Results of the 2006 TMDL Monitoring of Selected Pesticides During Irrigation Season in California's Central Valley Waterways

March - August 2006

Prepared by

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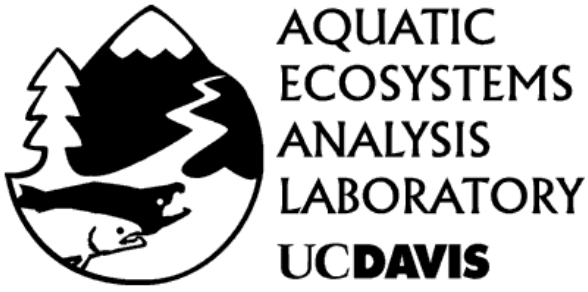
December 2006



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Glossary

AEAL:	Aquatic Ecosystems Analysis Laboratory
CDEC:	California Data Exchange Center
CDFA:	California Department of Food and Agriculture
CDFG:	California Department of Fish and Game
COC:	Chain of Custody
CVRWQCB:	Central Valley Regional Water Quality Control Board
DWR:	California Department of Water Resources
EC:	Electrical Conductivity
FB:	Field Blank
FD:	Field Duplicate
GC-FPD:	Gas Chromatography – Flame Photometric Detector
GC-MSMS:	Gas Chromatography – Tandem Mass Spectrometry
LC-MS:	Liquid Chromatography – Mass Spectrometry
LCS:	Lab Control Spike
LCSD:	Lab Control Spike Duplicate
MDL:	Method Detection Limits
MS:	Matrix Spike
MSD:	Matrix Spike Duplicate
PQL:	Practical Quantitation Limit
PTFE:	Polytetrafluoroethylene
QA:	Quality Assurance
QAO:	Quality Assurance Objective
QAPP:	Quality Assurance Project Plan
QC:	Quality Control
RL:	Reporting Limit
RPD:	Relative Percent Difference
TMDL:	Total Maximum Daily Load
USGS:	United States Geological Survey
WPCL:	Water Pollution Control Laboratory (the CDFG analytical lab)
WQO:	Water Quality Objective

Introduction

This report describes the results of pesticide monitoring at 19 locations in 17 waterways of California's Sacramento and San Joaquin valleys associated with irrigation runoff that occurred during the months of March - August, 2006. The river loading rates of diazinon and chlorpyrifos were also calculated at sites where discharge data was available. Monitoring was conducted by staff of the Aquatic Ecosystems Analysis Laboratory (AEAL) of the John Muir Institute of the Environment, University of California, Davis, as authorized under Contract No. 02-210-150 from the Central Valley Regional Water Quality Control Board (CVRWQCB).

Objective

The primary objective of this project was to monitor 19 sites in the southern Sacramento and northern San Joaquin River basins during the 2006 irrigation season to characterize the sources of diazinon, chlorpyrifos and other pesticides that can cause surface water contamination and toxic conditions to aquatic life. The results of this study will be used to support the development and implementation of pesticide Total Maximum Daily Loads (TMDLs) in the Sacramento and San Joaquin basins.

Monitoring Overview

Four sites (Figure 1, Table 1) in the southern Sacramento basin and four sites in the East Stockton area (Figure 2, Table 2) were monitored for selected organophosphate and carbamate pesticides every other week between March 14 and April 25, 2006 for a total of four times each. The same eight sites were monitored for selected herbicides once per week for four weeks from July 5-27, 2006.

Five sites in the Sacramento basin were monitored for selected herbicides once per week for eight consecutive weeks between May 23 and July 11, 2006 (Figure 3, Table 3).

Four sites in the northern San Joaquin basin were monitored for selected organophosphate pesticides once per week for four weeks from March 7-27, 2006 and then once a week for nine consecutive weeks from July 6 – August 31, 2006 (Figure 4, Table 4). Two additional sites on the San Joaquin River (at Patterson and at Lander Avenue) were sampled on alternate weeks during the same time periods (Figure 4, Table 4). No sampling was conducted in the San Joaquin basin during the months of April through late-June, because previous monitoring

results, and the California Department of Pesticide Regulation pesticide use records, indicate that relatively little diazinon and chlorpyrifos are applied to crops in the northern San Joaquin Basin during these months.

The measured field parameters included pH, water temperature and electrical conductivity (EC). Discharge measurements for selected sites were obtained from U.S. Geological Survey (USGS) and California Department of Water Resources (DWR) data (Table 5) available on the internet. All samples were delivered to the California Department of Fish and Game's Water Pollution Control Laboratory (WPCL) in Rancho Cordova for chemical analysis except for the samples collected in the northern San Joaquin basin during the period March 7-27, 2006; those samples were delivered to the California Department of Food and Agriculture (CDFA) laboratory in Sacramento, California.

Tables 6 and 7 list the chemical compounds analyzed for by each lab, method detection limits, reporting limits and analytical methods used. Table 8 lists the quality assurance objectives for data collected during this study. Tables of results including concentrations of detected pesticides, detection frequencies, water quality parameters measured at time of sample collection, and both field and laboratory quality control results are found in Appendix I . Details of the monitoring plans can be found in the documents: *Monitoring Plan for Diazinon and Chlorpyrifos TMDL Compliance and Characterization of Usage for Selected other Pesticides in the Sacramento and San Joaquin River Basins and the Sacramento-San Joaquin Delta 2006* (Calanchini, 2006b) and *TMDL Monitoring Plan San Joaquin River Basin 2006* (Calanchini 2006c) both available on the CVRWQCB website at: http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#wqstudies

Figure 1. The four sites in the Sacramento Basin monitored for pesticides in March, April and July 2006.

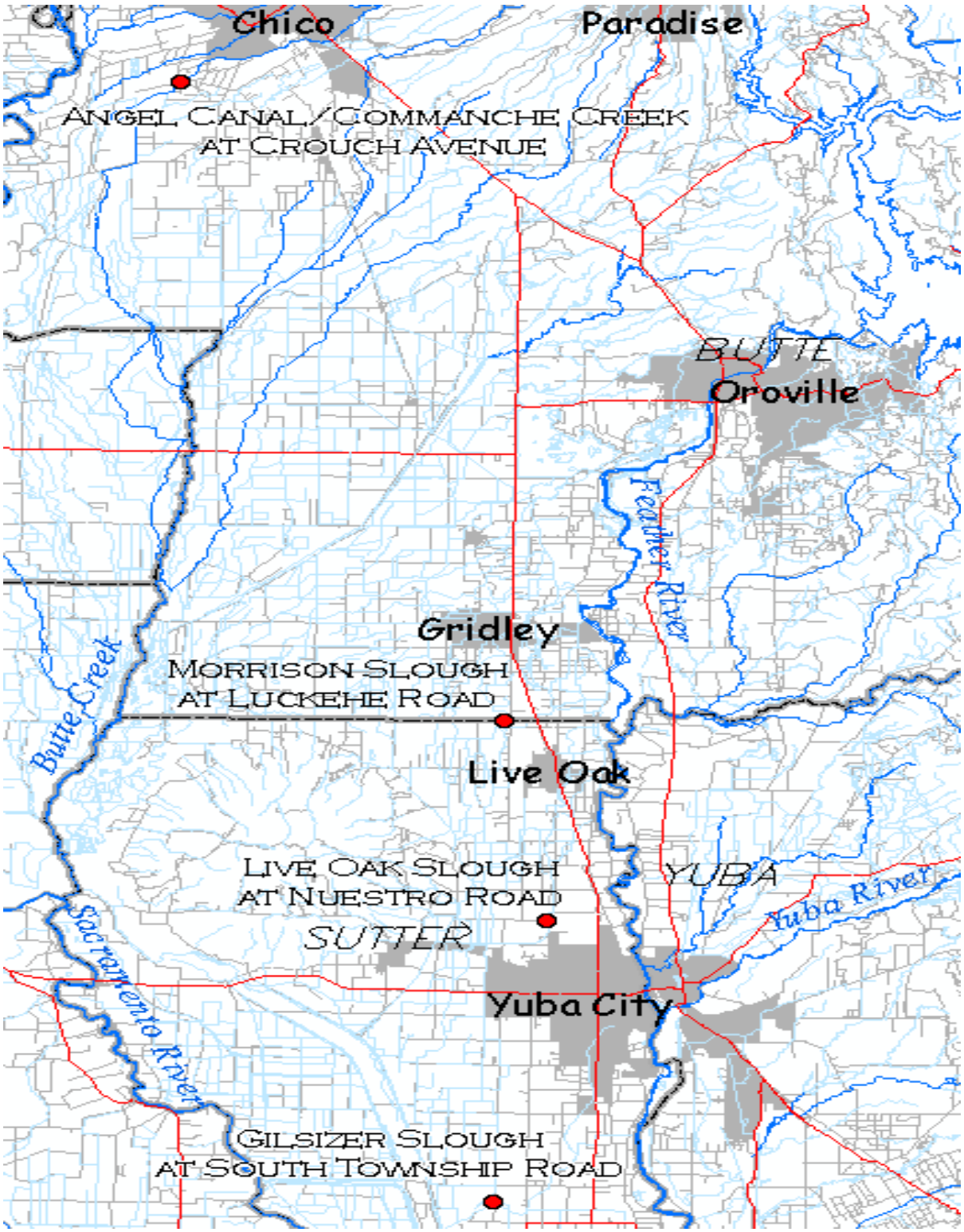


Figure 2. The four sites in the East Stockton area monitored for pesticides in March, April and July 2006.

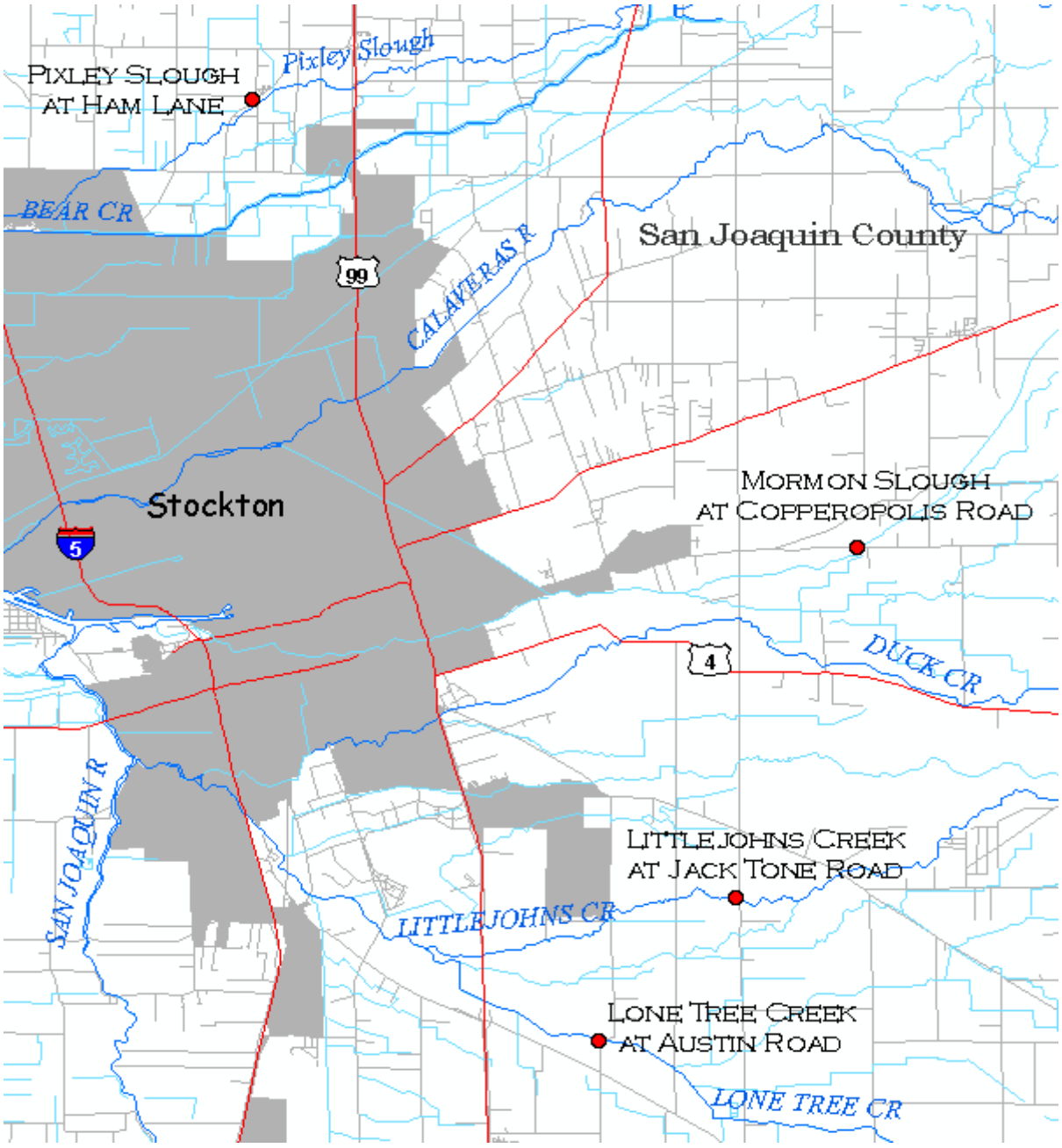


Figure 3. The four sites in the Sacramento Basin monitored for herbicides in May, June and July 2006.

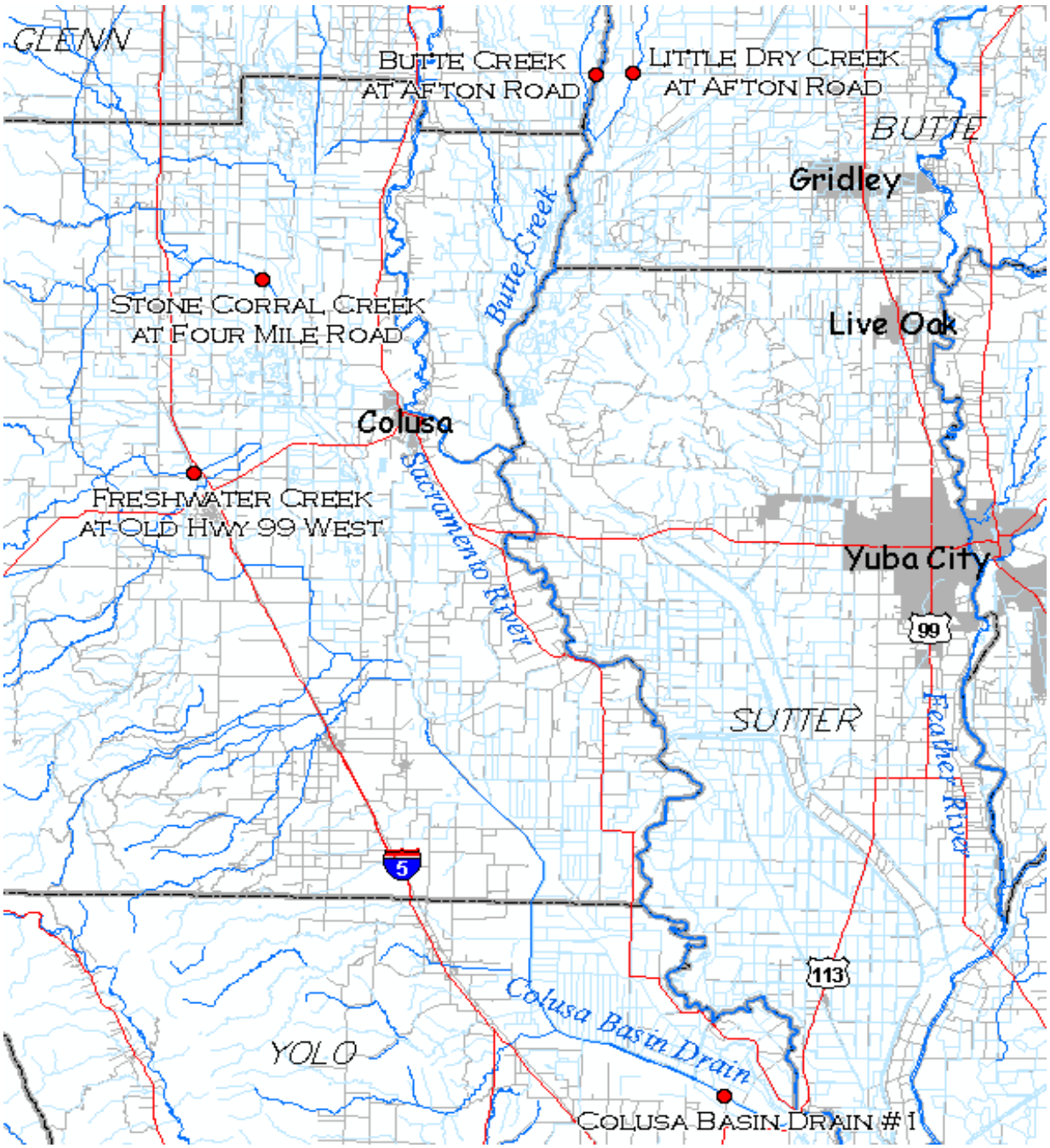


Figure 4. The six sites in the San Joaquin Basin monitored for pesticides in March, July and August 2006.

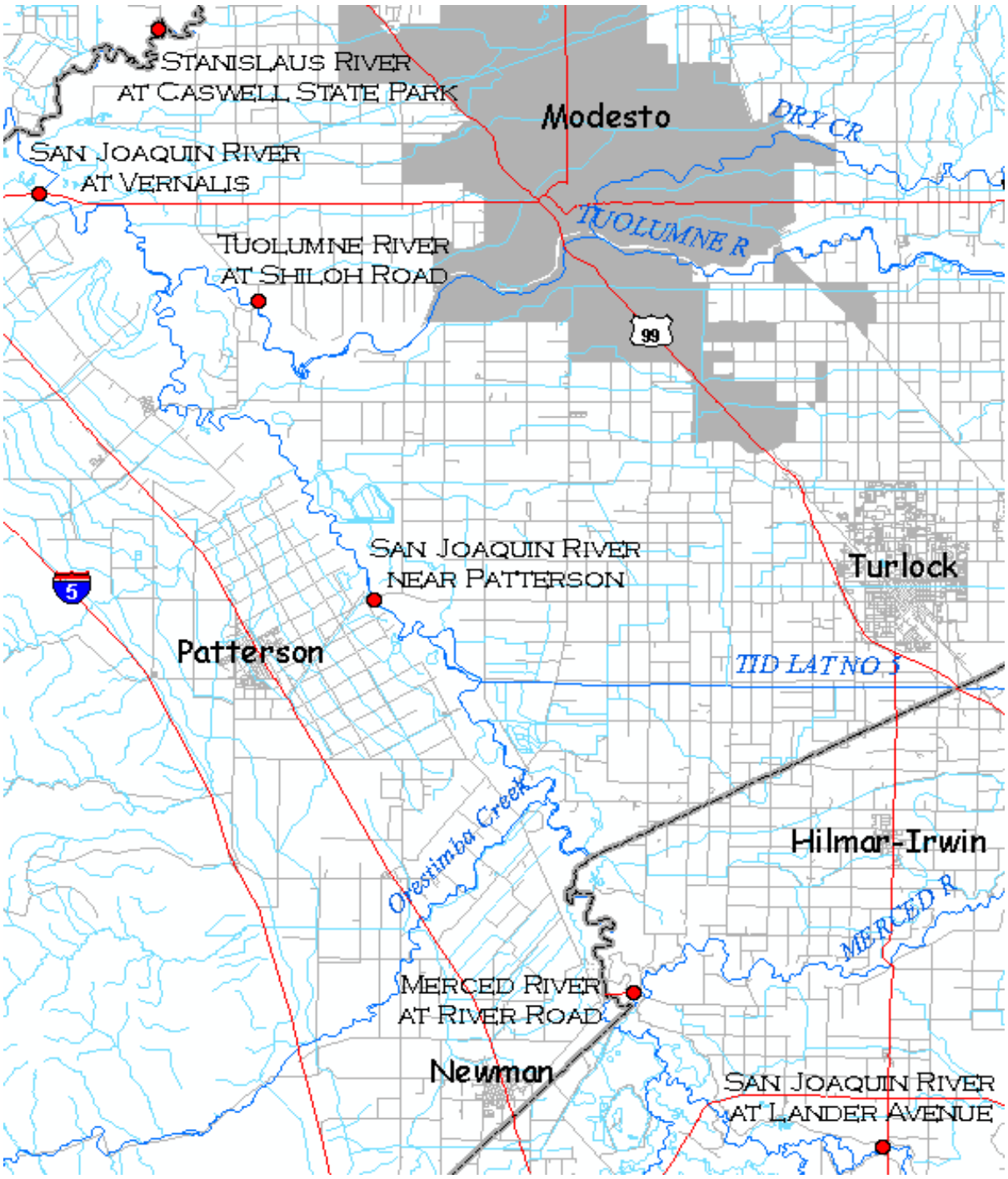


Table 1. Pesticide monitoring sites in the Sacramento Basin, collection methods and sampling dates

Site Name	Sample Collection Method	Sampling Dates
Gilsizer Slough at South Township Road	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 5, 12, 19 & 26, 2006
Live Oak Slough at Nuestro Road	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 5, 12, 19 & 26, 2006
Morrison Slough at Luckehe Road	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 5, 12, 19 & 26, 2006
Angel Canal/Comanche Creek at Crouch Avenue	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 5, 12, 19 & 26, 2006

Table 2. Pesticide monitoring sites in the east Stockton area, collection methods and sampling dates

Site Name	Sample Collection Method	Sampling Dates
Pixley Slough at Ham Lane	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 6, 13, 20 & 27, 2006
Mormon Slough at Copperopolis Road	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 6, 13, 20 & 27, 2006
Littlejohns Creek at Jack Tone Road	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 6, 13, 20 & 27, 2006
Lone Tree Creek at Austin Road	Grab from bank	March 14 & 28, 2006 April 11 & 25, 2006 July 6, 13, 20 & 27, 2006

Table 3. Herbicide monitoring sites in the Sacramento Basin, collection methods and sampling dates

Site Name	Sample Collection Method	Sampling Dates
Colusa Basin Drain #1	Integrated grab from bridge	May 23 & May 30, 2006 June 6, 13, 20, & 27, 2006 July 3 & 11, 2006
Little Dry Creek at Afton Road	Grab from bank	May 23 & May 30, 2006 June 6, 13, 20, & 27, 2006 July 3 & 11, 2006
Butte Creek at Afton Road	Integrated grab from bridge	May 23 & May 30, 2006 June 6, 13, 20, & 27, 2006 July 3 & 11, 2006
Stone Corral Creek at Four Mile Road	Grab from bank	May 23 & May 30, 2006 June 6, 13, 20, & 27, 2006 July 3 & 11, 2006
Freshwater Creek at Old Hwy 99	Grab from bank	May 23 & May 30, 2006 June 6, 13, 20, & 27, 2006 July 3 & 11, 2006

Table 4. Pesticide monitoring sites in the San Joaquin Basin, collection methods and sampling dates

Site Name	Sample Collection Method	Sampling Dates
Merced River at River Road	Integrated grab from bridge	March 7, 13, 20 & 27, 2006 July 6, 13, 20, & 27, 2006 August 3, 10, 17, 24 & 31, 2006
Tuolumne River at Shiloh Road	Integrated grab from bridge	March 7, 13, 20 & 27, 2006 July 6, 13, 20, & 27, 2006 August 3, 10, 17, 24 & 31, 2006
San Joaquin River at Vernalis	Integrated grab from bridge	March 7, 13, 20 & 27, 2006 July 6, 13, 20, & 27, 2006 August 3, 10, 17, 24 & 31, 2006
Stanislaus River at Caswell State Park	Grab from bank	March 7, 13, 20 & 27, 2006 July 6, 13, 20, & 27, 2006 August 3, 10, 17, 24 & 31, 2006
San Joaquin River at Lander Avenue	Grab from bank	March 13 & 27, 2006 July 13 & 27, 2006 August 10 & 24, 2006
San Joaquin River at Patterson	Grab from bank	March 7 & 20, 2006 July 6 & 20, 2006 August 3, 17 & 31, 2006

Environmental Sample Collection Methods

Sample collection, analysis and quality control procedures were performed under the guidance of the Quality Assurance Project Plan (Calanchini, 2006a) available at: http://www.waterboards.ca.gov/centralvalley/available_documents/waterqualitystudies/Sac-Delta_TMDL_QAPP.pdf

All samples were collected by either grab or integrated grab method (Tables 1-4). Grab samples were collected by harnessing a 1-liter amber glass bottle to a pole sampler and dipping the bottle into the stream as close to the center of the channel as possible.

