mile Rd., Deadman Creek @ Hwy 59, and Deanne Drain @ Gurr Rd.

ESJWQC - Watershed land use - Merced County south

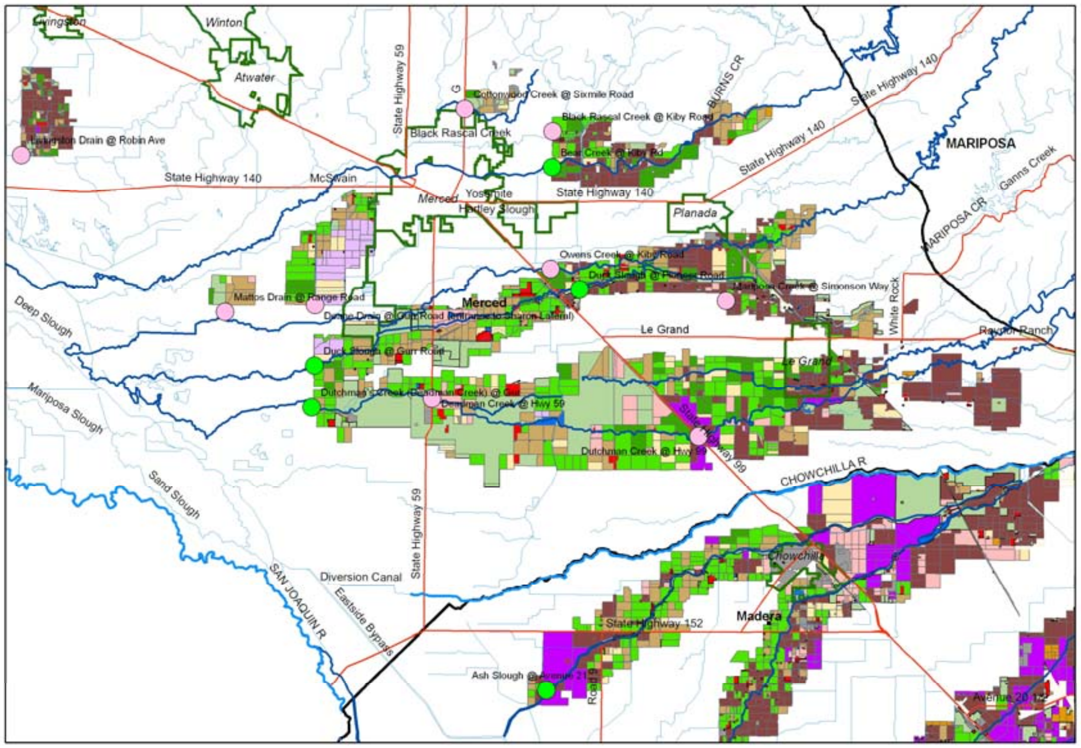
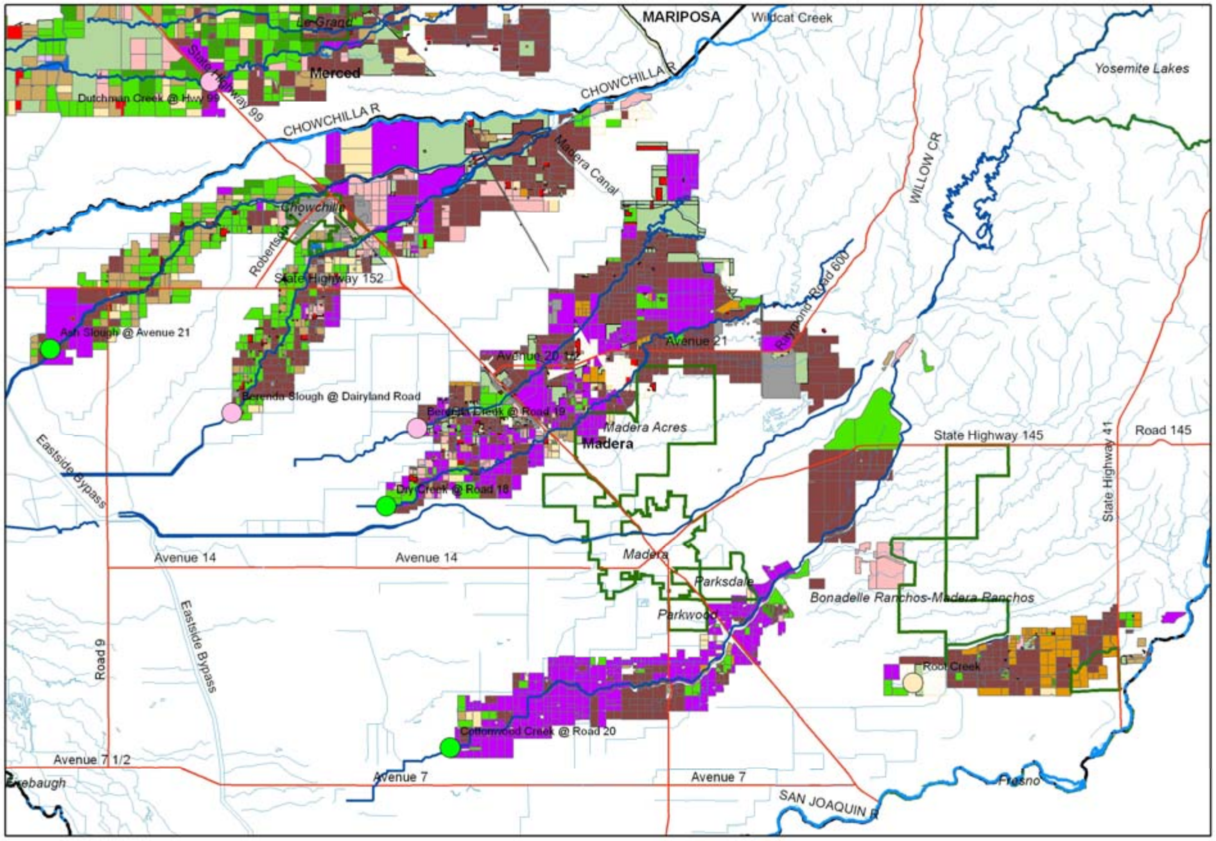