Integrated grab samples were collected by lowering a 3-liter PTFE (polytetrafluoroethylene) bottle, strapped in a weighted cage, from a bridge at three equally spaced verticals. At each vertical the bottle was filled approximately ¼ full. The composite sample was then thoroughly agitated and poured into a 1-liter amber glass sample bottle.

Quality Control Sample Collection Methods

Quality control (QC) samples were collected at the approximate rate of 20 QCs for every 100 environmental samples. Quality control samples included field duplicates, field blanks, matrix spikes and matrix spike duplicates. Field blanks collected with the 3-liter PTFE bottle also served as equipment blanks because the same stringent cleaning procedure was applied to the 3-liter PTFE collection bottle for each sample taken. The 3-liter PTFE bottle cleaning procedure can be found in Appendix 3 of the QAPP (Calanchini, 2006a).

Water collected for duplicate samples using the 3-liter PTFE bottle was split into two 1-liter bottles. For duplicate samples collected using a 1-liter bottle, two bottles were attached to the pole sampler and filled at the same time.

Field blanks were filled with organic-free (deionized) water obtained from the AEAL laboratory. When using the 3-liter bottle for sampling, the cleaned bottle was filled with organic-free water, which was then poured into a 1-liter bottle as a field blank. When using the 1-liter bottle, a clean bottle was filled directly with the organic-free water.

The matrix spike and matrix spike duplicate samples were collected in the same manner as the duplicate samples. The spike mixture was added to the matrix spike samples at the analytical lab.

Sample Transport and Delivery

All field samples, including QC samples, were placed into a cooler with ice to maintain the temperature at approximately 4°C during handling and transport to the lab. In general, samples were delivered to the lab on the sampling day. If the samples could not be transported to the lab on the sampling day they were stored in coolers with sufficient ice to maintain the sample preservation temperature and delivered to the lab on the following day. All samples were delivered under chain-of-custody (COC) protocol, as outlined in the QAPP (Calanchini, 2006a).

Discharge Sources, Methods and Stream Drainage Characteristics

Discharge estimates were only available for the rivers monitored in the San Joaquin Basin; monitored streams in the Sacramento Basin and East Stockton area had no discharge gages at or near the monitoring sites. Discharge estimates were obtained from USGS and DWR gages listed on the California Data Exchange Center (CDEC) website: http://cdec.water.ca.gov/ At sites where discharge gages were not present, discharge values from the nearest gage on the same stream were used. An explanation of the discharge source and characteristics of the stream drainage are listed below for each site in the San Joaquin Basin.

Merced River at River Road – Data for this site were obtained from the CDEC gage MST (Merced River at Stevinson) located approximately 3.68 miles upstream. The gage elevation is 59 feet and the sample site elevation is 53 feet. The low gradient (6 feet over 3.68 miles) and the size of the river allowed us to make the assumption that the river rises fairly uniformly under normal conditions, therefore, flow data from the MST gage were used unadjusted. There is one semi-permanent stream between the sample site and the discharge gage. Flows are unknown for this stream and were assumed to be negligible. The river flows through an urban area near Livingston about 20 miles upstream from the sample site.

Tuolumne River at Shiloh Road - The CDEC gage MOD (Tuolumne River at Modesto) was used to obtain discharge measurements for the sampling site. There are no other suitable gages for making any kind of distance-weighted hydrograph, so the data were used as presented on the CDEC website. There are significant urban areas upstream, including Modesto and Waterford. Since we did not measure discharge at this site, and no other measures were taken to

determine the applicability of the MOD discharge data, we cannot draw any conclusions about the accuracy of the discharge estimates.

San Joaquin River at Vernalis – USGS and DWR jointly operated discharge station 11303500 (San Joaquin River near Vernalis) was used for this site. The sampling site and gage are both located at the Durham Ferry highway bridge. Data were used unadjusted from the CDEC website. This location is approximately 2.6 miles downstream of the confluence with the Stanislaus River. The drainage area is approximately 13,536 mi^2 and also incorporates the flows of the Merced and Tuolumne rivers, Orestimba Creek, Del Puerto Creek, Dry Creek and Salt Slough.

Stanislaus River at Caswell State Park - Discharge was obtained from USGS gage 11303000 on the Stanislaus River near Ripon, approximately eight miles upstream of the sampling site. The CDEC data were used unadjusted from the Ripon station. The river flows through an urban area at Ripon and through several urban areas upstream of Ripon.

San Joaquin River at Lander Avenue - Discharge was obtained from the California Department of Water Resources gage (CDEC id: SJS) located at the sampling site approximately 2.25 miles south of Stevinson. There are no significant urban influences within 10 miles of the site. The CDEC data were used unadjusted.

San Joaquin River at Patterson - Discharge was obtained from the California Department of Water Resources gage (CDEC id: SJP) located at the sampling site approximately three miles northeast of Patterson. There are no significant urban influences upstream of the site. The CDEC data were used unadjusted.

Table 5. Sampling Sites Discharge Sources

Site Discharge Information					
Site Name	**USGS ID #**	**CDEC ID #**	**Agency**	**Lat**	**Long**
Merced River at River Road	---	MST	DWR	37°22'16"	120°55'52"
Tuolumne River at Shiloh Road	11290000	MOD	USGS/DWR	37°37'38"	120°59'11"
San Joaquin River at Vernalis	11303500	VNS	USGS	37°40'01"	121°16'01"
Stanislaus River at Caswell State Park	11303000	RIP	USGS	37°43'48"	121°06'32"
San Joaquin River at Lander Avenue		SJS	DWR	37°17'42"	120°51'04"
San Joaquin River at Patterson		SJP	DWR	37°29'38"	121°04'51"

Analytical Labs

Samples collected in the San Joaquin Basin in March 2006 were analyzed at the California Department of Food and Agriculture's (CDFA) Center for Analytical Chemistry in Sacramento. Samples collected in the San Joaquin Basin in July and August 2006, and all samples collected in the Sacramento Basin and East Stockton area, were analyzed at the California Department of Fish and Game's (CDFG) Water Pollution Control Laboratory in Rancho Cordova.

CDFA Laboratory Analysis Methods

Upon arrival at the CDFA laboratory, samples were weighed and recorded. Each sample was spiked with 500µL of surrogate spiking solution composed of 0.25µg/mL chlorpyrifos methyl. Matrix spikes were spiked with 500µL of appropriate spiking solution. Approximately 500ml of the sample was emptied into a 2-liter size separatory funnel. The sample bottle was weighed and recorded and approximately 10-15g of granular sodium chloride added. The sample was gently shaken to dissolve salt. The following steps, listed in parentheses, were then repeated three times in succession: (60ml of methylene chloride were added and the sample was mixed thoroughly for three minutes. After mixing the sample was allowed to settle until the lower methylene chloride layer was completely separated from the above water layer. The organic fraction was filtered through a bed of granular anhydrous sodium sulfate (approx. 20g) into a 250ml round bottom flask). The round bottom flask was then placed on a Rotavapor evaporator and the resultant sample evaporated to 5-7 ml at 40° C. The contents of the round bottom flask were then transferred to a 15ml collection tube. The round bottom flask was rinsed with 5ml of methylene chloride and the rinse was added to the collection tube. The 15ml collection tube was placed on the N-Evaporator with the water temperature set at 40° C and the sample was evaporated until just reaching dryness. The sample was removed from the evaporator and added to a test tube containing 0.5ml of methylene chloride and 5.0µL of 5.0µg/mL internal standard solution. The contents of the test tube where then mixed with a vortex and transferred into an autosampler vial. The vial was capped and stored in a -5° C freezer until ready for analysis.

Samples were analyzed with an Agilent Model 5973 GC-MSD using a HP-5MS or equivalent GC column. Analysis was performed in the selective ion-monitoring mode.

Twelve compounds were analyzed for each sample (Table 6). The Reporting Limit (RL) and Method Detection Limit (MDL) for each compound are listed in Table 6. The lab reported estimated values when the values were below the RL but above the MDL. To ensure the accuracy and precision of the sample analysis, lab spikes, blanks, and a surrogate standard (chlorpyrifos methyl) were used. If the recovery of a spike sample was out of the control range, the water sample was re-analyzed.

WPCL Laboratory Analysis Methods

Chemical analyses were performed by the California Department of Fish and Game's Fish and Wildlife Water Pollution Control Laboratory. Water samples were analyzed for selected organophosphates, carbamates, and herbicides using the following methods: Gas Chromatography – Flame Photometric Detector (GC-FPD), Liquid Chromatography – Mass Spectrometry (LC-MS), and Gas Chromatography – Tandem Mass Spectrometry (GC-MSMS). Analytes, Method Detection Limits (MDL) and Reporting Limits (RL) for each compound are shown in Table 7. Summaries of the methods used are provided below.

Organophosphorous Pesticides in Water Analysis:

A measured volume of sample (1000 ml) was extracted with methylene chloride (DCM) using a separatory funnel. The DCM extract was dried with sodium sulfate, evaporated using Kuderna-Danish (K-D) and solvent exchanged into petroleum ether. The extract was concentrated with micro-snyder (micro K-D) apparatus to approximately 1 ml and adjusted to 2.0 ml with iso-octane. The extracts were analyzed by gas chromatography using conditions which permitted the separation and measurement of the target analytes in the extracts by flame photometric detection (FPD) and Thermionic Specific Detector (TSD) detection.

Carbamate Pesticides in Water Analysis:

A measured volume of sample (1000 ml) was extracted with methylene chloride (DCM) using a separatory funnel. The DCM extract was dried with sodium sulfate, concentrated and solvent exchanged by rotary evaporation and adjusted to 2.0 ml with acetonitrile. The extracts were analyzed by liquid chromatography using conditions which permitted the separation and measurement of the target analytes in the extracts by MS detection.

Selected Herbicides in Water Analysis

A measured volume of sample (1000 ml) was extracted with methylene chloride (DCM) using a separatory funnel. The DCM extract is dried with sodium sulfate, evaporated using Kuderna-Danish (K-D), and solvent exchanged into petroleum ether. The extract is concentrated with a micro-Snyder (micro K-D) apparatus to approximately 1 ml and adjusted to 2.0 ml with iso-octane. The extracts are analyzed by gas chromatography using conditions which permit the separation and measurement of the target analytes in the extracts by GC-MSMS.

Diquat and Paraquat in Water Analysis

The analytical method is explained in Appendix II.

Table 6. CDFA Laboratory method detection limits (MDL) and target reporting limits (RL) for select pesticides

Group	Compound	Method Detection Limit (MDL), µg/L	Target Reporting Limit (RL), µg/L	Analytical Method
Organophosphate	Azinphos methyl	0.007	0.050	GC-MS
Organophosphate	Bifenthrin	0.007	0.050	GC-MS
Organophosphate	Carbaryl	0.007	0.020	GC-MS
Organophosphate	Chlorpyrifos	0.004	0.010	GC-MS
Organophosphate	Cyanazine	0.007	0.050	GC-MS
Organophosphate	Dacthal (DCPA)	0.007	0.050	GC-MS
Organophosphate	Diazinon	0.007	0.020	GC-MS
Organophosphate	EPTC (Eptam)	0.020	0.050	GC-MS
Organophosphate	Methidathion	0.010	0.030	GC-MS
Organophosphate	Metolachlor	0.007	0.020	GC-MS
Organophosphate	Propargite	0.150	0.500	GC-MS
Organophosphate	Simazine	0.005	0.200	GC-MS

Table 7. WPCL Laboratory method detection limits (MDL) and target reporting limits (RL) for select pesticides

Group	Compound	Method Detection Limit (MDL), µg/L	Target Reporting Limit (RL), µg/L	Analytical Method
Organophosphate	Diazinon	0.003	0.005	GC-FPD
Organophosphate	Chlorpyrifos	0.003	0.005	GC-FPD
Organophosphate	Azinphos methyl	0.030	0.050	GC-FPD
Organophosphate	Malathion	0.020	0.050	GC-FPD
Organophosphate	Methidathion	0.030	0.050	GC-FPD
Organophosphate	Methyl parathion	0.010	0.050	GC-FPD
Organophosphate	Dimethoate	0.030	0.050	GC-FPD
Organophosphate	Disulfoton	0.010	0.050	GC-FPD
Organophosphate	Phorate	0.050	0.200	GC-FPD
Organophosphate	Phosmet	0.050	0.200	GC-FPD
Carbamates	Aldicarb	0.010	0.020	LC-MS
Carbamates	Carbofuran	0.010	0.020	LC-MS
Carbamates	Carbaryl	0.010	0.020	LC-MS
Carbamates	Methiocarb	0.050	0.100	LC-MS
Carbamates	Methomyl	0.010	0.020	LC-MS
Fungicides	Captan	0.050	0.100	LC-MS
Herbicides	Diuron	0.002	0.005	LC-MS
Herbicides	Linuron	0.002	0.005	LC-MS
Herbicides	Paraquat dichloride	0.020	0.050	LC-MS
Herbicide	Oxyfluorfen	0.020	0.050	GC-MSMS
Herbicide	Trifluralin	0.050	0.100	GC-MSMS
Herbicide	Propanil	0.050	0.100	GC-MSMS
Acaricide	Propargite	0.200	0.500	GC-MSMS

Quality Assurance Objectives

Sampling during the 2006 irrigation season was conducted under the guidance of the Sacramento, Delta and San Joaquin River Basins Organophosphorus Pesticides TMDL Monitoring Quality Assurance Project Plan (QAPP) (Calanchini, 2006a).

Sampling precision and variability were measured through the use of field duplicates and matrix spike duplicates. The Quality Assurance Objective (QAO) for precision was a relative percent difference (RPD) of ≤ 25% between duplicate samples and their corresponding

environmental samples, and between matrix spike samples and their corresponding matrix spike duplicates (Table 8).

Accuracy was measured by determining the percent recovery of known concentrations of analytes spiked into environmental samples or reagent water before extraction. The QAO for accuracy in laboratory analytical measurements was a 70% - 125% recovery rate for all spiked compounds and surrogates.

Table 8. Field and Laboratory Quality Assurance Objectives (QAO).
LCS=Lab Control Spike; MS=Matrix Spike; OP=Organophosphate; QC = Quality Control; RPD = Relative Percent Difference

Field QC	**Frequency/Number**	**Acceptance Limits**
Field Blanks	Approximately 5% / 11	Less than Reporting Limit
Cooler Temperature	Measured by analyzing lab at time of delivery	$\leq$ 4° C
Field Duplicate Pairs	Approximately 5% / 12	RPD $\leq$ 25%
Field Matrix Spikes	Approximately 5% / 8	70-125% recovery
Field Matrix Spike Duplicates	Approximately 5% / 8	70-125% recovery
Field Matrix Spike Duplicates	Approximately 5% / 8	RPD to MS $\leq$ 25%
Laboratory QC	**Frequency/Number**	**Acceptance Limits**
Method Blank (=Lab Blank)	5% / 33	All target analytes below reporting limit
Lab Control Spike	1 per batch / 19	70-125% recovery
Lab Control Spike Duplicate	1 every 2 batches / 8	70-125% recovery
Lab Control Spike Duplicate	1 every 2 batches / 8	RPD to LCS $\leq$ 25%
Surrogates	OP samples and QC / 68	70-125% recovery

Water Quality Objectives

A Water Quality Objective (WQO) is a maximum allowable concentration of a pollutant as defined by the Central Valley Regional Water Quality Board in order to protect aquatic resources. The chronic toxicity WQOs for chlorpyrifos and diazinon in the San Joaquin River Basin and the East Stockton-Delta area were: 0.015 ug/L chlorpyrifos, and 0.10 ug/L diazinon (Beaulaurier et *al.*, 2005; McClure et al., 2006). One ug/L is equivalent to one part per billion (ppb). The diazinon WQO for the Sacramento Basin is currently being revised (Hann et *al.*, 2007). At the time of this study the WQO for diazinon in the Sacramento River (excluding tributaries) was 0.050 ug/L (Karkoski et *al.*, 2003). In the results tables of this report, concentrations exceeding the WQOs for chlorpyrifos and diazinon are presented in bold.

Analytical Results for Environmental Samples[1]

A total of 207 environmental samples were collected and analyzed for one or more of the following pesticides or pesticide classes: organophosphates, carbamates, herbicides, paraquat, the fungicide captan, and the acaricide propargite. Ninety-two of the samples were from the Sacramento Basin, 50 from the East Stockton area, and 65 from the San Joaquin Basin. In this report the results for the fungicide captan, and the herbicides diuron and linuron are presented with the results for the carbamate pesticides because each was analyzed for from the same samples using liquid chromatography-mass spectrometry (LC-MS). The results presented in this report are not surrogate-corrected or adjusted in any other manner. Tables of all results are presented in Appendix 1.

Sacramento Basin

In the Sacramento basin organophosphates, carbamates and paraquat were analyzed for every other week beginning in mid-March and ending in late April for a total of four sampling events. Herbicides were sampled for weekly beginning in late May and ending in late July for a total of eight sampling events.

Chlorpyrifos and diazinon were detected in 18.8% and 75%, of the 16 samples analyzed for organophosphate pesticides, respectively. Concentrations ranged from below detection to

[1] This section contains results of pesticide detections above the method detection limits that may or may not exceed water quality criteria and/or objectives.