Figure 13. Land use for subwatersheds in Madera County: Berenda Slough @ Dairyland Rd., Berenda Creek @ Kibby Rd., and Root Creek.

ESJWQC - Watershed land use - Madera County



Sites monitored through the 2006 winter storm water runoff season.

Highline Canal @ Lombardy Road (9,196 irrigated acres) – The Highline Canal is a conveyance of the Turlock Irrigation District and carries both clean irrigation water and irrigation return flow. The main upstream tributary of the Highline Canal is Mustang Creek. The Highline Canal flows west and eventually drains into the Merced River. Dairies are present upstream and the Mustang Creek, a major tributary during the dormant season, passes immediately to the southeast of the Turlock Airport. The main agricultural crop upstream is deciduous nuts (Table 7).

Duck Slough @ Gurr Road (17,116 irrigated acres) – This site is currently monitored and is proposed to be a core site. Located to the south and west of Merced, the site drains field crops immediately upstream and deciduous nuts farther upstream (Table 7). In addition, there is irrigated pasture upstream. We have recently learned that the city of Merced delivers treated water to Duck Slough a few miles upstream of the Gurr Road site. Duck Slough drains west flows eventually becoming Deadman Creek in the western portion of the coalition region. It continues to flow west feeding with a series of duck ponds near the Eastside Bypass and eventually drains into Deep Slough.

Merced River @ Santa Fe (23,402 irrigated acres) – This water body is designated as a major water body and is 303d listed. It was selected as an integrator site for several of the drains and tributaries in the vicinity. The Merced River originates in the high Sierra and flows through the Sierra's encountering several dams and impoundments. The Merced River eventually drains into the San Joaquin River near Hatfield State Park. Upstream agriculture includes some field crops in the immediate vicinity of the river and deciduous nuts, primarily almonds (Table 9).

Dry Creek @ Wellsford Road (12,110 irrigated acres) – This site is in the northern part of the Coalition region and drains a combination of field crops, deciduous nuts, and vineyards (Table 8). Dry Creek drains into the Tuolumne River in Modesto and this site represents the closest accessible location to Modesto that collects agricultural drainage. There appear to be dairies upstream and the town of Waterford may provide some urban signal but the site appears to be sufficiently far from Waterford to be used as a core site.

Ash Slough @ Avenue 21 (21,015 irrigated acres) – This site was used as a monitoring station during the 2004 irrigation season, although lack of flow did not allow samples to be collected. Agriculture upstream includes vineyards, field crops, and deciduous nuts (Table 8). Ash Creek flows just north of Chowchilla but there appears to be a buffer of agricultural land between Ash Slough and Chowchilla. As is true with most sites, there are dairies located upstream.

Prairie Flower Drain @ Crows Landing Road (2,610 irrigated acres) – Several drains exist in the western portion of the Coalition region and we are proposing Prairie Flower Drain as a core monitoring site. Relative to other drains in this part of the Coalition region, Prairie Flower Drain is longer and appears to drain a larger number of parcels of irrigated agriculture (Table 9). Dairies and feedlots are ubiquitous in this part of the Coalition region and this drain may receive runoff from several dairies immediately upstream. Upstream agriculture is field crops.

Cottonwood Creek @ Road 20 (113,424 irrigated acres) – This site is at the very southern edge of the Coalition region in Madera County and the creek drains into the Eastside Bypass (Table 8). The immediate upstream agriculture is vineyards and there are deciduous nuts farther to the east. Unlike other sites, there are few dairies on Cottonwood Creek.

Bear Creek @ Kibby Road (6,279 irrigated acres) – This watershed drains an eastern portion of the coalition region in Merced County. Bear Creek originates in the foothills of the Sierra's with Burn's Creek as one of the major tributaries. The Creek drains to the east just north of the towns of Planada, and eventually flows through Merced and eventually to the San Joaquin River. The primary irrigated agriculture in the watershed includes deciduous nuts, field crops, truck crops, and irrigated pasture (Table 8).

Duck Slough @ Pioneer Road (6,895 irrigated acres) – This site is located upstream of the Duck Slough @ Gurr Road site and was selected to determine relative contribution of water quality impairments in the upstream portion of the Duck Slough watershed. Duck Slough originates in the Sierra foothills and flows west eventually joining with Deadman's Creek in the western portion of the coalition region. The Pioneer Road site is located just east of Highway 99 south of Planada and Merced. Irrigated agriculture in the watershed is primarily deciduous nuts, with truck crops and irrigated pasture the next most common land uses (Table 7).

Highline Canal @ Highway 99 (14,585 irrigated acres not including Highline Canal @ Lombardy Road watershed) – This site was selected as a downstream companion site to the Highline Canal @ Lombardy Road site. Selected for the same reason that the Duck Slough sites were selected, this site allows a determination of the relative contribution of the upstream and downstream watersheds to water quality impairments. The sampling site is located just south of Delhi as the canal crosses the highway. The irrigated agriculture is primarily deciduous nuts, and these are located at the lower end of the watershed. A small number of vineyards are also present (Table 7).

Hilmar Drain @ Central Ave (1,658 irrigated acres) – This site is located toward the western edge of the coalition region near the San Joaquin River. This is a small watershed that is primarily field crops. This watershed also contains a large number of dairies. Hilmar Drain originates at Williams Ave and Washington Road and eventually drains into the San Joaquin River. The primary irrigated agriculture is field crops and irrigated pasture (Table 9).

Jones Drain @ Oakdale Road (2,140 irrigated acres) – This is a small watershed with the primary irrigated agriculture being deciduous nuts, field crops, and irrigated pasture (Table 9). The Jones Drain is located just south of the Merced River and joins with the

Silva Drain and both eventually drain into the Merced River just upstream of the Merced River @ Santa Fe monitoring site.

Dry Creek @ Road 18 (15,448 irrigated acres) – This site was selected for monitoring during the middle of the 2005 irrigation season as a replacement site for Lone Willow Slough. (We learned that growers in the Lone Willow Slough watershed had joined the Westside Coalition.) This Dry Creek originates in the Sierra foothills and flows to the north of the city of Madera eventually draining into the San Joaquin River. Deciduous crops are the primary irrigated agriculture in the upper portion of the watershed, and vineyards predominate in the lower portions of the watershed. There are field crops scattered throughout the watershed (Table87).

Sites and watersheds to be added to the monitoring program in April 2006.

Dutchman Creek @ Highway 59 (22,354 irrigated acres) – Dutchman Creek flows out of the Sierra foothills and confluences with Deadman's Creek in the vicinity of Highway 59. The primary agriculture in the watershed is orchards and row crops, with some irrigated pasture upstream (Table 10, Figure 12).

Silva Drain @ Meadow Drive (476 irrigated acres) – This is a very small watershed that joins with Jones Drain just upstream of the confluence of Jones Drain with the Merced River. The primary agriculture is citrus orchards, with small amounts of field crops and irrigated pasture (Table 10, Figure 11).

Mustang Creek @ East Ave (12,400 irrigated acres) – Mustang Creek forms the headwaters of the Highline Canal. Mustang Creek is ephemeral with flow primarily during winter runoff events. Summer flows are intermittent. Citrus is the main agriculture with smaller amounts of field crops and grains and hay (Table 11, Figure 11).

Mattos Drain @ Range Road (1,130 irrigated acres) – Mattos Drain is located west of the Deanne Drain watershed. The watershed is a small watershed that is composed of irrigated pasture and field crops. The drain eventually empties into Owen's Creek. (Table 10, Figure 12).

Black Rascal Creek @ Kibby Road (1,406 irrigated acres) – Black Rascal Creek is another creek that has its headwaters in the Sierra foothills. It is located just to the north of the Bear Creek watershed and to the east of the city of Merced. Citrus and field crops make up the majority of the agriculture in the watershed (Table 10, Figure 12).