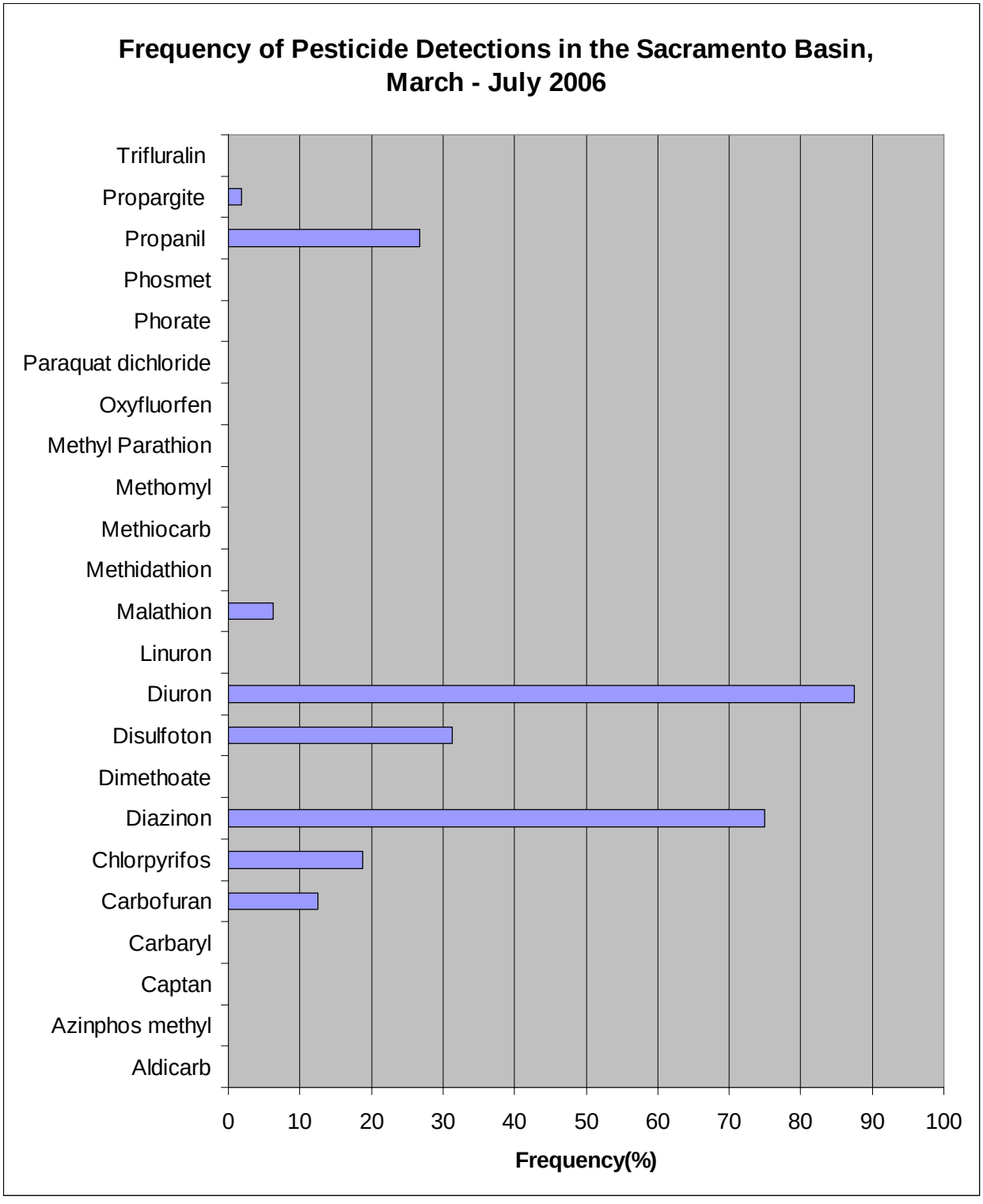
0.005 ppb of chlorpyrifos at Angel Canal/Comanche Creek and 0.096 ppb diazinon at Live Oak Slough. The median detections of chlorpyrifos and diazinon in Sacramento samples were 0.004 ppb and 0.016 ppb, respectively. The median concentrations (including non-detects) of chlorpyrifos and diazinon were non-detect ppb and 0.0105 ppb respectively. All three of the chlorpyrifos detections were in samples collected on March 28. Diazinon, on the other hand, was found at all sites where it was monitored for, and was present at Live Oak Slough during each sampling event. Other organophosphate pesticides present in samples and their detection frequencies were disulfoton (31.3%) and malathion (6.3%). Appendix Tables 1a and 2a list all of the detected concentrations of organophosphate pesticides and some basic statistical descriptions of the results. Figure 5 shows the frequency of detection for all pesticides analyzed for in the Sacramento Basin.

The only pesticides detected in the eight samples analyzed for carbamates and selected other pesticides using LC-MS, and their frequencies, were: carbofuran (12.5%) and diuron (87.5%). The carbofuran was found in a sample from March 28 while diuron was detected in at least one sample from each sampling event (Appendix Table 5a).

The herbicides propanil and propargite were found in 26.8% and 1.8%, respectively, of samples analyzed for herbicides, not including those analyzed strictly for paraquat (Appendix Table 9a). There were no detections of paraquat in any samples.

Note that detections shown in Figure 5 may or may not exceed water quality criteria and/or objectives.

Figure 5. Frequency of pesticide detections at sampling sites in the Sacramento River Basin, March-July 2006.



East Stockton Area

In the East Stockton area organophosphates, carbamates and paraquat were analyzed for every other week beginning in mid-March and ending in late April for a total of four sampling events. Herbicides were sampled for weekly during the month of July for a total of four sampling events.

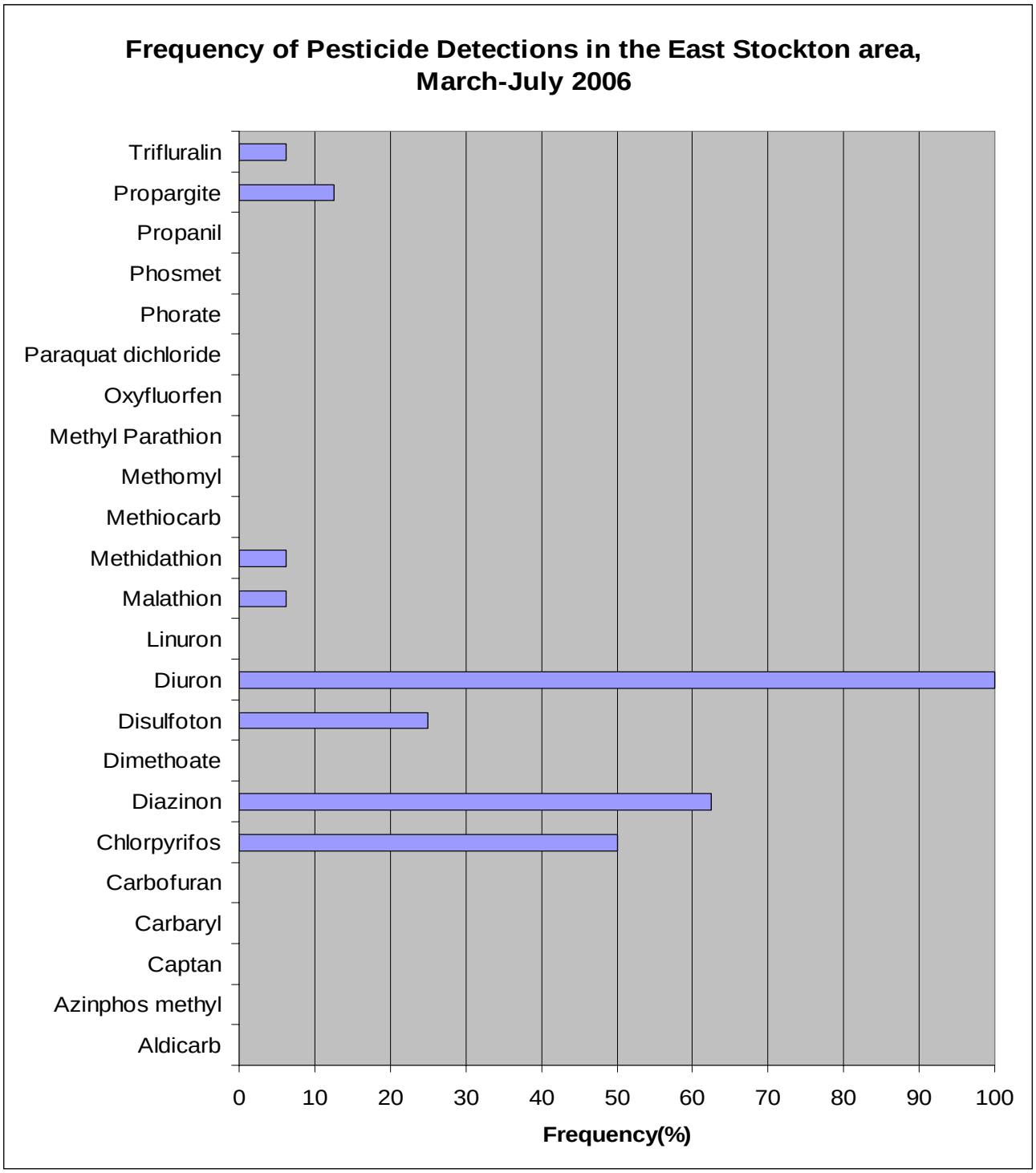
Chlorpyrifos and diazinon were detected in 50% and 62.5%, of the 16 samples analyzed for organophosphate pesticides, respectively (Figure 6). Concentrations ranged from below detection to 0.015 ppb of chlorpyrifos and 0.042 ppb diazinon, both at Lone Tree Creek. The median detections of chlorpyrifos and diazinon in Sacramento samples were 0.008 ppb and 0.013 ppb, respectively. The median concentrations (including non-detects) of chlorpyrifos and diazinon were 0.002 ppb and 0.0065 ppb, respectively. Chlorpyrifos was detected in every sample from Lone Tree Creek, in two of four samples from Pixley Slough and once each in samples from Littlejohns Creek and Mormon Slough. Diazinon was found in every sample from Lone Tree Creek and Pixley Slough and in half of the samples from Littlejohns Creek. No diazinon was detected in samples from Mormon Slough. Other organophosphate pesticides present in samples and their detection frequencies were disulfoton (25%), malathion (6.3%), and methidathion (6.3%). Appendix Tables 1b and 2b list all of the detected concentrations of organophosphate pesticides and some basic statistical descriptions of the results. Figure 6 shows the frequency of detection for all pesticides analyzed for in the East Stockton area.

A total of four samples were analyzed for using LC-MS for carbamates and selected other pesticides. The only pesticide detected was diuron which was present in all four samples and ranged in concentration from 0.022-1.4 ppb (Appendix Table 5b).

The herbicides propargite and trifluralin were found in 12.5% and 6.3% of samples analyzed for herbicides not including those analyzed strictly for paraquat (Appendix Table 9b). There were no detections of paraquat in any samples.

Note that detections shown in Figure 6 may or may not exceed water quality criteria and/or objectives.

Figure 6. Frequency of pesticide detections at sampling sites in the East Stockton area, March-July 2006.



San Joaquin River Basin

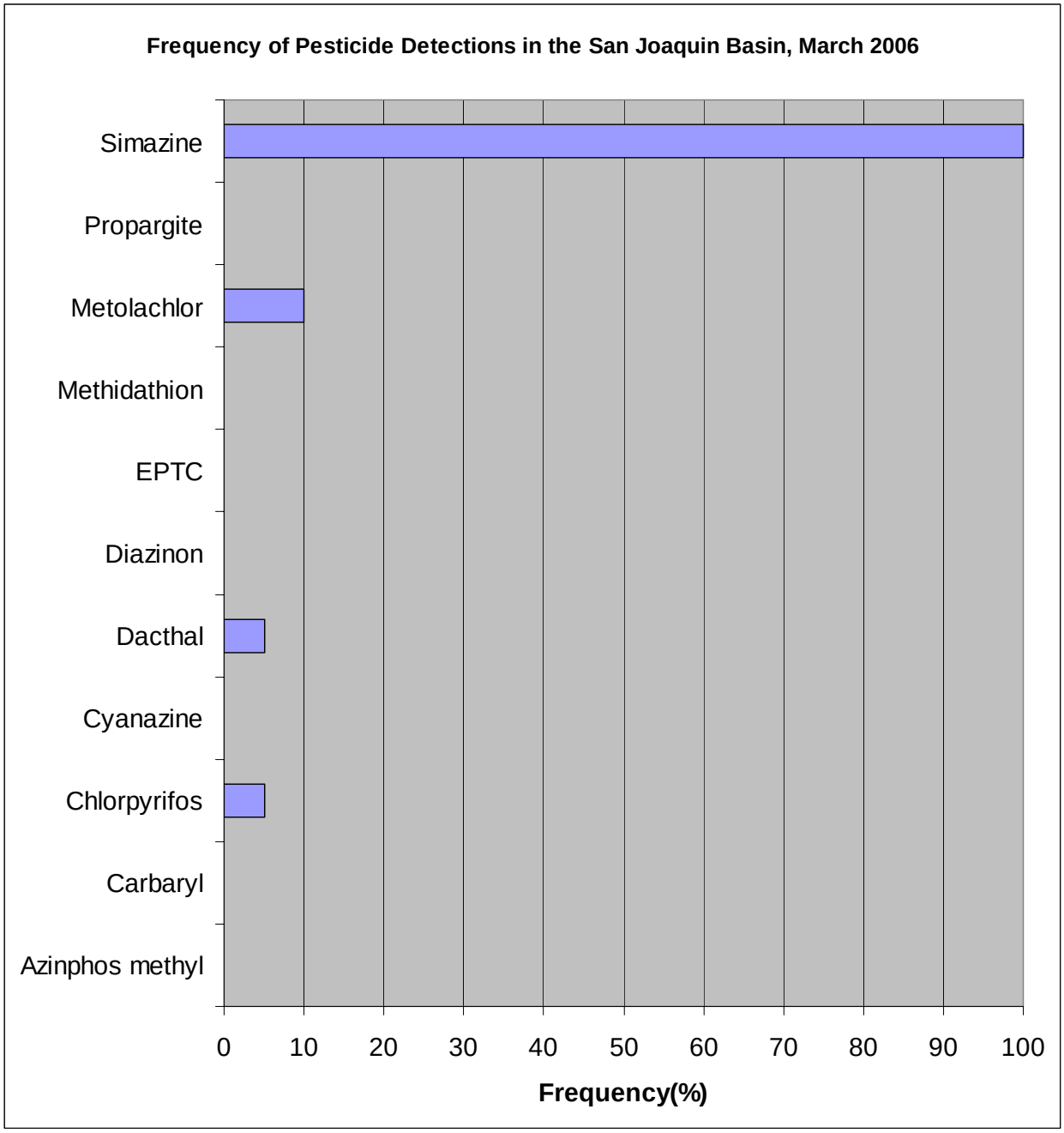
Organophosphate pesticides and selected herbicides were analyzed for on a weekly basis in the San Joaquin River Basin during the month of March and again during the months of July and August for a total of 13 sampling events. Samples collected in March were analyzed at the California Department of Food and Agriculture's (CDFA) Center for Analytical Chemistry. Samples collected in July and August were analyzed at the California Department of Fish and Game's (CDFG) Water Pollution Control Laboratory. Because of differences between the two labs in compounds analyzed for, method detection limits (MDL) and reporting limits (RL) those data have been organized independent of each other in the Appendix I tables and will also be presented separately here.

Of the 20 samples collected during March there were no detections of diazinon and only a single detection of chlorpyrifos which occurred in a sample from the San Joaquin River at Patterson on March 20. The detection of chlorpyrifos was 0.006 ppb which was just above the CDFA's MDL of 0.005 ppb (Appendix Table 1d). Other pesticides present in samples and their detection frequencies were dacthal (5%), and the herbicides metolachlor (10%) and simazine (100%). Appendix Tables 1d and 2d list all of the detected concentrations of pesticides and some basic statistical descriptions of the results.

Figure 7 shows the frequency of detection for all pesticides analyzed for in the San Joaquin Basin during March 2006.

Note that detections shown in Figure 7 may or may not exceed water quality criteria and/or objectives.

Figure 7. Frequency of pesticide detections at sampling sites in the San Joaquin Basin, March 2006.

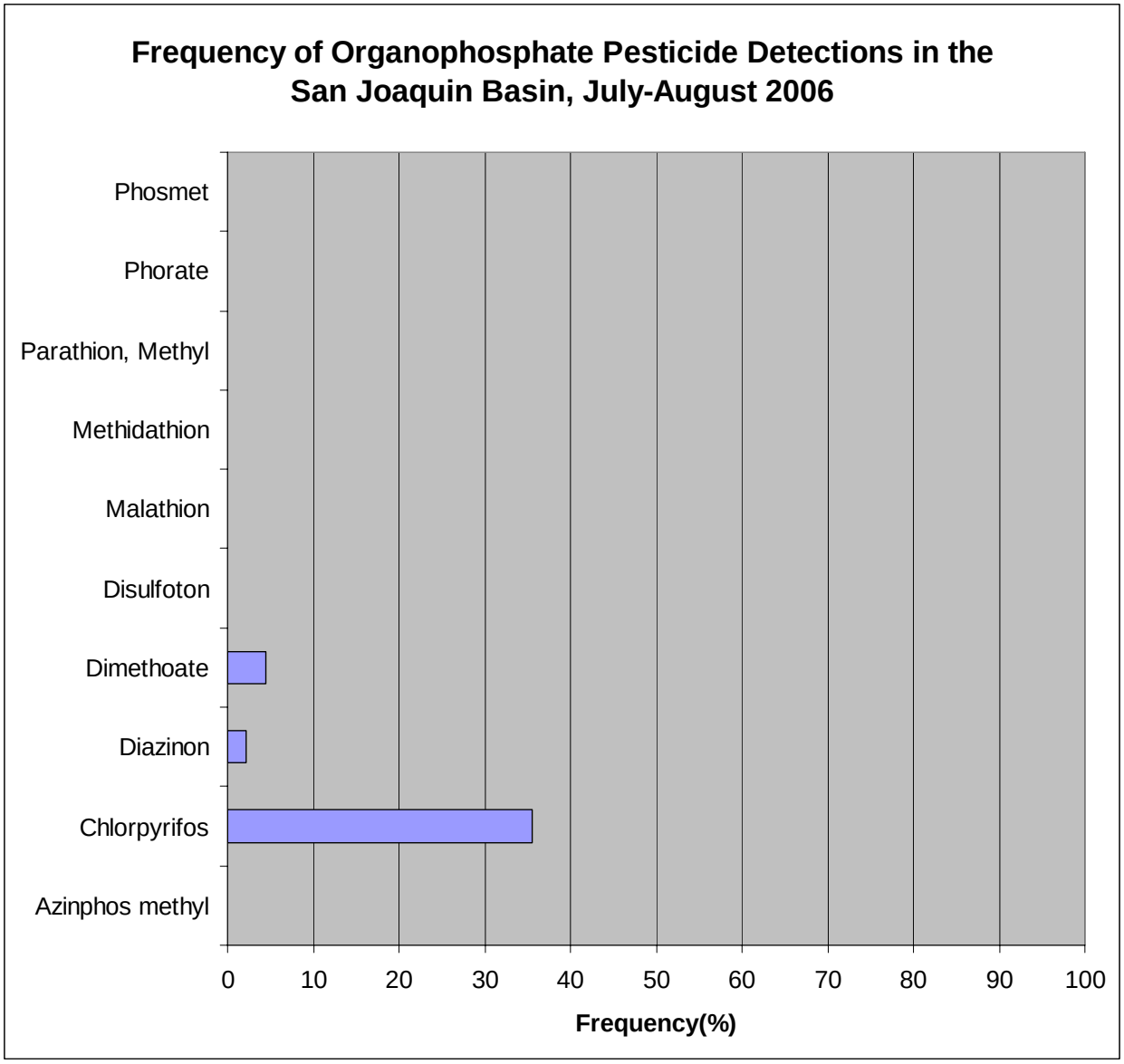


Chlorpyrifos was detected in 16 of the 45 samples collected in July and August, while diazinon was only detected in one sample (Figure 8). Concentrations of chlorpyrifos ranged from below detection to 0.062 ppb in the San Joaquin River at Vernalis. The single detection of diazinon was 0.008 ppb in a sample from the San Joaquin River at Lander Avenue. Chlorpyrifos

was detected mostly frequently in samples from the San Joaquin River at Patterson with 60% of those samples (n=5) having detectable concentrations. The site with the most detections of chlorpyrifos was the Stanislaus River at Caswell State Park with four of nine samples having detectable concentrations. The median detection of chlorpyrifos was 0.012 ppb. The median concentration (including non-detects) of chlorpyrifos was 0 ppb. The only other pesticide detected was dimethoate which was present in two of 45 samples; both detections were from the San Joaquin River at Patterson. Appendix Tables 1d and 2d list the concentrations of each pesticide found in the July and August samples from the San Joaquin Basin along with some basic statistical descriptions of the results. Figure 8 shows the frequency of detection for all pesticides analyzed for in the San Joaquin Basin in July and August 2006.

Note that detections shown in Figure 8 may or may not exceed water quality criteria and/or objectives.

Figure 8. Frequency of pesticide detections at sampling sites in the San Joaquin Basin, July-August 2006.



Instantaneous Loading Rates of Chlorpyrifos and Diazinon

Instantaneous loading rates of diazinon and chlorpyrifos were calculated by multiplying the stream discharge at the time of sample collection by the measured concentrations of each pesticide by the number of seconds (86,400) in one day. Loading rates were only calculated when the pesticide concentration was above the limit of detection and a discharge estimate was available. For all samples where pesticide concentrations were below the limit of detection, the

loading rate was assumed to be zero. Discharge estimates were only available for sites in the San Joaquin Basin. Discharge data for some of those sites were obtained from gages upstream of the sampling site and therefore may have varied from the actual discharge at the sampling site – see the discussion of discharge sources on page 13 for details.

Loading rates for chlorpyrifos ranged from 7.65 grams active ingredient per day (grams a.i./d) in the San Joaquin River at Lander Avenue on July 27 to 611.28 grams a.i./d in the San Joaquin River at Vernalis on July 27 (Appendix Tables 3a, b). The only calculated loading rate for diazinon was 7.56 grams a.i./d in the San Joaquin River at Lander Avenue on July 27 (Appendix Table 3b).

Analytical Results for Quality Control Samples[2]

Sample quality control was measured through collection of duplicates (n=12), environmental blanks (n=11), matrix spikes (n=8) and matrix spike duplicates (n=8). Appendix Tables 4a, b, c, d list the quality control results for organophosphate pesticides. Appendix Tables 6a, b list the quality control results for carbamates, captan, diuron and linuron. Appendix Tables 8a, b list the quality control results for paraquat. Appendix Tables 10a, b list the quality control data for selected herbicides and the acaricide propargite. The results presented in this report are not surrogate-corrected or adjusted in any other manner. Tables of all results are presented in Appendix 1.

Matrix Spike and Matrix Spike Duplicate Samples

Eight sets of matrix spike (MS) and matrix spike duplicates (MSD) were analyzed. The analytical lab failed to spike a ninth set collected at the San Joaquin River at Patterson on August 17. The results from those two samples were used as duplicates instead.

The MS and MSD collected on March 20 at the Merced River were analyzed by the CDFA lab and only spiked with chlorpyrifos and diazinon as required under their contract. All MS and MSD samples analyzed by the WPCL lab were spiked with each compound that was being analyzed for in the related environmental samples.

[2] This section contains results of pesticide detections above the method detection limits that may or may not exceed water quality criteria and/or objectives.

The relative percent differences (RPDs) between matrix spikes and matrix spike duplicates ranged from 0.9-7.7% and 0-9.8% for chlorpyrifos and diazinon, respectively. The percent recovery of chlorpyrifos and diazinon in the matrix spikes and matrix spike duplicates ranged from 93.5-113% and 80.1-105%, respectively (Appendix Tables 4b, c, d).

A matrix spike from Littlejohns Creek on April 11 had a recovery of 64.5% for disulfoton; slightly outside of the quality assurance objective (QAO) of 70-125% recovery. All other recoveries from that sample met the QAO. The same MS/MSD set had an RPD of 29% for dimethoate; the QAO was ≤ 25%.

An MSD from Angel Canal/Comanche Creek on April 25 had a 69.8% recovery for paraquat dichloride; just below the minimum QAO of 70%. The MS from that pair had a 71.4% recovery for a low RPD of 2.3%.

Matrix spike and matrix spike duplicate results are found in Appendix Tables 4b, 4c, 4d, 8a, 10a and 10b.

Field Duplicate Samples

A total of 12 field duplicates (FD) were distributed across the different analyses and sampling sites.

All field duplicates met the QAO for precision of a relative percent difference (RPD) between the environmental and duplicate sample ≤25%. RPDs ranged from 3.2% for propanil in a sample from Freshwater Creek on June 27 to 14.9% for dimethoate in a sample from the San Joaquin River at Patterson on August 17.

A sample collected from the Tuolumne River at Shiloh Road on July 27 had no detection for chlorpyrifos in the environmental sample and a detection of 0.011 ppb of chlorpyrifos in the duplicate sample. Because there was no detection above the method detection limit in the environmental sample no RPD was calculated between the samples. The discrepancy between the environmental and duplicate results could have been due to a number of factors including contamination from improper handling or unclean equipment in the field; failure to fully mix the composite sample in the 3L bottle prior to pouring off samples; contamination in the lab; and/or error in the analytical procedure. The lab blank and lab control spikes from the same batch each met the quality assurance objectives.

The field duplicate collected from the San Joaquin River at Patterson on August 17 was originally collected as an MS however the lab failed to spike the sample. Field duplicate results can be found in Appendix Tables 4a, 4b, 4c, 4d, 6a, 8a, 8b, 10a and 10b.

Environmental Blanks

A total of 11 field blanks were collected and analyzed. A blank from Gilsizer Slough on March 14 had a detection of 0.02 ppb of diazinon (Appendix Table 4a). The detection in this blank was most likely due to an error by the sampling crew in collecting and labeling a duplicate sample rather than a blank. This theory is supported by the results from the environmental sample collected at the same time and place: 0.025 ppb of diazinon and an estimated 0.01 ppb disulfoton; the MDL for disulfoton is 0.01 ppb. The concentrations of diazinon in each sample are similar. Because the detection of disulfoton in the environmental sample was equivalent to the MDL, a duplicate sample could easily contain a similar concentration of disulfoton at just below the MDL, and thereby go undetected. The results for the environmental sample were qualified as "less than" (<) the measured value (Appendix Tables 1a, 2a, 4a) as required in Element 22 of the QAPP (Calanchini, 2006a). No other compounds were detected in the contaminated environmental blank and associated environmental sample. There were no other detections in any of the other field blanks.

Surrogates

Chlorpyrifos methyl was added as a surrogate to all of the environmental and quality control (QC) samples analyzed by the CDFA lab. Triphenyl phosphate was added as a surrogate to all of the environmental and QC samples analyzed for organophosphates by the WPCL. The quality assurance objective for surrogate recovery was 70-125%. One sample failed the QAO: a sample collected from the Tuolumne River at Shiloh Road on July 13 had a surrogate recovery of 8.9%. No surrogates were added to carbamate, herbicide and paraquat samples. None of the data values in this report have been surrogate-corrected.

Method Blanks

A total of 33 method blanks (lab blanks) were run; one for every batch of 20 or fewer samples (Appendix Tables 4a, 4b, 4c, 4d, 6a, 6b, 8a, 8b, 10a, 10b) There were no detections of any analytes above the practical quantitation limit (PQL) in any of the method blanks. Batches of samples analyzed for organophosphates were spiked with either chlorpyrifos methyl (CDFA) or triphenyl phosphate (WPCL) as a surrogate. Recoveries of the surrogate ranged from 82-122% for chlorpyrifos methyl and 76-111% for triphenyl phosphate; all within the QAO acceptance limits of 70-125%.

Lab Control Spikes

Organophosphate samples

Nineteen lab control spikes (LCS) and eight lab control spike duplicates (LCSD) were analyzed with batches of organophosphate samples. Chlorpyrifos methyl was added as a surrogate to all of the LCSs analyzed by the CDFA lab. Triphenyl phosphate was added to all of the LCSs and LCSDs analyzed for organophosphates by the WPCL. Surrogate recoveries ranged from 82-116% for chlorpyrifos methyl and 59.8-104% for triphenyl phosphate. All recoveries met the QAO of 70-125% except for an LCSD from April 26 which had a surrogate recovery of 59.8%. Four analytes had recoveries outside of the QAO; all of the recoveries were low. Those analytes and the number of LCS/LCSDs that had exceedances were: azinphos methyl (1), dimethoate (5), disulfoton (1), and phorate (2). Recoveries of all other analytes were within the QAO limits. Four pairs of LCS/LCSDs exceeded the QAO (≤ 25%) for relative percent difference (RPD) in recovery between one or more analytes. Those exceedances were: azinphos methyl (25.3%); dimethoate (28%, 67%); and phorate (58%) (Appendix Tables 4a, b, c, d).

Carbamate samples, captan, diuron and linuron

Four lab control spikes (LCS) and four lab control spike duplicates (LCSD) were analyzed with batches of carbamate samples and selected other pesticides that were analyzed using liquid chromatography-mass spectrometry (LC-MS). Three analytes had recoveries

outside of the QAO control limits of 70-125%. Those analytes and the number of LCS/LCSDs that had exceedances were: diuron (1), methiocarb (1) and methomyl (2); the recoveries of methiocarb and methomyl were below the control limits while the recovery of diuron was above the control limits. All other analytes met the QAO of 70-125% recovery. Seven pairs of LCS/LCSDs exceeded the QAO of ≤25% RPD in recovery for one or more analytes. Those exceedances were: aldicarb (28%, 34%); captan (25.2%); linuron (25.2%, 37%); methiocarb (31%); methomyl (45%) (Appendix Tables 6a, 6b)

Herbicide samples

Seven lab control spikes (LCS) and six lab control spike duplicates (LCSD) were analyzed with batches of herbicide samples. Two analytes had recoveries outside of the control limits of 70-125%. Those analytes and the number of LCS/LCSDs that had exceedances were: propanil (1) and trifluralin (1). Two pair of LCS/LCSDs exceeded the QAO of ≤25% RPD in recovery for propargite (31%, 41%) (Appendix Tables 10a, b).

Paraquat samples

Four lab control spikes (LCS) and three lab control spike duplicates (LCSD) were analyzed with batches of paraquat samples. All recoveries of paraquat met the QAO of 70-125%. Recoveries ranged from 74.9-104%. One RPD (32%) between the LCS and LCSD exceeded the QAO of ≤ 25% recovery (Appendix Tables 8a, 8b).

Assessment of Data Quality

This section contains an assessment of the overall quality of the data generated in this project as defined by criteria set forth in elements 14 and 22 of the project QAPP (Calanchini, 2006a). A more detailed description of the actual results that did and did not meet the project quality assurance objectives can be found in the results sections of this report.

In general, the data generated in this project was of high quality and is considered usable with the exception of a single sample that was flagged with "GN" to indicate the surrogate recovery was outside of the acceptance limits, and "R" to indicate the data was rejected; in this case, due to an extremely low surrogate recovery. The following is a summary of the rejected sample and other data that did not meet one or more of the quality assurance objectives (QAOs).

Organophosphates

A sample collected from the Tuolumne River on July 13, 2006 and analyzed for organophosphates (OPs) had a surrogate recovery of 8.92%. While there were no detections of any compounds in the sample, the surrogate recovery was so low that the results were flagged with "GN" and "R" to indicate the data was rejected because it cannot be reasonably estimated whether any pesticides were present in the sample. All other samples analyzed for organophosphates had surrogate recoveries that met the quality assurance objective of 70-125% recovery. Results generated from those samples should be considered usable since they have met accuracy and precision objectives. A total of 97 samples were analyzed for OPs; only one sample was rejected. The completeness for OPs was 99% which met the completeness QAO of 90%.

Carbamates

Of the environmental samples analyzed with LC-MS only carbofuran and diuron were detected. The LCS and LCSD results for those compounds all met the quality assurance objectives (QAO) for accuracy (70-125% recovery) and precision (RPD $\leq$ 25%) with the exception of one sample in a pair of LCS/LCSD with a 128% recovery for diuron. That sample was flagged with the code "EUM" to indicate the recovery was outside of the control limits; this data is considered usable with the results having a slightly high bias. All other environmental sample results for captan, diuron and linuron are considered usable, precise and accurate as defined by the QAOs listed in Table 8.

There were no detections of the following compounds in environmental samples: aldicarb, captan, carbaryl, linuron, methiocarb, and methomyl. While the LCS/LCSD recoveries of aldicarb, captan and linuron met the QAO for accuracy, each of those compounds had one or more RPDs that failed the QAO for precision. Those LCS/LCSDs were flagged "IL" to indicate that the RPD was greater than 25%. No other duplicate analyses were performed in these batches such as an environmental split sample or an MS/MSD. Since there were no detections of these compounds in the environmental samples, and the recoveries met the QAO for accuracy, the batches are considered acceptable despite RPDs being greater than 25%. Therefore the results for aldicarb, captan and linuron should be considered usable and accurate data.

The LCS and LCSD analyzed on April 4, 2006 had low recoveries (60.1%, 62.9%) of the compound methomyl. Theoretically, methomyl may have been present at low levels in the

environmental samples from the same batch but gone undetected due to low recoveries. The actual detection and reporting limits may be higher than reported due to the low percent recovery of methomyl. The RPD between the same LCS and LCSD was 4.9%. Because of the relatively high precision of the analysis, the results for the environmental samples in the same batch should be considered as biased low but usable. The LCS/LCSD have been flagged EUM to indicate that their recoveries were outside of the control limits.

An LCS from April 27, 2006 had a recovery of 67.1% for methiocarb; below the QAO for accuracy of 70-125% recovery. The RPD between the LCS and LCSD was 31%; above the QAO limit for precision of ≤ 25%. Because there were no detections of methiocarb in the environmental samples from that batch, and the other three sets of LCS/LCSDs met all the QAOs for methiocarb, the environmental samples run with the LCS are considered usable but imprecise data. The actual detection and reporting limits may be higher than reported for this set of samples due to the low percent recovery of methiocarb. The LCS was flagged "EUM" to indicate that the recovery was outside of the control limits and "IL" to indicate the LCS/LCSD RPD was outside of the control limits. The completeness for carbamates and other compounds analyzed by LCMS was 100%.

Herbicides

All of the data for the herbicides oxyfluorfen, propanil, trifluralin and propargite are considered usable. One LCS for trifluralin and one for propanil had low recoveries: 65.2% and 58.6%, respectively. The results for these samples have been flagged "EUM" to indicate that the LCS was outside of the QAO for accuracy; these data are viewed as biased low. The actual detection and reporting limits may be higher than reported for this set of samples due to the low percent recovery of trifluralin and propanil. Two sets of LCS/LCSDs had RPDs of 31% and 41% for propargite; outside of the acceptance limits for precision of ≤ 25%. Those samples have been flagged "IL" to indicate the LCS/LCSD RPD was outside of the control limits. The precision of this data is questionable however the results met the QAO for accuracy and the data is considered usable.

An MSD from Angel Canal/Comanche Creek on April 25, 2006 had a 69.8% recovery for paraquat dichloride; barely below the minimum QAO for accuracy of 70% recovery. The associated MS had a 71.4% recovery for a low RPD between the two samples of 2.3%. The low

recoveries in combination with the low RPD indicated a marginal level of accuracy yet a high level of precision in detecting paraquat in those two samples. The LCS from the same batch of samples had a 90% recovery. The high recovery in the LCS indicates matrix interference in the MS and MSD. The data from the MS, MSD and the environmental samples run in the same batch are considered usable but biased low. The MSD has been flagged with a "GB" to indicate that the spike recovery was outside of the control limits. The completeness for herbicides analyzed by GC-MSMS was 100%. The completeness for paraquat, which was analyzed by LCMS, was 100%.

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Acknowledgements

Monitoring during the 2006 irrigation season was performed by Eric Huber, Anja Wehrmann, Ling Chu and Henry Calanchini from the University of California, Davis and Petra Lee from the Central Valley Regional Water Quality Control Board. Their hard work and commitment was vital to collecting the data used in this report.

A special thanks to Genevieve Walden for her excellent database management and for creating all of the tables and graphs in this report.

We would also like to thank Petra Lee and Diane Beaulaurier of the Central Valley Regional Water Quality Control Board for providing training, equipment and consultation throughout the project.

Thanks to Dave Crane, Abdou Mekebri, Loc Nguyen and others at the California Department of Fish and Game's Water Pollution Control Laboratory for their professionalism in handling and processing hundreds of water quality samples and their assistance in making this project SWAMP compliant.

Thank you to Stephen Siegel and his staff at the California Department of Food and Agriculture's Center for Analytical Chemistry for their assistance is processing samples from the March irrigation sampling in the San Joaquin Basin.

We would like to offer a special thank you to Jennifer Nickell of the John Muir Institute at UC Davis for her tireless efforts in processing numerous purchases, and handling of personnel matters.

Appendix I – Analytical Results

Table 1a. Chlorpyrifos and Diazinon concentrations in samples from the Sacramento River Basin, March-April, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value)

Station Name	Sample Date	Sample Time	Chlorpyrifos	Diazinon	% Recovery triphenyl phosphate (Surrogate)
Angel Canal/Comanche Cr at Crouch Ave	03/14/06	9:50	<0.003	0.024	85.5
Angel Canal/Comanche Cr at Crouch Ave	03/28/06	9:20	0.005	0.007	99.1
Angel Canal/Comanche Cr at Crouch Ave	04/11/06	11:40	<0.003	0.005	111
Angel Canal/Comanche Cr at Crouch Ave	04/25/06	9:40	<0.003	<0.003	96.8
Gilsizer Slough at South Township Rd	03/14/06	7:30	<0.003	<0.025[3]	105
Gilsizer Slough at South Township Rd	03/28/06	7:20	0.004 (J)	0.014	102
Gilsizer Slough at South Township Rd	04/11/06	8:30	<0.003	<0.003	110
Gilsizer Slough at South Township Rd	04/25/06	7:40	<0.003	0.017	99.6
Live Oak Slough at Nuestro Road	03/14/06	8:20	<0.003	0.096	113
Live Oak Slough at Nuestro Road	03/28/06	8:00	0.004 (J)	0.036	104
Live Oak Slough at Nuestro Road	04/11/06	9:00	<0.003	0.014	93.9
Live Oak Slough at Nuestro Road	04/25/06	8:10	<0.003	0.006	97.6
Morrison Slough at Luckehe Road	03/14/06	8:50	<0.003	0.018	112
Morrison Slough at Luckehe Road	03/28/06	8:30	<0.003	0.007	101
Morrison Slough at Luckehe Road	04/11/06	9:30	<0.003	<0.003	101
Morrison Slough at Luckehe Road	04/25/06	8:40	<0.003	<0.003	105

[3] The result for diazinon (0.025 ppb) has been qualified with a "less than" (<) symbol even though it was above the reporting limit of 0.005 ppb. The qualifier was added because a field blank collected at the same time and location as the qualified environmental sample tested positive for diazinon at a level greater than 1/5 of the concentration found in the environmental sample. The justification for this qualifier is found in Element 22 of the QAPP (Calanchini 2006). An explanation for the likely cause of contamination to the field blank is given in this report under the Analytical Results for Quality Control Samples: Environmental Blanks.

	Chlorpyrifos	Diazinon	Surrogate recovery
Total Samples	16	16	16
Number of Detections	3	12	16
Frequency (%)	18.75	75	100
Mean	0.004	0.022	102.28
Median (detects only)	0.004	0.016	101.50
Median (all samples)	0	0.0105	101.50
Minimum	0.004	0.005	85.50
Maximum	0.005	0.096	113.00
Standard Deviation	0.001	0.025	7.24

Table 1b. Chlorpyrifos and Diazinon concentrations in samples from the East Stockton area, March-April, 2006.

(All concentrations are in parts per billion (ppb); concentrations of chlorpyrifos and diazinon equal to or greater than the water quality objective for chronic toxicity are listed in bold type; J=estimated value)

Station Name	Sample Date	Sample Time	Chlorpyrifos	Diazinon	% Recovery triphenyl phosphate (surrogate)
Littlejohns Creek at Jack Tone Road	03/14/06	13:40	<0.003	0.005	102
Littlejohns Creek at Jack Tone Road	03/28/06	13:10	0.005	0.005	108
Littlejohns Creek at Jack Tone Road	04/11/06	15:30	<0.003	<0.003	100
Littlejohns Creek at Jack Tone Road	04/25/06	13:50	<0.003	<0.003	84.6
Lone Tree Creek at Austin Road	03/14/06	14:00	0.008	0.042	112
Lone Tree Creek at Austin Road	03/28/06	13:20	0.012	0.019	86.4
Lone Tree Creek at Austin Road	04/11/06	16:00	**0.015**	0.008	87.4
Lone Tree Creek at Austin Road	04/25/06	14:00	0.005	0.009	105
Mormon Slough at Copperopolis Road	03/14/06	13:10	<0.003	<0.003	105
Mormon Slough at Copperopolis Road	03/28/06	12:40	0.008	<0.003	98.2
Mormon Slough at Copperopolis Road	04/11/06	15:10	<0.003	<0.003	91.1
Mormon Slough at Copperopolis Road	04/25/06	13:30	<0.003	<0.003	105
Pixley Slough at Ham Lane	03/14/06	12:20	<0.003	0.027	125
Pixley Slough at Ham Lane	03/28/06	12:00	0.013	0.032	125
Pixley Slough at Ham Lane	04/11/06	14:30	0.004 (J)	0.012	102
Pixley Slough at Ham Lane	04/25/06	12:40	<0.003	0.014	111

	Chlorpyrifos	Diazinon	Surrogate recovery
Total Samples	16	16	16
Number of Detections	8	10	16
Frequency (%)	50	62.5	100
Mean	0.009	0.017	102.98
Median (detects only)	0.008	0.013	103.50
Median (all samples)	0.002	0.0065	103.50
Minimum	0.004	0.005	84.60
Maximum	0.015	0.042	125.00
Standard Deviation	0.004	0.013	12.06

Table 1c. Chlorpyrifos and Diazinon concentrations in samples from the San Joaquin River Basin, March, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value)

Station Name	Sample Date	Sample Time	Chlorpyrifos	Diazinon	% Recovery of chlorpyrifos methyl (surrogate)
Merced River at River Road	03/07/06	12:50	<0.004	<0.007	123
Merced River at River Road	03/13/06	12:10	<0.004	<0.007	82
Merced River at River Road	03/20/06	12:40	<0.004	<0.007	103
Merced River at River Road	03/27/06	12:20	<0.004	<0.007	101
San Joaquin River at Vernalis	03/07/06	10:10	<0.004	<0.007	121
San Joaquin River at Vernalis	03/13/06	9:40	<0.004	<0.007	90
San Joaquin River at Vernalis	03/20/06	10:10	<0.004	<0.007	90
San Joaquin River at Vernalis	03/27/06	10:00	<0.004	<0.007	92
San Joaquin River at Lander Avenue	03/13/06	12:30	<0.004	<0.007	105
San Joaquin River at Lander Avenue	03/27/06	12:50	<0.004	<0.007	96
San Joaquin River at Patterson	03/07/06	12:10	<0.004	<0.007	103
San Joaquin River at Patterson	03/20/06	12:10	0.006 (J)	<0.007	91
Stanislaus River at Caswell State Park	03/07/06	10:50	<0.004	<0.007	107
Stanislaus River at Caswell State Park	03/13/06	10:30	<0.004	<0.007	83
Stanislaus River at Caswell State Park	03/20/06	10:40	<0.004	<0.007	104
Stanislaus River at Caswell State Park	03/27/06	10:40	<0.004	<0.007	92
Tuolumne River at Shiloh Road	03/07/06	11:30	<0.004	<0.007	125
Tuolumne River at Shiloh Road	03/13/06	11:10	<0.004	<0.007	101
Tuolumne River at Shiloh Road	03/20/06	11:30	<0.004	<0.007	105
Tuolumne River at Shiloh Road	03/27/06	11:30	<0.004	<0.007	105

	Chlorpyrifos	Diazinon	Surrogate recovery
Total Samples	20	20	20
Number of Detections	1	0	20
Frequency (%)	5	0	100
Mean	0.006	NA	100.95
Median (detects only)	0.006	NA	102
Median (all samples)	0	0	102
Minimum	0.006	0	82
Maximum	0.006	0	125
Standard Deviation	NA	NA	12.085

Table 1d. Chlorpyrifos and Diazinon concentrations in samples from the San Joaquin River Basin, July-August, 2006.