Berenda Slough @ Dairyland Road (19,834 irrigated acres) – Berenda Slough flows through the northern portion of Madera County and empties into the Eastside Bypass. The primary agriculture in the watershed is orchards and vineyards with small amounts of pasture and field crops (Table 11, Figure 13).

Table 7. Acreages of various land use types in the watersheds selected for monitoring. The land uses are designated as irrigated/non-irrigated, and within each watershed, the total length of the hydrologic features in meters is provided as the row labeled hydrology. See text for descriptions of the watersheds.

Land Use	I/NI	Duck Slough @ Gurr Rd.	Duck Slough @ Pioneer Rd.	Highline Canal @ Lombardy	Highline Canal @ Hwy 99
Citrus	I	3,841.0	3,592.8	4,537.6	8,178.2
Deciduous nut and fruit	I				
Field crop	I	5,188.1	1,426.9	1,502.7	2,218.9
Field crop	N				
Grain and hay	I	1,034.7	229.9	605.7	605.7
Grain and hay	N	182.8	177.4	701.3	721.6
Idle	I	653.2	145.9	38.0	122.6
Wild vegetation	N	43,488.3	39,254.2	207.0	236.0
Water surface	N	119.1	53.9		5.0
Pasture	I	4,694.5	1,104.2	1,084.7	1,360.1
Pasture	N	47.5	37.7	306.3	437.5
Rice	I	474.7			
Feedlot, dairy, farmstead	N	591.6	120.5	293.1	413.7
Truck, nursery, berry	I	1,229.5	395.1		212.4
Urban	N	530.4	172.2	130.5	937.8
Golf course, cemetery, landscape	N	2.7		22.4	81.4
Vineyard	I			1,427.3	1,886.7
Total acres		**62,078.3**	**46,710.7**	**10,856.5**	**17,417.6**
Hydrology (m)		74,920.7	31,234.6	40,762.5	48,407.5

Table 8. Acreages of various land use types in the watersheds selected for monitoring during the 2005 dormant and 2005 irrigation seasons.

The land uses are designated as irrigated/non-irrigated, and within each watershed, the total length of the hydrologic features in meters is provided as the row labeled hydrology. See text for descriptions of the watersheds.

Land Use	I/N	Ash Slough @ Ave. 21	Bear Creek @ Kibby Rd.	Cottonwood Creek @ Rd. 20	Dry Creek @ Rd. 18	Dry Creek @ Wellsford Rd
Citrus	I		46.6	1,330.6	234.9	37.1
Deciduous nut and fruit	I	4,535.7	3,403.4	11,139.4	7,594.0	3,048.0
Field crop	I	4,233.9	738.3	5,391.1	899.6	2,498.0
Field crop	N					
Grain and hay	I	1,777.9	144.7	994.1	1,196.8	
Grain and hay	N	586.9		1,144.6		48.6
Idle	I	1,841.3	72.1	1,253.8	719.0	113.6
Wild vegetation	N	23,460.3	164.8	40,942.3	718.8	20,761.4
Water surface	N			419.3	11.9	47.8
Pasture	I	2,906.6	923.0	707.5	414.1	5,692.8
Pasture	N					
Rice	I					248.5
Feedlot, dairy, farmstead	N	204.2	87.9	651.9	357.9	590.0
Truck, nursery, berry	I	193.4	951.3	244.0	17.4	
Urban	N	3,829.6		7,904.9	1,968.3	157.5
Golf course, cemetery, landscape	N	18.2		146.5	28.9	
Vineyard	I	5,526.1		92,363.1	4,372.1	472.3
Total acres		**49,114.1**	**6,531.9**	**164,633.1**	**18,533.5**	**33,715.5**
Hydrology (m)		77,091.7	26,096.0	290,362.4	72,673.9	116,807.2

Table 9. Acreages of various land use types in the watersheds selected for monitoring during the 2005 dormant and 2005 irrigation seasons.

The land uses are designated as irrigated/non-irrigated, and within each watershed, the total length of the hydrologic features in meters is provided as the row labeled hydrology. See text for descriptions of the watersheds.