(All concentrations are in parts per billion (ppb); concentrations of chlorpyrifos and diazinon equal to or greater than the water quality objective for chronic toxicity are listed in bold type; GN=surrogate recovery was outside of control limits; R=data rejected)

Station Name	Sample Date	Sample Time	Chlorpyrifos	Diazinon	% Recovery triphenyl phosphate (surrogate)
Merced River at River Road	07/06/06	11:10	<0.003	<0.003	81.4
Merced River at River Road	07/13/06	10:10	0.009	<0.003	94.4
Merced River at River Road	07/20/06	10:10	0.005	<0.003	86.8
Merced River at River Road	07/27/06	12:10	**0.021**	<0.003	99.2
Merced River at River Road	08/03/06	11:10	<0.003	<0.003	103
Merced River at River Road	08/10/06	13:20	<0.003	<0.003	86.9
Merced River at River Road	08/17/06	14:20	<0.003	<0.003	104
Merced River at River Road	08/24/06	12:00	<0.003	<0.003	91.5
Merced River at River Road	08/31/06	9:50	<0.003	<0.003	87.9
San Joaquin River at Vernalis	07/06/06	8:50	<0.003	<0.003	87.3
San Joaquin River at Vernalis	07/13/06	8:00	0.012	<0.003	95.2
San Joaquin River at Vernalis	07/20/06	8:00	0.009	<0.003	83.8
San Joaquin River at Vernalis	07/27/06	10:10	**0.062**	<0.003	91
San Joaquin River at Vernalis	08/03/06	9:00	<0.003	<0.003	97.3
San Joaquin River at Vernalis	08/10/06	10:20	<0.003	<0.003	98.1
San Joaquin River at Vernalis	08/17/06	11:50	<0.003	<0.003	98.9
San Joaquin River at Vernalis	08/24/06	9:50	<0.003	<0.003	101
San Joaquin River at Vernalis	08/31/06	7:30	<0.003	<0.003	103
San Joaquin River at Lander Avenue	07/13/06	10:40	<0.003	<0.003	98.9
San Joaquin River at Lander Avenue	07/27/06	12:30	0.008	0.008	93.9
San Joaquin River at Lander Avenue	08/10/06	13:50	<0.003	<0.003	92.9
San Joaquin River at Lander Avenue	08/24/06	12:30	<0.003	<0.003	101

Station Name	Sample Date	Sample Time	Chlorpyrifos	Diazinon	% Recovery triphenyl phosphate (surrogate)
San Joaquin River at Patterson	07/06/06	10:40	<0.003	<0.003	93.1
San Joaquin River at Patterson	07/20/06	10:40	0.011	<0.003	96.6
San Joaquin River at Patterson	08/03/06	10:30	0.014	<0.003	108
San Joaquin River at Patterson	08/17/06	15:10	**0.024**	<0.003	110
San Joaquin River at Patterson	08/31/06	9:20	<0.003	<0.003	93.4
Stanislaus River at Caswell State Park	07/06/06	9:10	**0.036**	<0.003	103
Stanislaus River at Caswell State Park	07/13/06	8:30	0.01	<0.003	87.9
Stanislaus River at Caswell State Park	07/20/06	8:30	0.012	<0.003	96.8
Stanislaus River at Caswell State Park	07/27/06	10:30	0.008	<0.003	81.2
Stanislaus River at Caswell State Park	08/03/06	9:20	<0.003	<0.003	111
Stanislaus River at Caswell State Park	08/10/06	11:30	<0.003	<0.003	94.9
Stanislaus River at Caswell State Park	08/17/06	12:30	<0.003	<0.003	94.7
Stanislaus River at Caswell State Park	08/24/06	10:20	<0.003	<0.003	103
Stanislaus River at Caswell State Park	08/31/06	8:00	<0.003	<0.003	96
Tuolumne River at Shiloh Road	07/06/06	10:00	**0.034**	<0.003	95.1
Tuolumne River at Shiloh Road	07/13/06	9:10	<0.003 (GN,R)	<0.003 (GN,R)	8.92 (GN)
Tuolumne River at Shiloh Road	07/20/06	9:20	<0.003	<0.003	89.2
Tuolumne River at Shiloh Road	07/27/06	11:10	<0.003	<0.003	94.7
Tuolumne River at Shiloh Road	08/03/06	10:10	0.01	<0.003	106
Tuolumne River at Shiloh Road	08/10/06	12:30	<0.003	<0.003	90.8
Tuolumne River at Shiloh Road	08/17/06	13:20	<0.003	<0.003	101
Tuolumne River at Shiloh Road	08/24/06	11:10	<0.003	<0.003	108
Tuolumne River at Shiloh Road	08/31/06	8:40	<0.003	<0.003	91.7

	Chlorpyrifos	Diazinon	Surrogate recovery
Total Samples	45	45	45
Number of Detections	16	1	45
Frequency (%)	35.556	2.222	100
Mean	0.018	0.008	94.05
Median (detects only)	0.012	0.008	95.10
Median (all samples)	0	0	95.1
Minimum	0.005	0.008	8.92
Maximum	0.062	0.008	111.00
Standard Deviation	0.015	NA	14.86

Table 2a. Selected organophosphate pesticide concentrations in samples from the Sacramento River Basin, March-April, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value; other compounds analyzed for but not detected were: azinphos methyl, dimethoate, methyl parathion, phorate, phosmet, methidathion)

Station Name	Sample Date	Sample Time	Disulfoton	Malathion	% Recovery triphenyl phosphate (surrogate)
Angel Canal/Comanche Creek at Crouch Avenue	03/14/06	9:50	0.02 (J)	<0.03	85.5
Angel Canal/Comanche Creek at Crouch Avenue	03/28/06	9:20	0.02 (J)	0.035 (J)	99.1
Angel Canal/Comanche Creek at Crouch Avenue	04/11/06	11:40	0.01 (J)	<0.03	111
Angel Canal/Comanche Creek at Crouch Avenue	04/25/06	9:40	<0.01	<0.03	96.8
Gilsizer Slough at South Township Road	03/14/06	7:30	<0.01 (J)[4]	<0.03	105
Gilsizer Slough at South Township Road	03/28/06	7:20	<0.01	<0.03	102
Gilsizer Slough at South Township Road	04/11/06	8:30	0.03 (J)	<0.03	110
Gilsizer Slough at South Township Road	04/25/06	7:40	<0.01	<0.03	99.6
Live Oak Slough at Nuestro Road	03/14/06	8:20	<0.01	<0.03	113
Live Oak Slough at Nuestro Road	03/28/06	8:00	<0.01	<0.03	104
Live Oak Slough at Nuestro Road	04/11/06	9:00	<0.01	<0.03	93.9
Live Oak Slough at Nuestro Road	04/25/06	8:10	<0.01	<0.03	97.6
Morrison Slough at Luckehe Road	03/14/06	8:50	<0.01	<0.03	112
Morrison Slough at Luckehe Road	03/28/06	8:30	<0.01	<0.03	101

[4] The result for disulfoton (0.01 ppb) has been qualified with a "less than" (<) symbol even though it was equal to the method detection limit of 0.01 ppb. The qualifier was added because a field blank collected at the same time and location as the qualified environmental sample tested positive for diazinon at a level greater than 1/5 of the concentration found in the environmental sample. The justification for this qualifier is found in Element 22 of the QAPP (Calanchini 2006). An explanation for the likely cause of contamination to the field blank is given in this report under the Analytical Results for Quality Control Samples: Environmental Blanks.

Station Name	Sample Date	Sample Time	Disulfoton	Malathion	% Recovery triphenyl phosphate (surrogate)
Morrison Slough at Luckehe Road	04/11/06	9:30	<0.01	<0.03	101
Morrison Slough at Luckehe Road	04/25/06	8:40	<0.01	<0.03	105

	Disulfoton	Malathion	Surrogate recovery
Total Samples	16	16	16
Number of Detections	5	1	16
Frequency (%)	31.25	6.25	100
Mean	0.018	0.035	102.28
Median (detects only)	0.02	0.035	101.50
Median (all samples)	0	0	101.5
Minimum	0.01	0.035	85.50
Maximum	0.03	0.035	113.00
Standard Deviation	0.008	NA	7.24

Table 2b. Selected organophosphate pesticide concentrations in samples from the East Stockton area, March-April, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value; other compounds analyzed for but not detected were: azinphos methyl, dimethoate, methyl parathion, phorate and phosmet)

Station Name	Sample Date	Sample Time	Disulfoton	Malathion	Methidathion	% Recovery triphenyl phosphate (surrogate)
Littlejohns Creek at Jack Tone Road	03/14/06	13:40	<0.01	<0.03	<0.03	102
Littlejohns Creek at Jack Tone Road	03/28/06	13:10	<0.01	<0.03	<0.03	108
Littlejohns Creek at Jack Tone Road	04/11/06	15:30	<0.01	<0.03	<0.03	100
Littlejohns Creek at Jack Tone Road	04/25/06	13:50	<0.01	<0.03	<0.03	84.6
Lone Tree Creek at Austin Road	03/14/06	14:00	<0.01	<0.03	0.044 (J)	112
Lone Tree Creek at Austin Road	03/28/06	13:20	<0.01	<0.03	<0.03	86.4
Lone Tree Creek at Austin Road	04/11/06	16:00	<0.01	<0.03	<0.03	87.4
Lone Tree Creek at Austin Road	04/25/06	14:00	<0.01	<0.03	<0.03	105
Mormon Slough at Copperopolis Road	03/14/06	13:10	<0.01	<0.03	<0.03	105
Mormon Slough at Copperopolis Road	03/28/06	12:40	<0.01	<0.03	<0.03	98.2
Mormon Slough at Copperopolis Road	04/11/06	15:10	<0.01	<0.03	<0.03	91.1
Mormon Slough at Copperopolis Road	04/25/06	13:30	<0.01	<0.03	<0.03	105
Pixley Slough at Ham Lane	03/14/06	12:20	0.026 (J)	<0.03	<0.03	125
Pixley Slough at Ham Lane	03/28/06	12:00	0.048 (J)	0.036 (J)	<0.03	125
Pixley Slough at Ham Lane	04/11/06	14:30	0.021 (J)	<0.03	<0.03	102
Pixley Slough at Ham Lane	04/25/06	12:40	0.06	<0.03	<0.03	111

	Disulfoton	Malathion	Methidathion	Surrogate recovery
Total Samples	16	16	16	16
Number of Detections	4	1	1	16
Frequency (%)	25	6.25	6.25	100
Mean	0.039	0.036	0.044	102.98
Median (detects only)	0.037	0.036	0.044	103.50
Median (all samples)	0.000	0.000	0.000	103.5
Minimum	0.021	0.036	0.044	84.60
Maximum	0.060	0.036	0.044	125.00
Standard Deviation	0.018	NA	NA	12.06

Table 2c. Selected organophosphate pesticide concentrations in samples from the San Joaquin River Basin, March, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value; other compounds analyzed for but not detected were: azinphos methyl, carbaryl, cyanazine, EPTC, methidathion, propargite)

Station Name	Sample Date	Sample Time	Dacthal	Metolachlor	Simazine	% Recovery chlorpyrifos methyl (surrogate)
Merced River at River Road	03/07/06	12:50	<0.007	<0.007	0.015 (J)	123
Merced River at River Road	03/13/06	12:10	<0.007	<0.007	0.022 (J)	82
Merced River at River Road	03/20/06	12:40	<0.007	<0.007	0.035 (J)	103
Merced River at River Road	03/27/06	12:20	<0.007	<0.007	0.043 (J)	101
San Joaquin River at Vernalis	03/07/06	10:10	<0.007	<0.007	0.055 (J)	121
San Joaquin River at Vernalis	03/13/06	9:40	<0.007	<0.007	0.048 (J)	90
San Joaquin River at Vernalis	03/20/06	10:10	<0.007	<0.007	0.049 (J)	90
San Joaquin River at Vernalis	03/27/06	10:00	<0.007	<0.007	0.055 (J)	92
San Joaquin River at Lander Avenue	03/13/06	12:30	0.008 (J)	0.011 (J)	0.58	105
San Joaquin River at Lander Avenue	03/27/06	12:50	<0.007	<0.007	0.11 (J)	96
San Joaquin River at Patterson	03/07/06	12:10	<0.007	0.007 (J)	0.11 (J)	103
San Joaquin River at Patterson	03/20/06	12:10	<0.007	<0.007	0.12 (J)	91
Stanislaus River at Caswell State Park	03/07/06	10:50	<0.007	<0.007	0.016 (J)	107
Stanislaus River at Caswell State Park	03/13/06	10:30	<0.007	<0.007	0.025 (J)	83
Stanislaus River at Caswell State Park	03/20/06	10:40	<0.007	<0.007	0.025 (J)	104
Stanislaus River at Caswell State Park	03/27/06	10:40	<0.007	<0.007	0.02 (J)	92
Tuolumne River at Shiloh Road	03/07/06	11:30	<0.007	<0.007	0.021 (J)	125
Tuolumne River at Shiloh Road	03/13/06	11:10	<0.007	<0.007	0.028 (J)	101
Tuolumne River at Shiloh Road	03/20/06	11:30	<0.007	<0.007	0.038 (J)	105
Tuolumne River at Shiloh Road	03/27/06	11:30	<0.007	<0.007	0.049 (J)	105

	Dacthal	Metolachlor	Simazine	Surrogate recovery
Total Samples	20	20	20	20
Number of Detections	1	2	20	20
Frequency (%)	5	10	100	100
Mean concentration	0.008	0.009	0.0732	100.95
Median (detects only)	0.008	0.009	0.0405	102
Median (all samples)	0	0	0.0405	102
Minimum	0.008	0.007	0.015	82
Maximum	0.008	0.011	0.58	125
Standard Deviation	NA	0.003	0.123	12.085

Table 2d. Selected organophosphate pesticide concentrations in samples from the San Joaquin River Basin, July-August, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value; GN=surrogate recovery was outside of control limits; R=data rejected; other compounds analyzed for but not detected were: azinphos methyl, disulfoton, malathion, methidathion, methyl parathion, phorate, phosmet)

Station Name	Sample Date	Sample Time	Dimethoate	% Recovery triphenyl phosphate (surrogate)
Merced River at River Road	07/06/06	11:10	<0.03	81.4
Merced River at River Road	07/13/06	10:10	<0.03	94.4
Merced River at River Road	07/20/06	10:10	<0.03	86.8
Merced River at River Road	07/27/06	12:10	<0.03	99.2
Merced River at River Road	08/03/06	11:10	<0.03	103
Merced River at River Road	08/10/06	13:20	<0.03	86.9
Merced River at River Road	08/17/06	14:20	<0.03	104
Merced River at River Road	08/24/06	12:00	<0.03	91.5
Merced River at River Road	08/31/06	9:50	<0.03	87.9
San Joaquin River at Vernalis	07/06/06	8:50	<0.03	87.3
San Joaquin River at Vernalis	07/13/06	8:00	<0.03	95.2
San Joaquin River at Vernalis	07/20/06	8:00	<0.03	83.8
San Joaquin River at Vernalis	07/27/06	10:10	<0.03	91
San Joaquin River at Vernalis	08/03/06	9:00	<0.03	97.3
San Joaquin River at Vernalis	08/10/06	10:20	<0.03	98.1
San Joaquin River at Vernalis	08/17/06	11:50	<0.03	98.9
San Joaquin River at Vernalis	08/24/06	9:50	<0.03	101
San Joaquin River at Vernalis	08/31/06	7:30	<0.03	103
San Joaquin River at Lander Avenue	07/13/06	10:40	<0.03	98.9
San Joaquin River at Lander Avenue	07/27/06	12:30	<0.03	93.9
San Joaquin River at Lander Avenue	08/10/06	13:50	<0.03	92.9
San Joaquin River at Lander Avenue	08/24/06	12:30	<0.03	101

Station Name	Sample Date	Sample Time	Dimethoate	% Recovery triphenyl phosphate (surrogate)
San Joaquin River at Patterson	07/06/06	10:40	<0.03	93.1
San Joaquin River at Patterson	07/20/06	10:40	<0.03	96.6
San Joaquin River at Patterson	08/03/06	10:30	0.052	108
San Joaquin River at Patterson	08/17/06	15:10	0.031 (J)	110
San Joaquin River at Patterson	08/31/06	9:20	<0.03	93.4
Stanislaus River at Caswell State Park	07/06/06	9:10	<0.03	103
Stanislaus River at Caswell State Park	07/13/06	8:30	<0.03	87.9
Stanislaus River at Caswell State Park	07/20/06	8:30	<0.03	96.8
Stanislaus River at Caswell State Park	07/27/06	10:30	<0.03	81.2
Stanislaus River at Caswell State Park	08/03/06	9:20	<0.03	111
Stanislaus River at Caswell State Park	08/10/06	11:30	<0.03	94.9
Stanislaus River at Caswell State Park	08/17/06	12:30	<0.03	94.7
Stanislaus River at Caswell State Park	08/24/06	10:20	<0.03	103
Stanislaus River at Caswell State Park	08/31/06	8:00	<0.03	96
Tuolumne River at Shiloh Road	07/06/06	10:00	<0.03	95.1
Tuolumne River at Shiloh Road	07/13/06	9:10	<0.03 (GN,R)	8.92 (GN)
Tuolumne River at Shiloh Road	07/20/06	9:20	<0.03	89.2
Tuolumne River at Shiloh Road	07/27/06	11:10	<0.03	94.7
Tuolumne River at Shiloh Road	08/03/06	10:10	<0.03	106
Tuolumne River at Shiloh Road	08/10/06	12:30	<0.03	90.8
Tuolumne River at Shiloh Road	08/17/06	13:20	<0.03	101
Tuolumne River at Shiloh Road	08/24/06	11:10	<0.03	108
Tuolumne River at Shiloh Road	08/31/06	8:40	<0.03	91.7

	Dimethoate	Surrogate recovery
Total Samples	45	45
Number of Detections	2	45
Frequency (%)	4.444	100
Mean	0.042	94.05
Median (detects only)	0.042	95.10
Median (all samples)	0	95.1
Minimum	0.031	8.92
Maximum	0.052	111.00
Standard Deviation	0.015	14.86

Table 3a. Instantaneous loading rates of chlorpyrifos and diazinon in the San Joaquin River Basin, March, 2006.

(All concentrations are in parts per billion (ppb); a.i. =active ingredient; J=estimated value; NA=not applicable or not available. Discharge data for some sites was obtained from upstream gages and may have varied from the actual discharge at those sites – see the discussion of discharge sources on page 13 for details)

Station Name	Sample Date	Sample Time	Discharge (cfs)	Chlorpyrifos (µg/L)	Chlorpyrifos Loading Rate (grams a.i./day)	Diazinon (µg/L)	Diazinon Loading Rate (grams a.i./day)
Merced River at River Road	03/07/06	12:50	3155	<0.004	NA	<0.007	NA
Merced River at River Road	03/13/06	12:10	2750	<0.004	NA	<0.007	NA
Merced River at River Road	03/20/06	12:40	NA	<0.004	NA	<0.007	NA
Merced River at River Road	03/27/06	12:20	NA	<0.004	NA	<0.007	NA
San Joaquin River at Vernalis	03/07/06	10:10	12983	<0.004	NA	<0.007	NA
San Joaquin River at Vernalis	03/13/06	9:40	11500	<0.004	NA	<0.007	NA
San Joaquin River at Vernalis	03/20/06	10:10	12000	<0.004	NA	<0.007	NA
San Joaquin River at Vernalis	03/27/06	10:00	12700	<0.004	NA	<0.007	NA
San Joaquin River at Lander Ave	03/13/06	12:30	508	<0.004	NA	<0.007	NA
San Joaquin River at Lander Ave	03/27/06	12:50	986	<0.004	NA	<0.007	NA
San Joaquin River at Patterson	03/07/06	12:10	3923	<0.004	NA	<0.007	NA
San Joaquin River at Patterson	03/20/06	12:10	4541	0.006 (J)	66.66	<0.007	NA
Stanislaus River at Caswell S.P.	03/07/06	10:50	3278	<0.004	NA	<0.007	NA
Stanislaus River at Caswell S.P.	03/13/06	10:30	3320	<0.004	NA	<0.007	NA
Stanislaus River at Caswell S.P.	03/20/06	10:40	2930	<0.004	NA	<0.007	NA
Stanislaus River at Caswell S.P.	03/27/06	10:40	3130	<0.004	NA	<0.007	NA
Tuolumne River at Shiloh Road	03/07/06	11:30	4790	<0.004	NA	<0.007	NA
Tuolumne River at Shiloh Road	03/13/06	11:10	4000	<0.004	NA	<0.007	NA
Tuolumne River at Shiloh Road	03/20/06	11:30	4520	<0.004	NA	<0.007	NA
Tuolumne River at Shiloh Road	03/27/06	11:30	4850	<0.004	NA	<0.007	NA

Table 3b. Instantaneous loading rates of chlorpyrifos and diazinon in the San Joaquin River Basin, July-August, 2006.

(All concentrations are in parts per billion (ppb); concentrations of chlorpyrifos and diazinon equal to or greater than the water quality objective for chronic toxicity are listed in bold type; a.i. =active ingredient; NA=not applicable or not available. Discharge data for some sites was obtained from upstream gages and may have varied from the actual discharge at those sites – see the discussion of discharge sources on page 13 for details)

Station Name	Sample Date	Sample Time	Discharge (cfs)	Chlorpyrifos (µg/L)	Chlorpyrifos Loading Rate (grams a.i./day)	Diazinon (µg/L)	Diazinon Loading Rate (grams a.i./day)
Merced River at River Road	07/06/06	11:10	NA	<0.003	NA	<0.003	NA
Merced River at River Road	07/13/06	10:10	NA	0.009	NA	<0.003	NA
Merced River at River Road	07/20/06	10:10	NA	0.005	NA	<0.003	NA
Merced River at River Road	07/27/06	12:10	NA	**0.021**	NA	<0.003	NA
Merced River at River Road	08/03/06	11:10	NA	<0.003	NA	<0.003	NA
Merced River at River Road	08/10/06	13:20	NA	<0.003	NA	<0.003	NA
Merced River at River Road	08/17/06	14:20	NA	<0.003	NA	<0.003	NA
Merced River at River Road	08/24/06	12:00	NA	<0.003	NA	<0.003	NA
Merced River at River Road	08/31/06	9:50	NA	<0.003	NA	<0.003	NA
San Joaquin River at Vernalis	07/06/06	8:50	8120	<0.003	NA	<0.003	NA
San Joaquin River at Vernalis	07/13/06	8:00	4750	0.012	139.45	<0.003	NA
San Joaquin River at Vernalis	07/20/06	8:00	4320	0.009	95.12	<0.003	NA
San Joaquin River at Vernalis	07/27/06	10:10	4030	**0.062**	611.28	<0.003	NA
San Joaquin River at Vernalis	08/03/06	9:00	3925	<0.003	NA	<0.003	NA
San Joaquin River at Vernalis	08/10/06	10:20	3760	<0.003	NA	<0.003	NA
San Joaquin River at Vernalis	08/17/06	11:50	3280	<0.003	NA	<0.003	NA
San Joaquin River at Vernalis	08/24/06	9:50	3280	<0.003	NA	<0.003	NA
San Joaquin River at Vernalis	08/31/06	7:30	3270	<0.003	NA	<0.003	NA
San Joaquin River at Lander Ave	07/13/06	10:40	677	<0.003	NA	<0.003	NA
San Joaquin River at Lander Ave	07/27/06	12:30	391	0.008	7.65	0.008	7.65
San Joaquin River at Lander Ave	08/10/06	13:50	71	<0.003	NA	<0.003	NA

Station Name	Sample Date	Sample Time	Discharge (cfs)	Chlorpyrifos (µg/L)	Chlorpyrifos Loading Rate (grams a.i./day)	Diazinon (µg/L)	Diazinon Loading Rate (grams a.i./day)
San Joaquin River at Lander Ave	08/24/06	12:30	106	<0.003	NA	<0.003	NA
San Joaquin River at Patterson	07/06/06	10:40	4005	<0.003	NA	<0.003	NA
San Joaquin River at Patterson	07/20/06	10:40	1383	0.011	37.22	<0.003	NA
San Joaquin River at Patterson	08/03/06	10:30	1245	0.014	42.64	<0.003	NA
San Joaquin River at Patterson	08/17/06	15:10	1294	**0.024**	75.98	<0.003	NA
San Joaquin River at Patterson	08/31/06	9:20	1089	<0.003	NA	<0.003	NA
Stanislaus River at Caswell S.P.	07/06/06	9:10	1330	**0.036**	117.14	<0.003	NA
Stanislaus River at Caswell S.P.	07/13/06	8:30	1260	0.01	30.83	<0.003	NA
Stanislaus River at Caswell S.P.	07/20/06	8:30	1220	0.012	35.82	<0.003	NA
Stanislaus River at Caswell S.P.	07/27/06	10:30	1210	0.008	23.68	<0.003	NA
Stanislaus River at Caswell S.P.	08/03/06	9:20	1190	<0.003	NA	<0.003	NA
Stanislaus River at Caswell S.P.	08/10/06	11:30	1210	<0.003	NA	<0.003	NA
Stanislaus River at Caswell S.P.	08/17/06	12:30	1180	<0.003	NA	<0.003	NA
Stanislaus River at Caswell S.P.	08/24/06	10:20	1240	<0.003	NA	<0.003	NA
Stanislaus River at Caswell S.P.	08/31/06	8:00	1180	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	07/06/06	10:00	1900	**0.034**	158.04	<0.003	NA
Tuolumne River at Shiloh Road	07/13/06	9:10	NA	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	07/20/06	9:20	NA	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	07/27/06	11:10	1430	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	08/03/06	10:10	1520	0.01	37.19	<0.003	NA
Tuolumne River at Shiloh Road	08/10/06	12:30	1490	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	08/17/06	13:20	1450	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	08/24/06	11:10	1500	<0.003	NA	<0.003	NA
Tuolumne River at Shiloh Road	08/31/06	8:40	1460	<0.003	NA	<0.003	NA

Table 4a. Summary of quality control data for selected organophosphate pesticides in samples from the Sacramento River Basin, March-April, 2006.

(All concentrations are in parts per billion (ppb); EUM=laboratory control spike was outside of control limits; GN=surrogate recovery was outside of control limits; IL=RPD exceeded laboratory control limits; IP=analyte detected in method blank; J=estimated value; LCS=lab control spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Azinphos methyl	Chlorpyrifos
Gilsizer Slough at South Township Rd	Grab	03/14/06	7:30	<0.03	<0.003
Gilsizer Slough at South Township Rd	Field Blank	03/14/06	7:31	<0.03	<0.003
Laboratory QC Samples	Lab Blank	03/16/06	0:00	<0.03	<0.003
Laboratory QC Samples	LCS	03/17/06	0:00	0.166 PR 83.2	0.197 PR 98.3
Laboratory QC Samples	LCS	03/17/06	0:00	0.165 PR 82.3 RPD 0.6	0.176 PR 88.2, RPD 11
Laboratory QC Samples	LCS	04/04/06	0:00	0.161 PR 80.6	0.175 PR 87.5
Laboratory QC Samples	LCS	04/04/06	0:00	0.157 PR 78.3 RPD 2.5	0.174 PR 86.8, RPD 0.57
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.03	<0.003
Morrison Slough at Luckehe Road	Grab	04/11/06	9:30	<0.03	<0.003
Morrison Slough at Luckehe Road	Field Dup	04/11/06	9:33	<0.03 RPD NA	<0.003 RPD NA
Laboratory QC Samples	LCS	04/17/06	0:00	0.122 (EUM) PR 60.8	0.177 PR 88.5
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.03	<0.003
Laboratory QC Samples	LCS	04/26/06	0:00	0.166 PR 82.8	0.204 (IL) PR 102
Laboratory QC Samples	LCS	04/26/06	0:00	0.146 (GN) PR 73 RPD 13	0.158 (GN,IL) PR 78.8, RPD 25
Laboratory QC Samples	Lab Blank	04/26/06	0:00	<0.03	<0.003

Station Name	Sample Type	Sample Date	Sample Time	Diazinon	Dimethoate
Gilsizer Slough at South Township Rd	Grab	03/14/06	7:30	<0.025[5]	<0.03
Gilsizer Slough at South Township Rd	Field Blank	03/14/06	7:31	0.02 (IP)	<0.03
Laboratory QC Samples	Lab Blank	03/16/06	0:00	<0.003	<0.03
Laboratory QC Samples	LCS	03/17/06	0:00	0.184 PR 91.8	0.133 (EUM) PR 66.7
Laboratory QC Samples	LCS	03/17/06	0:00	0.167 PR 83.7 RPD 9.7	0.109 (EUM) PR 54.7, RPD 20
Laboratory QC Samples	LCS	04/04/06	0:00	0.177 PR 88.3	0.117 (EUM,IL) PR 58.3
Laboratory QC Samples	LCS	04/04/06	0:00	0.173 PR 86.5 RPD 2.3	0.058 (EUM,IL) PR 29, RPD 67
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.003	<0.03
Morrison Slough at Luckehe Road	Grab	04/11/06	9:30	<0.003	<0.03
Morrison Slough at Luckehe Road	Field Dup	04/11/06	9:33	<0.003 RPD NA	<0.03 RPD NA
Laboratory QC Samples	LCS	04/17/06	0:00	0.142 PR 71.1	0.185 PR 92.3
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.003	<0.03
Laboratory QC Samples	LCS	04/26/06	0:00	0.168 PR 84.1	0.129 (EUM,IL) PR 64.4
Laboratory QC Samples	LCS	04/26/06	0:00	0.18 (GN) PR 89.8 RPD 6.9	0.171 (GN,IL) PR 85.4, RPD 28
Laboratory QC Samples	Lab Blank	04/26/06	0:00	<0.003	<0.03

[5] The result for diazinon (0.025 ppb) has been qualified with a "less than" (<) symbol even though it was above the reporting limit of 0.005 ppb. The qualifier was added because a field blank collected at the same time and location as the qualified environmental sample tested positive for diazinon at a level greater than 1/5 of the concentration found in the environmental sample. The justification for this qualifier is found in Element 22 of the QAPP (Calanchini 2006). An explanation for the likely cause of contamination to the field blank is given in this report under the Analytical Results for Quality Control Samples: Environmental Blanks.

Station Name	Sample Type	Sample Date	Sample Time	Disulfoton	Malathion
Gilsizer Slough at South Township Rd	Grab	03/14/06	7:30	<0.01 (J)[6]	<0.03
Gilsizer Slough at South Township Rd	Field Blank	03/14/06	7:31	<0.01	<0.03
Laboratory QC Samples	Lab Blank	03/16/06	0:00	<0.01	<0.03
Laboratory QC Samples	LCS	03/17/06	0:00	0.148 PR 73.8	0.202 PR 101
Laboratory QC Samples	LCS	03/17/06	0:00	0.129 (EUM) PR 64.6 RPD 14	0.196 PR 98.1, RPD 3
Laboratory QC Samples	LCS	04/04/06	0:00	0.203 PR 102	0.199 PR 99.4
Laboratory QC Samples	LCS	04/04/06	0:00	0.188 PR 93.8 RPD 7.7	0.199 PR 99.4, RPD 0
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.01	<0.03
Morrison Slough at Luckehe Road	Grab	04/11/06	9:30	<0.01	<0.03
Morrison Slough at Luckehe Road	Field Dup	04/11/06	9:33	<0.01 RPD NA	<0.03 RPD NA
Laboratory QC Samples	LCS	04/17/06	0:00	0.224 PR 112	0.194 PR 96.8
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.01	<0.03
Laboratory QC Samples	LCS	04/26/06	0:00	0.188 PR 93.9	0.171 PR 85.5
Laboratory QC Samples	LCS	04/26/06	0:00	0.175 (GN) PR 87.5 RPD 7.2	0.189 (GN) PR 94.7 RPD 10
Laboratory QC Samples	Lab Blank	04/26/06	0:00	<0.01	<0.03

[6] The result for disulfoton (0.01 ppb) has been qualified with a "less than" (<) symbol even though it was equal to the method detection limit of 0.01 ppb. The qualifier was added because a field blank collected at the same time and location as the qualified environmental sample tested positive for diazinon at a level greater than 1/5 of the concentration found in the environmental sample. The justification for this qualifier is found in Element 22 of the QAPP (Calanchini 2006). An explanation for the likely cause of contamination to the field blank is given in this report under the Analytical Results for Quality Control Samples: Environmental Blanks.

Station Name	Sample Type	Sample Date	Sample Time	Methidathion	Methyl Parathion
Gilsizer Slough at South Township Rd	Grab	03/14/06	7:30	<0.03	<0.01
Gilsizer Slough at South Township Rd	Field Blank	03/14/06	7:31	<0.03	<0.01
Laboratory QC Samples	Lab Blank	03/16/06	0:00	<0.03	<0.01
Laboratory QC Samples	LCS	03/17/06	0:00	0.197 PR 98.5	0.197 PR 98.7
Laboratory QC Samples	LCS	03/17/06	0:00	0.175 PR 87.4, RPD 12	0.189 PR 94.6 RPD 4.1
Laboratory QC Samples	LCS	04/04/06	0:00	0.17 PR 85.2	0.148 PR 74
Laboratory QC Samples	LCS	04/04/06	0:00	0.175 PR 87.6, RPD 2.9	0.151 PR 75.6, RPD 2
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.03	<0.01
Morrison Slough at Luckehe Road	Grab	04/11/06	9:30	<0.03	<0.01
Morrison Slough at Luckehe Road	Field Dup	04/11/06	9:33	<0.03 RPD NA	<0.01 RPD NA
Laboratory QC Samples	LCS	04/17/06	0:00	0.171 PR 85.4	0.16 PR 79.8
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.03	<0.01
Laboratory QC Samples	LCS	04/26/06	0:00	0.177 PR 88.3	0.193 PR 96.3
Laboratory QC Samples	LCS	04/26/06	0:00	0.14 (GN) PR 70.1, RPD 23	0.157 (GN) PR 78.6 RPD 21
Laboratory QC Samples	Lab Blank	04/26/06	0:00	<0.03	<0.01

Station Name	Sample Type	Sample Date	Sample Time	Phorate	Phosmet	% Recovery triphenyl phosphate (surrogate)
Gilsizer Slough at S. Township Rd	Grab	03/14/06	7:30	<0.05	<0.05	105
Gilsizer Slough at S. Township Rd	Field Blank	03/14/06	7:31	<0.05	<0.05	108
Laboratory QC Samples	Lab Blank	03/16/06	0:00	<0.05	<0.05	103
Laboratory QC Samples	LCS	03/17/06	0:00	0.317 PR 79.3	0.364 PR 90.9	104
Laboratory QC Samples	LCS	03/17/06	0:00	0.29 PR 72.6, RPD 8.9	0.343 PR 85.8, RPD 5.9	98
Laboratory QC Samples	LCS	04/04/06	0:00	0.416 (IL) PR 104	0.401 PR 100	101
Laboratory QC Samples	LCS	04/04/06	0:00	0.23 (EUM,IL) PR 57.6, RPD 58	0.393 PR 98.3, RPD 2	101
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.05	<0.05	96.6
Morrison Slough at Luckehe Road	Grab	04/11/06	9:30	<0.05	<0.05	101
Morrison Slough at Luckehe Road	Field Dup	04/11/06	9:33	<0.05 RPD NA	<0.05 RPD NA	104
Laboratory QC Samples	LCS	04/17/06	0:00	0.427 PR 107	0.37 PR 92.4	102
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.05	<0.05	76
Laboratory QC Samples	LCS	04/26/06	0:00	0.424 PR 106	0.402 PR 101	80.5
Laboratory QC Samples	LCS	04/26/06	0:00	0.374 (GN) PR 93.4, RPD 13	0.376 (GN) PR 94, RPD 6.7	59.8 (GN)
Laboratory QC Samples	Lab Blank	04/26/06	0:00	<0.05	<0.05	90.2

Table 4b. Summary of quality control data for selected organophosphate pesticides in samples from the East Stockton area, March-April, 2006.

(All concentrations are in parts per billion (ppb); EUM=laboratory control spike was outside of control limits; FB=field blank; GB=matrix spike recovery not within control limits; GN=surrogate recovery was outside of control limits; IL=RPD exceeded laboratory control limits; J=estimated value; LB= lab blank; LCS=lab control spike; MS=matrix spike; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Azinphos methyl	Chlorpyrifos
Pixley Slough at Ham Lane	Grab	03/14/06	12:20	<0.03	<0.003
Pixley Slough at Ham Lane	FB	03/14/06	12:21	<0.03	<0.003
Laboratory QC Samples	LB	03/16/06	0:00	<0.03	<0.003
Laboratory QC Samples	LCS	03/17/06	0:00	0.166 PR 83.2	0.197 PR 98.3
Laboratory QC Samples	LCS	03/17/06	0:00	0.165 PR 82.3, RPD 0.6	0.176 PR 88.2, RPD 11
Laboratory QC Samples	LCS	04/04/06	0:00	0.161 PR 80.6	0.175 PR 87.5
Laboratory QC Samples	LCS	04/04/06	0:00	0.157 PR 78.3, RPD 2.5	0.174 PR 86.8, RPD 0.57
Laboratory QC Samples	LB	04/04/06	0:00	<0.03	<0.003
Littlejohns Creek at Jack Tone Road	Grab	04/11/06	15:30	<0.03	<0.003
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.178 PR 88.8	0.187 PR 93.5
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.206 PR 103, RPD 15	0.202 PR 101, RPD 7.7
Laboratory QC Samples	LCS	04/17/06	0:00	0.122 (EUM) PR 60.8	0.177 PR 88.5
Laboratory QC Samples	LB	04/17/06	0:00	<0.03	<0.003
Laboratory QC Samples	LCS	04/26/06	0:00	0.166 PR 82.8	0.204 (IL) PR 102
Laboratory QC Samples	LCS	04/26/06	0:00	0.146 (GN) PR 73, RPD 13	0.158 (GN,IL) PR 78.8, RPD 25
Laboratory QC Samples	LB	04/26/06	0:00	<0.03	<0.003

Station Name	Sample Type	Sample Date	Sample Time	Diazinon	Dimethoate
Pixley Slough at Ham Lane	Grab	03/14/06	12:20	0.027	<0.03
Pixley Slough at Ham Lane	FB	03/14/06	12:21	<0.003	<0.03
Laboratory QC Samples	LB	03/16/06	0:00	<0.003	<0.03
Laboratory QC Samples	LCS	03/17/06	0:00	0.184 PR 91.8	0.133 (EUM) PR 66.7
Laboratory QC Samples	LCS	03/17/06	0:00	0.167 PR 83.7, RPD 9.7	0.109 (EUM) PR 54.7, RPD 20
Laboratory QC Samples	LCS	04/04/06	0:00	0.177 PR 88.3	0.117 (EUM,IL) PR 58.3
Laboratory QC Samples	LCS	04/04/06	0:00	0.173 PR 86.5, RPD 2.3	0.058 (EUM,IL) PR 29, RPD 67
Laboratory QC Samples	LB	04/04/06	0:00	<0.003	<0.03
Littlejohns Creek at Jack Tone Road	Grab	04/11/06	15:30	<0.003	<0.03
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.16 PR 80.1	0.196 (IL) PR 98.2
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.16 PR 80.2, RPD 0	0.147 (IL) PR 73.4, RPD 29
Laboratory QC Samples	LCS	04/17/06	0:00	0.142 PR 71.1	0.185 PR 92.3
Laboratory QC Samples	LB	04/17/06	0:00	<0.003	<0.03
Laboratory QC Samples	LCS	04/26/06	0:00	0.168 PR 84.1	0.129 (EUM,IL) PR 64.4
Laboratory QC Samples	LCS	04/26/06	0:00	0.18 (GN) PR 89.8, RPD 6.9	0.171 (GN,IL) PR 85.4, RPD 28
Laboratory QC Samples	LB	04/26/06	0:00	<0.003	<0.03

Station Name	Sample Type	Sample Date	Sample Time	Disulfoton	Malathion
Pixley Slough at Ham Lane	Grab	03/14/06	12:20	0.026 (J)	<0.03
Pixley Slough at Ham Lane	FB	03/14/06	12:21	<0.01	<0.03
Laboratory QC Samples	LB	03/16/06	0:00	<0.01	<0.03
Laboratory QC Samples	LCS	03/17/06	0:00	0.148 PR 73.8	0.202 PR 101
Laboratory QC Samples	LCS	03/17/06	0:00	0.129 (EUM) PR 64.6, RPD 14	0.196 PR 98.1, RPD 3
Laboratory QC Samples	LCS	04/04/06	0:00	0.203 PR 102	0.199 PR 99.4
Laboratory QC Samples	LCS	04/04/06	0:00	0.188 PR 93.8, RPD 7.7	0.199 PR 99.4, RPD 0
Laboratory QC Samples	LB	04/04/06	0:00	<0.01	<0.03
Littlejohns Creek at Jack Tone Road	Grab	04/11/06	15:30	<0.01	<0.03
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.129 (GB) PR 64.5	0.19 PR 95.2
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.142 PR 71, RPD 9.6	0.192 PR 95.8, RPD 1
Laboratory QC Samples	LCS	04/17/06	0:00	0.224 PR 112	0.194 PR 96.8
Laboratory QC Samples	LB	04/17/06	0:00	<0.01	<0.03
Laboratory QC Samples	LCS	04/26/06	0:00	0.188 PR 93.9	0.171 PR 85.5
Laboratory QC Samples	LCS	04/26/06	0:00	0.175 (GN) PR 87.5, RPD 7.2	0.189 (GN) PR 94.7, RPD 10
Laboratory QC Samples	LB	04/26/06	0:00	<0.01	<0.03

Station Name	Sample Type	Sample Date	Sample Time	Methidathion	Parathion, Methyl
Pixley Slough at Ham Lane	Grab	03/14/06	12:20	<0.03	<0.01
Pixley Slough at Ham Lane	FB	03/14/06	12:21	<0.03	<0.01
Laboratory QC Samples	LB	03/16/06	0:00	<0.03	<0.01
Laboratory QC Samples	LCS	03/17/06	0:00	0.197 PR 98.5	0.197 PR 98.7
Laboratory QC Samples	LCS	03/17/06	0:00	0.175 PR 87.4, RPD 12	0.189 PR 94.6, RPD 4.1
Laboratory QC Samples	LCS	04/04/06	0:00	0.17 PR 85.2	0.148 PR 74
Laboratory QC Samples	LCS	04/04/06	0:00	0.175 PR 87.6, RPD 2.9	0.151 PR 75.6, RPD 2
Laboratory QC Samples	LB	04/04/06	0:00	<0.03	<0.01
Littlejohns Creek at Jack Tone Road	Grab	04/11/06	15:30	<0.03	<0.01
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.202 PR 101	0.172 PR 86.2
Littlejohns Creek at Jack Tone Road	MS	04/11/06	15:39	0.197 PR 98.7, RPD 2.5	0.202 PR 101, RPD 16
Laboratory QC Samples	LCS	04/17/06	0:00	0.171 PR 85.4	0.16 PR 79.8
Laboratory QC Samples	LB	04/17/06	0:00	<0.03	<0.01
Laboratory QC Samples	LCS	04/26/06	0:00	0.177 PR 88.3	0.193 PR 96.3
Laboratory QC Samples	LCS	04/26/06	0:00	0.14 (GN) PR 70.1, RPD 23	0.157 (GN) PR 78.6, RPD 21
Laboratory QC Samples	LB	04/26/06	0:00	<0.03	<0.01