Land Use	I/N	Hilmar Drain @ Central Ave.	Jones Drain @ Oakdale Rd.	Merced River @ Santa Fe	Prairie Flower Drain @ Crows Landing Rd.
Citrus	I	31.7		45.4	3.8
Deciduous nut and fruit	I		1,209.1	11,903.5	
Field crop	I	1,038.0	289.6	4,749.0	1,558.8
Field crop	N			140.1	
Grain and hay	I			653.7	
Grain and hay	N			86.4	
Idle	I		370.9	141.1	
Wild vegetation	N		88.8	69,891.3	41.2
Water surface	N	13.9		214.2	22.0
Pasture	I	588.0	252.6	3,332.7	1,009.7
Pasture	N			97.1	
Rice	I				
Feedlot, dairy, farmstead	N	178.9	46.9	703.6	337.5
Truck, nursery, berry	I			400.8	37.6
Urban	N		102.0	78.8	26.9
Golf course, cemetery, landscape	N			176.6	
Vineyard	I		17.6	2,176.4	
Total acres		**1,850.5**	**2,377.4**	**94,790.8**	**3,037.4**
Hydrology (m)		5,205.0	6,493.4	162,288.4	9,985.0

Table 10. Acreages of various land use types in the watersheds selected for monitoring during the 2005 dormant and 2005 irrigation seasons.
The land uses are designated as irrigated/non-irrigated, and within each watershed, the total length of the hydrologic features in meters is provided as the row labeled hydrology. See text for descriptions of the watersheds.

	I/N	Dutchman Creek @ Highway 59	Mattos Drain @ Range Rd	Silva Drain @ Meadow Dr	Black Rascal Cr @ Kibby Rd
Citrus	I	38.9		340.7	514.3
Deciduous nut and fruit	I	5,078.1			
Field crop	I	1,145.5	107.9	99.7	642.2
Grain and hay	I	594.0			11.4
Grain and hay	N	78.1			
Idle	I	422.8			
Wild vegetation	N	347.7	672.2	55.5	
Water surface	N	36.4			
Pasture	I	445.0	1,022.2	11.7	82.7
Pasture	N				
Rice	I	100.2			
Feedlot, dairy, farmstead	N	100.2		129.5	12.7
Truck, nursery, berry	I	587.6		24.2	155.6
Urban	N	14.3			
Golf course, cemetery, landscape	N				
Vineyard	I	324.6			
Area outside study area	N				
Total acres		9,313.4	1,802.4	661.3	1,418.9
Irrigated acres		8,736.7	1,130.2	476.3	1,406.2

Table 11. Acreages of various land use types in the watersheds selected for monitoring during the 2005 dormant and 2005 irrigation seasons.

The land uses are designated as irrigated/non-irrigated, and within each watershed, the total length of the hydrologic features in meters is provided as the row labeled hydrology. See text for descriptions of the watersheds.

	I/N	Berenda Sl @ Dairyland Rd	Mustang Creek @ East Ave.
Citrus	I	57.6	4,000.1
Deciduous nut and fruit	I	9,010.0	
Field crop	I	2,738.0	1,790.3
Grain and hay	I	666.9	1,045.2
Grain and hay	N	185.3	
Idle	I	3,258.7	
Wild vegetation	N	20,687.2	193.4
Water surface	N	185.9	5.0
Pasture	I	917.2	320.0
Pasture	N		
Rice	I		
Feedlot, dairy, farmstead	N	485.0	31.1
Truck, nursery, berry	I	7.6	
Urban	N	742.5	
Golf course, cemetery, landscape	N	10.9	
Vineyard	I	3,178.0	5,244.2
Area outside study area	N		
Total acres		42,130.7	12,629.2
Irrigated acres		19,833.9	12,399.7

Sampling Locations

Sampling locations are identified as the downstream point of the watersheds described above. The locations identified by lat/long are provided below in Table 12.

Table 12. Sample site locations starting the 2006 irrigation season.
The first 13 sites have been sampled as part of the Coalition monitoring program currently underway.

Site name	LATITUDE	LONGITUDE
Bear Creek @ Kibby Rd	37.3128	-120.4138
Cottonwood Creek @ Road 20	36.8686	-120.1818
Duck Slough @ Pioneer Road	37.2524	-120.3963
Highline Canal @ Hwy 99	37.4153	-120.7557
Hilmar Drain @ Central Ave	37.3906	-120.9582
Jones Drain @ Oakdale Road	37.4495	-120.6007
Dry Creek @ Road 18	36.8603	-120.3749
Prairie Flower Drain @ Crows Landing Road	37.4422	-121.0024
Ash Slough @ Avenue 21	37.0545	-120.4158
Duck Slough @ Gurr Road	37.2142	-120.5596
Highline Canal @ Lombardy Ave	37.4556	-120.7207
Merced River @ Santa Fe	37.4271	-120.6721
Dry Creek @ Wellsford Road	37.6602	-120.8743
Deadman's Creek @ Gurr Road	37.1936	-120.5612
Dutchman Creek @ Highway 59	37.1981	-120.4869
Mattos Drain @ Range Rd	37.2420	-120.6149
Silva Drain @ Meadow Drive	37.4921	-120.6329
Black Rascal Creek @ Kibby Road	37.3300	-120.4133
Berenda Slough @ Dairyland Road	37.0251	-120.3097
Mustang Creek @ East Ave	37.4918	-120.6839

With the addition of the new monitoring locations, the Coalition will be sampling 11 of the 15 intermediate-sized drainages in the coalition region.

Location Maps of Sample Sites and Watershed Land Use

Maps of all the sample sites and the land use upstream of the sites are provided above in Figures 10-13. The legend for all land uses is provided in Figure 7. See text above for details of the sampling sites and land use.

Table 13. Constituents to be monitored during the three monitoring phases. All constituents that are scheduled to be eliminated from the Phase 2 monitoring will be included in Phase 2 if an exceedance for that constituent was detected during Phase 1 monitoring. Analytical methods for each constituent will be as specified in the Monitoring and Reporting Program Order No. R5-2005-0833 for Coalition Groups Under Resolution No. R5-2003-0105.

Constituent	PQL	Reporting Unit	Monitoring Phase
Physical Parameters			
Flow	1	CFS (Ft^3/Sec)	Phase 1, 2 & 3
PH	0.1	pH units	Phase 1, 2 & 3
Electrical Conductivity	100	μmhos/cm	Phase 1, 2 & 3
Dissolved Oxygen	0.1	mg O_2/L	Phase 1, 2 & 3
Temperature	0.1	Degrees Celsius	Phase 1, 2 & 3
Color	5	Color Unit	Phase 1, 2 & 3
Turbidity	1	NTUs	Phase 1, 2 & 3
Total Dissolved Solids	10	mg/L	Phase 1, 2 & 3
Total Organic Carbon	0.5	ug/L	Phase 1, 2 & 3
Drinking Water			
E. Coli	2	MPN/100ml	Phase 1
Toxicity [a]			
Water Column Toxicity			Phase 1 & 3
Algae	NA	% reduction	
Cerio/Pimophales	NA	% survival	
Sediment Toxicity	NA	% survival	
Pesticides			
Carbamates			Phase 2 (Phase 3) ©
Aldicarb	0.5	ug/L	
Carbaryl	0.5	ug/L	
Carbofuran	0.5	ug/L	
Methiocarb	0.5	ug/L	
Methomyl	0.5	ug/L	
Oxamyl	0.5	ug/L	
Organochlorines			Phase 2 (Phase 3) ©
DDD	0.02	ug/L	
DDE	0.01	ug/L	
DDT	0.01	ug/L	
Dicofol	0.1	ug/L	
Dieldrin	0.01	ug/L	
Endrin	0.01	ug/L	
Methoxychlor	0.05	ug/L	
Organophosphorus			Phase 2 (Phase 3) ©
Azinphos-methyl	0.1	ug/L	
Chlorpyrifos	0.02	ug/L	
Diazinon	0.02	ug/L	
Dimethoate	0.1	ug/L	

Disulfoton	0.1	ug/L	
Malathion	0.1	ug/L	
Methamidophos	0.2	ug/L	
Methidathion	0.1	ug/L	
Parathion-methyl	0.1	ug/L	
Phorate	0.2	ug/L	
Phosmet	0.2	ug/L	
Pyrethroids			Phase 2 (Phase 3) ©
Bifenthrin	0.05	ug/L	
Cyfluthrin	0.05	ug/L	
Cypermethrin	0.05	ug/L	
Esfenvalerate	0.05	ug/L	
Lambda-cyhalothrin	0.05	ug/L	
Permethrin	0.05	ug/L	
Herbicides			Phase 2 (Phase 3) ©
Atrazine	0.5	ug/L	
Cyanazine	0.5	ug/L	
Diuron	0.5	ug/L	
Glyphosate	5	ug/L	
Linuron	0.5	ug/L	
Molinate	0.5	ug/L	
Paraquat dichloride	0.5	ug/L	
Simazine	0.5	ug/L	
Thiobencarb	0.5	ug/L	
Metals [(a)]			Phase 2 (Phase 3) ©
Cadmium	0.1	ug/L	
Copper	0.5	ug/L	
Lead	0.5	ug/L	
Nickel	1	ug/L	
Zinc	1	ug/L	
Selenium	1	ug/L	
Arsenic	1	ug/L	
Boron	10	ug/L	
Nutrients			Phase 2 (Phase 3) ©
Total Kjeldahl Nitrogen	500	ug/L	
Nitrate as NO3	50	ug/L	
Nitrite as Nitrogen	50	ug/L	
Ammonia	100	ug/L	
Hardness	10,000	ug/L	
Total Phosphorus	10	ug/L	
Soluble Orthophosphate	10	ug/L	

[(a)] In addition to TIEs, sites identified as toxic in the initial screen shall be re-sampled to estimate the duration of the toxicant in the waterbody. Additional samples upstream of the original site may also be collected to determine the potential source(s) of the toxicant in the watershed.
[(b)] Quantitation limits must be lower than LC50 or other applicable federal or state toxic or risk limits.
© Pesticides, metals and/or nutrients suspected in causing toxicity will be monitored in Phase 3.