Station Name	Sample Type	Sample Date	Sample Time	Phorate	Phosmet	% Recovery triphenyl phosphate (surrogate)
Pixley Slough at Ham Lane	Grab	03/14/06	12:20	<0.05	<0.05	125
Pixley Slough at Ham Lane	FB	03/14/06	12:21	<0.05	<0.05	89
Laboratory QC Samples	LB	03/16/06	0:00	<0.05	<0.05	103
Laboratory QC Samples	LCS	03/17/06	0:00	0.317 PR 79.3	0.364 PR 90.9	104
Laboratory QC Samples	LCS	03/17/06	0:00	0.29 PR 72.6, RPD 8.9	0.343 PR 85.8 RPD 5.9	98
Laboratory QC Samples	LCS	04/04/06	0:00	0.416 (IL) PR 104	0.401 PR 100	101
Laboratory QC Samples	LCS	04/04/06	0:00	0.23 (EUM,IL) PR 57.6, RPD 58	0.393 PR 98.3 RPD 2	101
Laboratory QC Samples	LB	04/04/06	0:00	<0.05	<0.05	96.6
Littlejohns Cr at Jack Tone Rd	Grab	04/11/06	15:30	<0.05	<0.05	100
Littlejohns Cr at Jack Tone Rd	MS	04/11/06	15:39	0.455 PR 114	0.406 PR 102	97.9
Littlejohns Cr at Jack Tone Rd	MS	04/11/06	15:39	0.456 PR 114, RPD 0.22	0.448 PR 112 RPD 9.8	116
Laboratory QC Samples	LCS	04/17/06	0:00	0.427 PR 107	0.37 PR 92.4	102
Laboratory QC Samples	LB	04/17/06	0:00	<0.05	<0.05	76
Laboratory QC Samples	LCS	04/26/06	0:00	0.424 PR 106	0.402 PR 101	80.5
Laboratory QC Samples	LCS	04/26/06	0:00	0.374 (GN) PR 93.4, RPD 13	0.376 (GN) PR 94 RPD 6.7	59.8 (GN)
Laboratory QC Samples	LB	04/26/06	0:00	<0.05	<0.05	90.2

Table 4c. Summary of quality control data for selected organophosphate pesticides in samples from the San Joaquin River Basin, March, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value; LCS=lab control spike; MS= matrix spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Azinphos methyl	Carbaryl	Chlorpyrifos
San Joaquin River at Vernalis	Integrated	03/07/06	10:10	<0.007	<0.007	<0.004
San Joaquin River at Vernalis	Field Blank	03/07/06	10:11	<0.007	<0.007	<0.004
Laboratory QC Samples	Lab Blank	03/08/06	0:00	<0.007	<0.007	<0.004
Laboratory QC Samples	LCS	03/08/06	0:00			0.111 PR 111
Laboratory QC Samples	LCS	03/08/06	0:00			0.105 PR 105, RPD 5.6
Stanislaus River at Caswell S.P.	Grab	03/13/06	10:30	<0.007	<0.007	<0.004
Stanislaus River at Caswell S.P.	Field Dup	03/13/06	10:33	<0.007, RPD NA	<0.007, RPD NA	<0.004, RPD NA
Laboratory QC Samples	Lab Blank	03/15/06	0:00	<0.007	<0.007	<0.004
Laboratory QC Samples	LCS	03/15/06	0:00			0.09 PR 90
Laboratory QC Samples	LCS	03/15/06	0:00			0.097 PR 97, RPD 7.5
Merced River at River Road	Integrated	03/20/06	12:40	<0.007	<0.007	<0.004
Merced River at River Road	MS	03/20/06	12:49			0.113 PR 113
Merced River at River Road	MS	03/20/06	12:49			0.112 PR 112, RPD 0.9
Laboratory QC Samples	Lab Blank	03/21/06	0:00	<0.007	<0.007	<0.004
Laboratory QC Samples	LCS	03/21/06	0:00			0.097 PR 97
Laboratory QC Samples	LCS	03/21/06	0:00			0.095 PR 95, RPD 2.1
Laboratory QC Samples	Lab Blank	03/28/06	0:00	<0.007	<0.007	<0.004
Laboratory QC Samples	LCS	03/28/06	0:00			0.121 PR 121
Laboratory QC Samples	LCS	03/28/06	0:00			0.13 PR 130, RPD 7.2

Station Name	Sample Type	Sample Date	Sample Time	Cyanazine	Dacthal	Diazinon
San Joaquin River at Vernalis	Integrated	03/07/06	10:10	<0.007	<0.007	<0.007
San Joaquin River at Vernalis	Field Blank	03/07/06	10:11	<0.007	<0.007	<0.007
Laboratory QC Samples	Lab Blank	03/08/06	0:00	<0.007	<0.007	<0.007
Laboratory QC Samples	LCS	03/08/06	0:00			0.21, PR 105
Laboratory QC Samples	LCS	03/08/06	0:00			0.196, PR 98, RPD 6.9
Stanislaus River at Caswell S.P.	Grab	03/13/06	10:30	<0.007	<0.007	<0.007
Stanislaus River at Caswell S.P.	Field Dup	03/13/06	10:33	<0.007, RPD NA	<0.007, RPD NA	<0.007, RPD NA
Laboratory QC Samples	Lab Blank	03/15/06	0:00	<0.007	<0.007	<0.007
Laboratory QC Samples	LCS	03/15/06	0:00			0.191, PR 96
Laboratory QC Samples	LCS	03/15/06	0:00			0.164, PR 82, RPD 15.2
Merced River at River Road	Integrated	03/20/06	12:40	<0.007	<0.007	<0.007
Merced River at River Road	MS	03/20/06	12:49			0.21, PR 105
Merced River at River Road	MS	03/20/06	12:49			0.205, PR 103, RPD 1.9
Laboratory QC Samples	Lab Blank	03/21/06	0:00	<0.007	<0.007	<0.007
Laboratory QC Samples	LCS	03/21/06	0:00			0.187, PR 94
Laboratory QC Samples	LCS	03/21/06	0:00			0.189, PR 94, RPD 1.1
Laboratory QC Samples	Lab Blank	03/28/06	0:00	<0.007	<0.007	<0.007
Laboratory QC Samples	LCS	03/28/06	0:00			0.224, PR 112
Laboratory QC Samples	LCS	03/28/06	0:00			0.231, PR 116, RPD 3.5

Station Name	Sample Type	Sample Date	Sample Time	EPTC	Methidathion	Metolachlor
San Joaquin River at Vernalis	Integrated	03/07/06	10:10	<0.02	<0.01	<0.007
San Joaquin River at Vernalis	Field Blank	03/07/06	10:11	<0.02	<0.01	<0.007
Laboratory QC Samples	Lab Blank	03/08/06	0:00	<0.02	<0.01	<0.007
Laboratory QC Samples	LCS	03/08/06	0:00			
Laboratory QC Samples	LCS	03/08/06	0:00			
Stanislaus River at Caswell S.P.	Grab	03/13/06	10:30	<0.02	<0.01	<0.007
Stanislaus River at Caswell S.P.	Field Dup	03/13/06	10:33	<0.02, RPD NA	<0.01, RPD NA	<0.007, RPD NA
Laboratory QC Samples	Lab Blank	03/15/06	0:00	<0.02	<0.01	<0.007
Laboratory QC Samples	LCS	03/15/06	0:00			
Laboratory QC Samples	LCS	03/15/06	0:00			
Merced River at River Road	Integrated	03/20/06	12:40	<0.02	<0.01	<0.007
Merced River at River Road	MS	03/20/06	12:49			
Merced River at River Road	MS	03/20/06	12:49			
Laboratory QC Samples	Lab Blank	03/21/06	0:00	<0.02	<0.01	<0.007
Laboratory QC Samples	LCS	03/21/06	0:00			
Laboratory QC Samples	LCS	03/21/06	0:00			
Laboratory QC Samples	Lab Blank	03/28/06	0:00	<0.02	<0.01	<0.007
Laboratory QC Samples	LCS	03/28/06	0:00			
Laboratory QC Samples	LCS	03/28/06	0:00			

Station Name	Sample Type	Sample Date	Sample Time	Propargite	Simazine	% Recovery chlorpyrifos methyl (surrogate)
San Joaquin River at Vernalis	Integrated	03/07/06	10:10	<0.15	0.055 (J)	121
San Joaquin River at Vernalis	Field Blank	03/07/06	10:11	<0.15	<0.005	120
Laboratory QC Samples	Lab Blank	03/08/06	0:00	<0.15	<0.005	122
Laboratory QC Samples	LCS	03/08/06	0:00			107
Laboratory QC Samples	LCS	03/08/06	0:00			99
Stanislaus River at Caswell S.P.	Grab	03/13/06	10:30	<0.15	0.025 (J)	83
Stanislaus River at Caswell S.P.	Field Dup	03/13/06	10:33	<0.15, RPD NA	0.022 (J), RPD 12.8	81
Laboratory QC Samples	Lab Blank	03/15/06	0:00	<0.15	<0.005	82
Laboratory QC Samples	LCS	03/15/06	0:00			83
Laboratory QC Samples	LCS	03/15/06	0:00			80
Merced River at River Road	Integrated	03/20/06	12:40	<0.15	0.035 (J)	103
Merced River at River Road	MS	03/20/06	12:49			96
Merced River at River Road	MS	03/20/06	12:49			99
Laboratory QC Samples	Lab Blank	03/21/06	0:00	<0.15	<0.005	101
Laboratory QC Samples	LCS	03/21/06	0:00			89
Laboratory QC Samples	LCS	03/21/06	0:00			90
Laboratory QC Samples	Lab Blank	03/28/06	0:00	<0.15	<0.005	110
Laboratory QC Samples	LCS	03/28/06	0:00			109
Laboratory QC Samples	LCS	03/28/06	0:00			117

Table 4d. Summary of quality control data for selected organophosphate pesticides in samples from the San Joaquin River Basin, July-August, 2006.

(All concentrations are in parts per billion (ppb); concentrations of chlorpyrifos and diazinon equal to or greater than the water quality objective for chronic toxicity are listed in bold type; EUM=laboratory control spike was outside of control limits; J=estimated value; LCS=lab control spike; MS=matrix spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference; RSD=relative standard deviation)

Station Name	Sample Type	Sample Date	Sample Time	Azinphos methyl	Chlorpyrifos
San Joaquin River at Vernalis	Integrated	07/06/06	8:50	<0.03	<0.003
San Joaquin River at Vernalis	Field Blank	07/06/06	8:51	<0.03	<0.003
Laboratory QC Samples	LCS	07/10/06	0:00	0.196 PR 97.8	0.191 PR 95.7
Laboratory QC Samples	LCS	07/10/06	0:00	0.152 PR 76.2, RPD 25	0.17 PR 84.9, RPD 12
Laboratory QC Samples	Lab Blank	07/10/06	0:00	<0.03	<0.003
San Joaquin River at Lander Ave	Grab	07/13/06	10:40	<0.03	<0.003
San Joaquin River at Lander Ave	Field Dup	07/13/06	10:43	<0.03 RPD NA	<0.003 RPD NA
Stanislaus River at Caswell S.P.	Grab	07/20/06	8:30	<0.03	0.012
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.141 PR 70.5	0.194 PR 97.2
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.174 PR 87.1, RPD 21	0.199 PR 99.6, RPD 2.5
Laboratory QC Samples	LCS	07/26/06	0:00	0.146 PR 73.2	0.19 PR 95.2
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.03	<0.003
Tuolumne River at Shiloh Road	Integrated	07/27/06	11:10	<0.03	<0.003
Tuolumne River at Shiloh Road	Field Dup	07/27/06	11:13	<0.03 RPD NA	0.011 RPD NA
Laboratory QC Samples	Lab Blank	07/30/06	0:00	<0.03	<0.003
Laboratory QC Samples	LCS	07/31/06	0:00	0.141 PR 70.4	0.185 PR 92.3
Laboratory QC Samples	LCS	07/31/06	0:00	0.148 PR 73.9, RPD 4.8	0.167 PR 83.4, RPD 10
Laboratory QC Samples	LCS	08/02/06	0:00	0.204 PR 102	0.214 PR 107
Laboratory QC Samples	LCS	08/02/06	0:00	0.19 PR 94.8, RPD 7.1	0.197 PR 98.7, RPD 8.3
Laboratory QC Samples	Lab Blank	08/02/06	0:00	<0.03	<0.003
Merced River at River Road	Integrated	08/10/06	13:20	<0.03	<0.003
Merced River at River Road	Field Blank	08/10/06	13:21	<0.03	<0.003

Station Name	Sample Type	Sample Date	Sample Time	Azinphos methyl	Chlorpyrifos
Laboratory QC Samples	LCS	08/11/06	0:00	0.184 PR 91.8	0.177 PR 88.5
Laboratory QC Samples	LCS	08/11/06	0:00	0.197 PR 98.3, RPD 6.8	0.198 PR 99.2, RPD 11
Laboratory QC Samples	Lab Blank	08/11/06	0:00	<0.03	<0.003
San Joaquin River at Patterson	Grab	08/17/06	15:10	<0.03	**0.024**
San Joaquin River at Patterson	Field Dup	08/17/06	15:19	<0.03 RPD NA	0.026 RPD 8
Laboratory QC Samples	LCS	08/24/06	0:00	0.19 PR 95.2	0.162 PR 81.2
Laboratory QC Samples	Lab Blank	08/24/06	0:00	<0.03	<0.003
Laboratory QC Samples	LCS	08/30/06	0:00	0.164 PR 81.8	0.176 PR 87.8
Laboratory QC Samples	LCS	08/30/06	0:00	0.194 PR 97.1, RPD 17	0.2 PR 100, RPD 13
Laboratory QC Samples	Lab Blank	08/30/06	0:00	<0.03	<0.003
San Joaquin River at Vernalis	Integrated	08/31/06	7:30	<0.03	<0.003
San Joaquin River at Vernalis	Field Dup	08/31/06	7:33	<0.03 RPD NA	<0.003 RPD NA

Station Name	Sample Type	Sample Date	Sample Time	Diazinon	Dimethoate
San Joaquin River at Vernalis	Integrated	07/06/06	8:50	<0.003	<0.03
San Joaquin River at Vernalis	Field Blank	07/06/06	8:51	<0.003	<0.03
Laboratory QC Samples	LCS	07/10/06	0:00	0.192 PR 95.9	0.156 PR 78.2
Laboratory QC Samples	LCS	07/10/06	0:00	0.186 PR 92.9, RPD 3.2	0.151 PR 75.6, RPD 3.3
Laboratory QC Samples	Lab Blank	07/10/06	0:00	<0.003	<0.03
San Joaquin River at Lander Ave	Grab	07/13/06	10:40	<0.003	<0.03
San Joaquin River at Lander Ave	Field Dup	07/13/06	10:43	<0.003 RPD NA	<0.03 RPD NA
Stanislaus River at Caswell S.P.	Grab	07/20/06	8:30	<0.003	<0.03
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.185 PR 92.7	0.16 PR 79.8
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.204 PR 102, RPD 9.8	0.179 PR 89.5, RPD 11

Station Name	Sample Type	Sample Date	Sample Time	Diazinon	Dimethoate
Laboratory QC Samples	LCS	07/26/06	0:00	0.189 PR 94.5	0.165 PR 82.5
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.003	<0.03
Tuolumne River at Shiloh Road	Integrated	07/27/06	11:10	<0.003	<0.03
Tuolumne River at Shiloh Road	Field Dup	07/27/06	11:13	<0.003 RPD NA	<0.03 RPD NA
Laboratory QC Samples	Lab Blank	07/30/06	0:00	<0.003	<0.03
Laboratory QC Samples	LCS	07/31/06	0:00	0.199 PR 99.4	0.143 PR 71.5
Laboratory QC Samples	LCS	07/31/06	0:00	0.181 PR 90.5, RPD 9.5	0.14 PR 70.2, RPD 2.1
Laboratory QC Samples	LCS	08/02/06	0:00	0.208 PR 104	0.192 PR 96
Laboratory QC Samples	LCS	08/02/06	0:00	0.216 PR 108, RPD 3.8	0.2 PR 100, RPD 4.1
Laboratory QC Samples	Lab Blank	08/02/06	0:00	<0.003	<0.03
Merced River at River Road	Integrated	08/10/06	13:20	<0.003	<0.03
Merced River at River Road	Field Blank	08/10/06	13:21	<0.003	<0.03
Laboratory QC Samples	LCS	08/11/06	0:00	0.159 PR 79.3	0.154 PR 76.9
Laboratory QC Samples	LCS	08/11/06	0:00	0.18 PR 89.9, RPD 12	0.178 PR 88.9, RPD 14
Laboratory QC Samples	Lab Blank	08/11/06	0:00	<0.003	<0.03
San Joaquin River at Patterson	Grab	08/17/06	15:10	<0.003	0.031 (J)
San Joaquin River at Patterson	Field Dup	08/17/06	15:19	<0.003 RPD NA	0.036 (J) RPD 14.9
Laboratory QC Samples	LCS	08/24/06	0:00	0.212 PR 106	0.182 PR 91.2
Laboratory QC Samples	Lab Blank	08/24/06	0:00	<0.003	<0.03
Laboratory QC Samples	LCS	08/30/06	0:00	0.184 PR 92.1	0.166 PR 82.8
Laboratory QC Samples	LCS	08/30/06	0:00	0.224 PR 112, RPD 20	0.189 PR 94.3, RPD 13
Laboratory QC Samples	Lab Blank	08/30/06	0:00	<0.003	<0.03
San Joaquin River at Vernalis	Integrated	08/31/06	7:30	<0.003	<0.03
San Joaquin River at Vernalis	Field Dup	08/31/06	7:33	<0.003 RPD NA	<0.03 RPD NA

Station Name	Sample Type	Sample Date	Sample Time	Disulfoton	Malathion
San Joaquin River at Vernalis	Integrated	07/06/06	8:50	<0.01	<0.03
San Joaquin River at Vernalis	Field Blank	07/06/06	8:51	<0.01	<0.03
Laboratory QC Samples	LCS	07/10/06	0:00	0.148 PR 73.8	0.186 PR 93
Laboratory QC Samples	LCS	07/10/06	0:00	0.144 PR 71.9, RPD 2.7	0.158 PR 79, RPD 16
Laboratory QC Samples	Lab Blank	07/10/06	0:00	<0.01	<0.03
San Joaquin River at Lander Ave	Grab	07/13/06	10:40	<0.01	<0.03
San Joaquin River at Lander Ave	Field Dup	07/13/06	10:43	<0.01 RPD NA	<0.03 RPD NA
Stanislaus River at Caswell S.P.	Grab	07/20/06	8:30	<0.01	<0.03
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.151 PR 75.6	0.183 PR 91.3
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.176 PR 88.2, RPD 15	0.191 PR 95.7, RPD 4.3
Laboratory QC Samples	LCS	07/26/06	0:00	0.148 PR 73.8	0.184 PR 91.9
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.01	<0.03
Tuolumne River at Shiloh Road	Integrated	07/27/06	11:10	<0.01	<0.03
Tuolumne River at Shiloh Road	Field Dup	07/27/06	11:13	<0.01 RPD NA	<0.03 RPD NA
Laboratory QC Samples	Lab Blank	07/30/06	0:00	<0.01	<0.03
Laboratory QC Samples	LCS	07/31/06	0:00	0.172 PR 86.1	0.192 PR 95.9
Laboratory QC Samples	LCS	07/31/06	0:00	0.16 PR 79.8, RPD 7.2	0.195 PR 97.3, RPD 1.6
Laboratory QC Samples	LCS	08/02/06	0:00	0.185 PR 92.6	0.236 PR 118
Laboratory QC Samples	LCS	08/02/06	0:00	0.2 PR 100, RPD 7.8	0.218 PR 109, RPD 7.9
Laboratory QC Samples	Lab Blank	08/02/06	0:00	<0.01	<0.03
Merced River at River Road	Integrated	08/10/06	13:20	<0.01	<0.03
Merced River at River Road	Field Blank	08/10/06	13:21	<0.01	<0.03
Laboratory QC Samples	LCS	08/11/06	0:00	0.142 PR 71	0.204 PR 102
Laboratory QC Samples	LCS	08/11/06	0:00	0.178 PR 88.8, RPD 23	0.202 PR 101, RPD 0.99
Laboratory QC Samples	Lab Blank	08/11/06	0:00	<0.01	<0.03
San Joaquin River at Patterson	Grab	08/17/06	15:10	<0.01	<0.03
San Joaquin River at Patterson	Field Dup	08/17/06	15:19	<0.01 RPD NA	<0.03 RPD NA
Laboratory QC Samples	LCS	08/24/06	0:00	0.155 PR 77.6	0.175 PR 87.7

Station Name	Sample Type	Sample Date	Sample Time	Disulfoton	Malathion
Laboratory QC Samples	Lab Blank	08/24/06	0:00	<0.01	<0.03
Laboratory QC Samples	LCS	08/30/06	0:00	0.163 PR 81.5	0.195 PR 97.7
Laboratory QC Samples	LCS	08/30/06	0:00	0.177 PR 88.7, RPD 8.2	0.214 PR 107, RPD 9.3
Laboratory QC Samples	Lab Blank	08/30/06	0:00	<0.01	<0.03
San Joaquin River at Vernalis	Integrated	08/31/06	7:30	<0.01	<0.03
San Joaquin River at Vernalis	Field Dup	08/31/06	7:33	<0.01 RPD NA	<0.03 RPD NA