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Table 14. Parameters to be monitored at each location starting in the 2006 irrigation season. An * indicates a new site.

Site Name	Field Parameters	Metals	Nutrients	Physical Parameters	E. coli	WCT	Sed Toxicity
Ash Slough @ Avenue 21	x	x	x	x	x		
Bear Creek @ Kibby Rd	x	x	x	x	x	x	
Cottonwood Creek @ Road 20	x	x	x	x	x		x
Dry Creek @ Wellsford Road	x	x	x	x	x	x	x
Dry Creek @ Road 18	x	x	x	x	x		
Duck Slough @ Gurr Road	x	x	x	x	x	x	x
Duck Slough @ Pioneer Road	x	x	x	x	x	x	
Highline Canal @ Hwy 99	x	x	x	x		x	x
Highline Canal @ Lombardy Ave	x	x	x	x	x	x	x
Hilmar Drain @ Central Ave	x	x	x	x	x	x	x
Jones Drain @ Oakdale Road	x	x	x	x	x	x	
Merced River @ Santa Fe	x	x	x	x		x	
Prairie Flower Drain @ Crows Landing Road	x	x	x	x			x
Dutchman Creek @ Highway 59*	x			x	x	x	x
Silva Drain @ Meadow Drive*	x			x	x	x	x
Mustang Creek @ East Ave*	x			x	x	x	x
Mattos Drain @ Range Road*	x			x	x	x	x
Black Rascal Creek @ Kibby Road*	x			x	x	x	x
Berenda Slough @ Dairyland Road*	x			x	x	x	x

Table 15. Parameters to be monitored at each location starting in the 2006 irrigation season. An * indicates a new site.

Site Name	OP	Pyrethroids	OC	Carbamates	Herbicides
Ash Slough @ Avenue 21	x		x	x	x
Bear Creek @ Kibby Rd			x	x	x
Cottonwood Creek @ Road 20			x	x	x
Dry Creek @ Wellsford Road	x		x	x	x
Dry Creek @ Road 18			x	x	x
Duck Slough @ Gurr Road			x	x	x
Duck Slough @ Pioneer Road	x		x	x	x
Highline Canal @ Hwy 99			x	x	x
Highline Canal @ Lombardy Ave			x	x	x
Hilmar Drain @ Central Ave			x	x	x
Jones Drain @ Oakdale Road			x	x	x
Merced River @ Santa Fe			x	x	x
Prairie Flower Drain @ Crows Landing Road	x		x	x	x
Dutchman Creek @ Highway 59*	x	x			
Silva Drain @ Meadow Drive*	x	x			
Mustang Creek @ East Ave*	x	x			
Mattos Drain @ Range Road*	x	x			
Black Rascal Creek @ Kibby Road*	x	x			
Berenda Slough @ Dairyland Road*	x	x			

Field Parameters: temperature, DO, EC, pH, Discharge (Velocity)
Physical Parameters: color, turbidity, TDS, TSS
OP – Organophosphates
OC – organochlorine pesticides
WCT (Water Column Toxicity): *Ceriodaphnia dubia*, *Pimephales promelas*, *Selenastrum capricornutum*
Sed (Sediment) Toxicity: *Hyalella azteca*

QAPP AND MONITORING PROTOCOLS

The Quality Assurance Program Plan is to be submitted as a separate document later in the spring, but prior to the initiation of sampling in the 2006 irrigation season. Specifically, because the QAPP must include a list of monitoring sites and constituents, we are requesting that the Regional Board provide the Coalition with written approval of the proposed sites and constituents.

Monitoring protocols

Full descriptions of the sampling protocols with Standard Operating Procedures for all measurements and the analytical procedures with their SOPs will be provided in the QAPP. Below we provide a brief description of the monitoring triggers and reporting triggers.

Storm season sampling protocol

During the storm season, the primary concern is the mobilization and movement of soluble constituents in storm water runoff during and following winter rains. These constituents can move from locations where applications take place to water bodies within the Coalition's area.

Sampling will be initiated during a storm event when a 0.30"- 0.50" rain is forecast for the Coalition area. Note that this is a change from the previous MRPP which indicated that a storm of at least 0.50" was necessary for sampling to be initiated. The change is a function of conditions in the latter portion of the winter often generating runoff with smaller storms. However, early in the season or after long periods without rainfall, the 0.05" criterion is required. County Agricultural Commissioners will be consulted to confirm the initiation of pesticide applications. A single grab sample for each constituent will be collected from each storm event according to the protocols specified in the Quality Assurance Program Plan QAPP to be submitted later. Sampling will be conducted to collect water during or shortly after the peak of the hydrograph. Sampling is to begin anywhere from 15 to 60 hours after the initiation of the storm event. Examination of several hydrographs from storms in the Coalition area from the last two years suggests that the timing of the peak of the hydrograph varies according to total rainfall, rainfall intensity, soils, and antecedent conditions.

During the initial sampling, field probes and meters will be used to collect standard water quality data in the field and water will be collected for laboratory analysis of total organic carbon, *E. coli*, color, turbidity, total dissolved solids, total suspended solids, and water column toxicity. Acute toxicity testing will be conducted using the invertebrate, *Ceriodaphnia dubia*, and the larval fathead minnow, *Pimephales promelas*, according to standard USEPA acute toxicity test methods[1]. In addition, 96-hr chronic toxicity tests with the green algae *Selenastrum capricornutum*, will be conducted[2]. The water column toxicity testing will be used as an indicator of toxicity to resident biota from constituents that are water-soluble. If toxicity testing indicates significant toxicity is present, a second sample will be collected from the site and a second set of toxicity tests initiated. Water will also be collected in sufficient quantity to perform a Phase I Toxicity Identification Evaluations (TIE). The Phase I TIE, the TIE will be initiated only if mortality of the sample organism is greater than or equal to 50% relative to the controls. The Phase I TIE[3] will be conducted to determine the general class (i.e., metals, non-polar organics such as pesticides, surfactants, etc.) of chemical causing toxicity. Regardless of the level of significance in the second toxicity test, if the first test (original sample) is statistically significant, an exceedance of the water quality objective will be reported. Sediment toxicity testing will be performed once during the dormant season using the invertebrate species *Hyalella azteca* according to USEPA methods[4]. All statistically significant results will trigger an Exceedance Report to the CVRWQCB, and all data will be entered into a database that is compatible with the Statewide Ambient Monitoring Program Database (SWAMP).

In accordance with the August 15, 2005 MRP, any evidence of statistically significant toxicity or the identification of a specific chemical constituent in surface water in exceedance of an established water quality standard will trigger an Exceedance Report to the Central Valley Regional Water Quality Control Board (CVRWQCB). The Exceedance Report will be submitted to the CVRWQCB in the form of an email and will be submitted within 1 day following sampling or of the receipt of results. Exceedances involving field parameters will be reported within 1 day after sampling, and all exceedances of constituents analyzed by the laboratories (toxicity, drinking water parameters, and physical/chemical constituents) will be reported 1 day following receipt of the results from the laboratory.

In accordance with the August 15, 2005 MRP Order No. R5-2005-0833, for any constituent for which an Exceedance Report is submitted, a Communication Report will be submitted 45 business days following submission of the Exceedance Report. Each Communication Report will include a description of the follow-up monitoring and analyses that were conducted, actions taken to identify the sources of the exceedance(s), complete analytical results if available (if not available, a time schedule for delivery of the analytical results will be provided), and time schedules for delivery of the Management Practices Effectiveness information and the Evaluation Report.

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[1] USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. Office of Water, Washington, D.C. EPA-821-R-02-012.
[2] USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-013.
[3] USEPA. 1998. Methods for Aquatic Toxicity Identification Evaluations. Phase I Toxicity Characterization Procedures. Office of Research and Development, Duluth, MN. EPA-600-3-88-034.
[4] USEPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Office of Research and Development, Washington, D.C. EPA-600-R-94-024.

Evaluation Report

In accordance with the time schedule established in the Communication Report, an Evaluation Report will be submitted. The Evaluation Report will include a description of the management practice(s) implemented and the chemicals/constituents targeted by the management practice(s), the reasons for implementing the specific practice(s), the methodology employed to evaluate the effectiveness of the practice(s), and the involvement of the stakeholders in evaluating the practice(s).

Irrigation season sampling

Irrigation season sampling will be conducted monthly from early April through September provided there is measurable flow at a site. All parameters measured during the winter runoff sampling will be included in the irrigation season sampling. Sediment toxicity tests will be performed once during the irrigation season. No TIEs are proposed for sediment toxicity even if the result of the toxicity test indicates significant toxicity. All triggers for reporting are as previously described.

Quality Assurance Program Plan

The QAPP will be provided after the Coalition received approval of the monitoring sites and constituents as outlined in this MRPP.

Monitoring Protocols - Sample Collection Methods

Monitoring protocols are outlined in the QAPP, which will be submitted at a later date.

Laboratory Quality Assurance Manual

Laboratory QAPPs and SOPs will be submitted with the full QAPP.

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