Station Name	Sample Type	Sample Date	Sample Time	Methidathion	Methyl Parathion
San Joaquin River at Vernalis	Integrated	07/06/06	8:50	<0.03	<0.01
San Joaquin River at Vernalis	Field Blank	07/06/06	8:51	<0.03	<0.01
Laboratory QC Samples	LCS	07/10/06	0:00	0.187 PR 93.6	0.187 PR 93.7
Laboratory QC Samples	LCS	07/10/06	0:00	0.155 PR 77.3, RPD 19	0.15 PR 75.2, RPD 22
Laboratory QC Samples	Lab Blank	07/10/06	0:00	<0.03	<0.01
San Joaquin River at Lander Ave	Grab	07/13/06	10:40	<0.03	<0.01
San Joaquin River at Lander Ave	Field Dup	07/13/06	10:43	<0.03 RPD NA	<0.01 RPD NA
Stanislaus River at Caswell S.P.	Grab	07/20/06	8:30	<0.03	<0.01
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.173 PR 86.4	0.173 PR 86.5
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.185 PR 92.6, RPD 6.7	0.183 PR 91.4, RPD 5.6
Laboratory QC Samples	LCS	07/26/06	0:00	0.175 PR 87.3	0.17 PR 84.9
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.03	<0.01
Tuolumne River at Shiloh Road	Integrated	07/27/06	11:10	<0.03	<0.01
Tuolumne River at Shiloh Road	Field Dup	07/27/06	11:13	<0.03 RPD NA	<0.01 RPD NA
Laboratory QC Samples	Lab Blank	07/30/06	0:00	<0.03	<0.01
Laboratory QC Samples	LCS	07/31/06	0:00	0.16 PR 79.8	0.164 PR 81.8
Laboratory QC Samples	LCS	07/31/06	0:00	0.141 PR 70.5, RPD 13	0.144 PR 71.8, RPD 13

Station Name	Sample Type	Sample Date	Sample Time	Methidathion	Methyl Parathion
Laboratory QC Samples	LCS	08/02/06	0:00	0.224 PR 112	0.214 PR 107
Laboratory QC Samples	LCS	08/02/06	0:00	0.224 PR 112, RPD 0	0.22 PR 110, RPD 2.8
Laboratory QC Samples	Lab Blank	08/02/06	0:00	<0.03	<0.01
Merced River at River Road	Integrated	08/10/06	13:20	<0.03	<0.01
Merced River at River Road	Field Blank	08/10/06	13:21	<0.03	<0.01
Laboratory QC Samples	LCS	08/11/06	0:00	0.173 PR 86.5	0.193 PR 96.3
Laboratory QC Samples	LCS	08/11/06	0:00	0.191 PR 95.6, RPD 9.9	0.196 PR 98.2, RPD 1.5
Laboratory QC Samples	Lab Blank	08/11/06	0:00	<0.03	<0.01
San Joaquin River at Patterson	Grab	08/17/06	15:10	<0.03	<0.01
San Joaquin River at Patterson	Field Dup	08/17/06	15:19	<0.03 RPD NA	<0.01 RPD NA
Laboratory QC Samples	LCS	08/24/06	0:00	0.167 PR 83.4	0.167 PR 83.4
Laboratory QC Samples	Lab Blank	08/24/06	0:00	<0.03	<0.01
Laboratory QC Samples	LCS	08/30/06	0:00	0.187 PR 93.4	0.168 PR 83.9
Laboratory QC Samples	LCS	08/30/06	0:00	0.202 PR 101, RPD 7.7	0.173 PR 86.7, RPD 2.9
Laboratory QC Samples	Lab Blank	08/30/06	0:00	<0.03	<0.01
San Joaquin River at Vernalis	Integrated	08/31/06	7:30	<0.03	<0.01
San Joaquin River at Vernalis	Field Dup	08/31/06	7:33	<0.03 RPD NA	<0.01 RPD NA

Station Name	Sample Type	Sample Date	Sample Time	Phorate	Phosmet	% Recovery triphenyl phosphate (surrogate)
San Joaquin River at Vernalis	Integrated	07/06/06	8:50	<0.05	<0.05	87.3

Station Name	Sample Type	Sample Date	Sample Time	Phorate	Phosmet	% Recovery triphenyl phosphate (surrogate)
San Joaquin River at Vernalis	Field Blank	07/06/06	8:51	<0.05	<0.05	82.7
Laboratory QC Samples	LCS	07/10/06	0:00	0.318 PR 79.6	0.44 PR 110	88.9
Laboratory QC Samples	LCS	07/10/06	0:00	0.309 PR 77.3, RPD 2.9	0.376 PR 93.9, RPD 16	76.2
Laboratory QC Samples	Lab Blank	07/10/06	0:00	<0.05	<0.05	87.1
San Joaquin River at Lander Ave	Grab	07/13/06	10:40	<0.05	<0.05	98.9
San Joaquin River at Lander Ave	Field Dup	07/13/06	10:43	<0.05 RPD NA	<0.05 RPD NA	96.2
Stanislaus River at Caswell S.P.	Grab	07/20/06	8:30	<0.05	<0.05	96.8
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.314 PR 78.5	0.398 PR 99.6	88.9
Stanislaus River at Caswell S.P.	MS	07/20/06	8:39	0.346 PR 86.6, RPD 9.7	0.4 PR 100, RPD 0.5	91.6
Laboratory QC Samples	LCS	07/26/06	0:00	0.299 PR 74.8	0.382 PR 95.5	93.5
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.05	<0.05	96.9
Tuolumne River at Shiloh Road	Integrated	07/27/06	11:10	<0.05	<0.05	94.7
Tuolumne River at Shiloh Road	Field Dup	07/27/06	11:13	<0.05 RPD NA	<0.05 RPD NA	92.3
Laboratory QC Samples	Lab Blank	07/30/06	0:00	<0.05	<0.05	80.8
Laboratory QC Samples	LCS	07/31/06	0:00	0.293 PR 73.2	0.361 PR 90.2	92.6
Laboratory QC Samples	LCS	07/31/06	0:00	0.279 (EUM) PR 69.8, RPD 4.9	0.326 PR 81.5, RPD 10	75.4
Laboratory QC Samples	LCS	08/02/06	0:00	0.38 PR 95.1	0.448 PR 112	102
Laboratory QC Samples	LCS	08/02/06	0:00	0.382 PR 95.5, RPD 0.52	0.452 PR 113, RPD 0.89	91.8
Laboratory QC Samples	Lab Blank	08/02/06	0:00	<0.05	<0.05	111
Merced River at River Road	Integrated	08/10/06	13:20	<0.05	<0.05	86.9
Merced River at River Road	Field Blank	08/10/06	13:21	<0.05	<0.05	98.1
Laboratory QC Samples	LCS	08/11/06	0:00	0.374 PR 93.6	0.428 PR 107	91.6
Laboratory QC Samples	LCS	08/11/06	0:00	0.359 PR 89.7, RPD 4.1	0.44 PR 110, RPD 2.8	96.4
Laboratory QC Samples	Lab Blank	08/11/06	0:00	<0.05	<0.05	94.1

Station Name	Sample Type	Sample Date	Sample Time	Phorate	Phosmet	% Recovery triphenyl phosphate (surrogate)
San Joaquin River at Patterson	Grab	08/17/06	15:10	<0.05	<0.05	110
San Joaquin River at Patterson	Field Dup	08/17/06	15:19	<0.05 RPD NA	<0.05 RPD NA	94.5
Laboratory QC Samples	LCS	08/24/06	0:00	0.4 PR 100	0.416 PR 104	97.7
Laboratory QC Samples	Lab Blank	08/24/06	0:00	<0.05	<0.05	98.4
Laboratory QC Samples	LCS	08/30/06	0:00	0.424 PR 106	0.452 PR 113	86.7
Laboratory QC Samples	LCS	08/30/06	0:00	0.476 PR 119, RPD 12	0.476 PR 119, RPD 5.2	99.5
Laboratory QC Samples	Lab Blank	08/30/06	0:00	<0.05	<0.05	97.6
San Joaquin River at Vernalis	Integrated	08/31/06	7:30	<0.05	<0.05	103
San Joaquin River at Vernalis	Field Dup	08/31/06	7:33	<0.05 RPD NA	<0.05 RPD NA	89.5

Table 5a. Concentrations of selected carbamate pesticides, the fungicide captan, and the herbicides diuron and linuron in samples from the Sacramento River Basin, March-April, 2006.

(All concentrations are in parts per billion (ppb); NA=not applicable)

Station Name	Sample Date	Sample Time	Aldicarb	Captan	Carbaryl	Carbo-furan	Diuron	Linuron	Methio-carb	Metho -myl
Gilsizer Slough at South Township Road	03/14/06	7:30	<0.01	<0.05	<0.01	<0.01	0.44	<0.002	<0.05	<0.01
Gilsizer Slough at South Township Road	03/28/06	7:20	<0.01	<0.05	<0.01	0.0496	0.081	<0.002	<0.05	<0.01
Gilsizer Slough at South Township Road	04/11/06	8:30	<0.01	<0.05	<0.01	<0.01	0.105	<0.002	<0.05	<0.01
Gilsizer Slough at South Township Road	04/25/06	7:40	<0.01	<0.05	<0.01	<0.01	0.031	<0.002	<0.05	<0.01
Live Oak Slough at Nuestro Rd	03/14/06	8:20	<0.01	<0.05	<0.01	<0.01	0.5	<0.002	<0.05	<0.01
Live Oak Slough at Nuestro Rd	03/28/06	8:00	<0.01	<0.05	<0.01	<0.01	1.158	<0.002	<0.05	<0.01
Live Oak Slough at Nuestro Rd	04/11/06	9:00	<0.01	<0.05	<0.01	<0.01	0.035	<0.002	<0.05	<0.01
Live Oak Slough at Nuestro Rd	04/25/06	8:10	<0.01	<0.05	<0.01	<0.01	<0.002	<0.002	<0.05	<0.01

	Aldicarb	Captan	Carbaryl	Carbofuran	Diuron	Linuron	Methiocarb	Methomyl
Total Samples	8	8	8	8	8	8	8	8
Number of Detections	0	0	0	1	7	0	0	0
Frequency (%)	0	0	0	12.5	87.5	0	0	0
Mean	NA	NA	NA	0.0496	0.3357	NA	NA	NA
Median (detects only)	NA	NA	NA	0.0496	0.105	NA	NA	NA
Median (all samples)	0	0	0	0	0.093	0	0	0
Minimum	0	0	0	0.0496	0.031	0	0	0
Maximum	0	0	0	0.0496	1.158	0	0	0
Standard Deviation	NA	NA	NA	NA	0.4114	NA	NA	NA

Table 5b. Concentrations of selected carbamate pesticides, the fungicide captan, and the herbicides diuron and linuron in samples from the East Stockton area, March-April, 2006.

(All concentrations are in parts per billion (ppb); NA=not applicable)

Station Name	Sample Date	Sample Time	Aldicarb	Captan	Carbaryl	Carbo-furan	Diuron	Linuron	Methio-carb	Metho-myl
Lone Tree Creek at Austin Rd	03/14/06	14:00	<0.01	<0.05	<0.01	<0.01	0.36	<0.002	<0.05	<0.01
Lone Tree Creek at Austin Rd	03/28/06	13:20	<0.01	<0.05	<0.01	<0.01	0.022	<0.002	<0.05	<0.01
Lone Tree Creek at Austin Rd	04/11/06	16:00	<0.01	<0.05	<0.01	<0.01	1.4	<0.002	<0.05	<0.01
Lone Tree Creek at Austin Rd	04/25/06	14:00	<0.01	<0.05	<0.01	<0.01	0.458	<0.002	<0.05	<0.01

	Aldicarb	Captan	Carbaryl	Carbofuran	Diuron	Linuron	Methiocarb	Methomyl
Total Samples	4	4	4	4	4	4	4	4
Number of Detections	0	0	0	0	4	0	0	0
Frequency (%)	0	0	0	0	100	0	0	0
Mean	NA	NA	NA	NA	0.56	NA	NA	NA
Median (detects only)	NA	NA	NA	NA	0.409	NA	NA	NA
Median (all samples)	0	0	0	0	0.409	0	0	0
Minimum	0	0	0	0	0.022	0	0	0
Maximum	0	0	0	0	1.4	0	0	0
Standard Deviation	NA	NA	NA	NA	0.590	NA	NA	NA

Table 6a. Summary of quality control data for selected carbamate pesticides, the fungicide captan, and the herbicides diuron and linuron in samples from the Sacramento River Basin, March-April, 2006.

(All concentrations are in parts per billion (ppb); EUM=laboratory control spike was outside of control limits; IL=RPD exceeded laboratory control limits; LCS=lab control spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Aldicarb	Captan
Laboratory QC Samples	LCS	03/17/06	0:00	0.159 PR 79.5	0.88 PR 88
Laboratory QC Samples	LCS	03/17/06	0:00	0.141 PR 70.4, RPD 12	1.0 PR 100, RPD 13
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.01	<0.05
Live Oak Slough at Nuestro Rd	Grab	03/28/06	8:00	<0.01	<0.05
Live Oak Slough at Nuestro Rd	Field Dup	03/28/06	8:03	<0.01 RPD NA	<0.05 RPD NA
Laboratory QC Samples	LCS	04/04/06	0:00	0.179 (IL) PR 89.7	0.867 PR 86.7
Laboratory QC Samples	LCS	04/04/06	0:00	0.237 (IL) PR 118, RPD 28	0.804 PR 80.4 RPD 7.5
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.01	<0.05
Laboratory QC Samples	LCS	04/17/06	0:00	0.165 PR 82.6	0.96 PR 96
Laboratory QC Samples	LCS	04/17/06	0:00	0.164 PR 82 RPD 0.61	0.904 PR 90.4 RPD 6
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.01	<0.05
Laboratory QC Samples	LCS	04/27/06	0:00	0.144 (IL) PR 71.9	0.908 (IL) PR 90.8
Laboratory QC Samples	LCS	04/27/06	0:00	0.203 (IL) PR 101, RPD 34	1.17 (IL) PR 117 RPD 25
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.01	<0.05

Station Name	Sample Type	Sample Date	Sample Time	Carbaryl	Carbofuran
Laboratory QC Samples	LCS	03/17/06	0:00	0.212 PR 106	0.161 PR 80.6
Laboratory QC Samples	LCS	03/17/06	0:00	0.214 PR 107 0.215 RPD 0.94	0.143 PR 71.6, RPD 12
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.01	<0.01
Live Oak Slough at Nuestro Rd	Grab	03/28/06	8:00	<0.01	<0.01
Live Oak Slough at Nuestro Rd	Field Dup	03/28/06	8:03	<0.01 RPD NA	<0.01 RPD NA
Laboratory QC Samples	LCS	04/04/06	0:00	0.19 PR 94.8	0.184 PR 92
Laboratory QC Samples	LCS	04/04/06	0:00	0.209 PR 105 RPD 9.5	0.192 PR 96.2, RPD 4.3
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.01	<0.01
Laboratory QC Samples	LCS	04/17/06	0:00	0.2 PR 100	0.187 PR 93.6
Laboratory QC Samples	LCS	04/17/06	0:00	0.201 PR 100 RPD 0.5	0.165 PR 82.6, RPD 13
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.01	<0.01
Laboratory QC Samples	LCS	04/27/06	0:00	0.151 PR 75.4	0.195 PR 97.6
Laboratory QC Samples	LCS	04/27/06	0:00	0.167 PR 83.5 RPD 10	0.222 PR 111, RPD 13
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.01	<0.01

Station Name	Sample Type	Sample Date	Sample Time	Diuron	Linuron
Laboratory QC Samples	LCS	03/17/06	0:00	0.074 PR 74.1	0.076 (IL) PR 76.3
Laboratory QC Samples	LCS	03/17/06	0:00	0.084 PR 83.6, RPD 13	0.11 (IL) PR 110 RPD 37
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.002	<0.002
Live Oak Slough at Nuestro Rd	Grab	03/28/06	8:00	1.158	<0.002
Live Oak Slough at Nuestro Rd	Field Dup	03/28/06	8:03	0.996 RPD 15	<0.002 RPD NA
Laboratory QC Samples	LCS	04/04/06	0:00	0.074 PR 73.9	0.114 PR 114
Laboratory QC Samples	LCS	04/04/06	0:00	0.092 PR 91.7, RPD 22	0.111 PR 111 RPD 2.7
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.002	<0.002
Laboratory QC Samples	LCS	04/17/06	0:00	0.128 (EUM) PR 128	0.115 PR 115
Laboratory QC Samples	LCS	04/17/06	0:00	0.122 PR 122, RPD 4.8	0.124 PR 124 RPD 7.5
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.002	<0.002
Laboratory QC Samples	LCS	04/27/06	0:00	0.083 PR 83.1	0.094 (IL) PR 93.8
Laboratory QC Samples	LCS	04/27/06	0:00	0.082 PR 82.2, RPD 1.2	0.073 (IL) PR 72.8 RPD 25
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.002	<0.002

Station Name	Sample Type	Sample Date	Sample Time	Methiocarb	Methomyl
Laboratory QC Samples	LCS	03/17/06	0:00	0.336 PR 83.9	0.179 PR 89.5
Laboratory QC Samples	LCS	03/17/06	0:00	0.311 PR 77.7 RPD 7.7	0.164 PR 81.9 RPD 8.7
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.05	<0.01
Live Oak Slough at Nuestro Rd	Grab	03/28/06	8:00	<0.05	<0.01
Live Oak Slough at Nuestro Rd	Field Dup	03/28/06	8:03	<0.05 RPD NA	<0.01 RPD NA
Laboratory QC Samples	LCS	04/04/06	0:00	0.329 PR 82.3	0.126 (EUM) PR 62.9
Laboratory QC Samples	LCS	04/04/06	0:00	0.378 PR 94.4 RPD 14	0.12 (EUM) PR 60.1 RPD 4.9
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.05	<0.01
Laboratory QC Samples	LCS	04/17/06	0:00	0.308 PR 77.1	0.16 PR 79.8
Laboratory QC Samples	LCS	04/17/06	0:00	0.321 PR 80.3 RPD 4.1	0.162 PR 80.8 RPD 1.2
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.05	<0.01
Laboratory QC Samples	LCS	04/27/06	0:00	0.268 (EUM,IL) 0.269 PR 67.1	0.145 (IL) PR 72.3
Laboratory QC Samples	LCS	04/27/06	0:00	0.368 (IL) PR 92 RPD 31	0.23 (IL) PR 115 RPD 45
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.05	<0.01

Table 6b. Summary of quality control data for selected carbamate pesticides, the fungicide captan, and the herbicides diuron and linuron in samples from the East Stockton area, March-April, 2006.

(All concentrations are in parts per billion (ppb); EUM=laboratory control spike was outside of control limits; IL=RPD exceeded laboratory control limits; LCS=lab control spike; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Aldicarb	Captan
Laboratory QC Samples	LCS	03/17/06	0:00	0.159 PR 79.5	0.88 PR 88
Laboratory QC Samples	LCS	03/17/06	0:00	0.141 PR 70.4, RPD 12	1 PR 100, RPD 13
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.01	<0.05
Laboratory QC Samples	LCS	04/04/06	0:00	0.179 (IL) PR 89.7	0.867 PR 86.7
Laboratory QC Samples	LCS	04/04/06	0:00	0.237 (IL) PR 118, RPD 28	0.804 PR 80.4, RPD 7.5
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.01	<0.05
Laboratory QC Samples	LCS	04/17/06	0:00	0.165 PR 82.6	0.96 PR 96
Laboratory QC Samples	LCS	04/17/06	0:00	0.164 PR 82, RPD 0.61	0.904 PR 90.4, RPD 6
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.01	<0.05
Laboratory QC Samples	LCS	04/27/06	0:00	0.144 (IL) PR 71.9	0.908 (IL) PR 90.8
Laboratory QC Samples	LCS	04/27/06	0:00	0.203 (IL) PR 101, RPD 34	1.17 (IL) PR 117, RPD 25
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.01	<0.05

Station Name	Sample Type	Sample Date	Sample Time	Carbaryl	Carbofuran
Laboratory QC Samples	LCS	03/17/06	0:00	0.212 PR 106	0.161 PR 80.6
Laboratory QC Samples	LCS	03/17/06	0:00	0.214 PR 107, RPD 0.94	0.143 PR 71.6, RPD 12
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.01	<0.01
Laboratory QC Samples	LCS	04/04/06	0:00	0.19 PR 94.8	0.184 PR 92
Laboratory QC Samples	LCS	04/04/06	0:00	0.209 PR 105, RPD 9.5	0.192 PR 96.2, RPD 4.3
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.01	<0.01
Laboratory QC Samples	LCS	04/17/06	0:00	0.2 PR 100	0.187 PR 93.6
Laboratory QC Samples	LCS	04/17/06	0:00	0.201 PR 100, RPD 0.5	0.165 PR 82.6, RPD 13
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.01	<0.01
Laboratory QC Samples	LCS	04/27/06	0:00	0.151 PR 75.4	0.195 PR 97.6
Laboratory QC Samples	LCS	04/27/06	0:00	0.167 PR 83.5, RPD 10	0.222 PR 111, RPD 13
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.01	<0.01

Station Name	Sample Type	Sample Date	Sample Time	Diuron	Linuron
Laboratory QC Samples	LCS	03/17/06	0:00	0.074 PR 74.1	0.076 (IL) PR 76.3
Laboratory QC Samples	LCS	03/17/06	0:00	0.084 PR 83.6, RPD 13	0.11 (IL) PR 110, RPD 37
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.002	<0.002
Laboratory QC Samples	LCS	04/04/06	0:00	0.074 PR 73.9	0.114 PR 114
Laboratory QC Samples	LCS	04/04/06	0:00	0.092 PR 91.7, RPD 22	0.111 PR 111, RPD 2.7
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.002	<0.002
Laboratory QC Samples	LCS	04/17/06	0:00	0.128 (EUM) PR 128	0.115 PR 115
Laboratory QC Samples	LCS	04/17/06	0:00	0.122 PR 122, RPD 4.8	0.124 PR 124, RPD 7.5
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.002	<0.002
Laboratory QC Samples	LCS	04/27/06	0:00	0.083 PR 83.1	0.094 (IL) PR 93.8
Laboratory QC Samples	LCS	04/27/06	0:00	0.082 PR 82.2, RPD 1.2	0.073 (IL) PR 72.8, RPD 25
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.002	<0.002

Station Name	Sample Type	Sample Date	Sample Time	Methiocarb	Methomyl
Laboratory QC Samples	LCS	03/17/06	0:00	0.336 PR 83.9	0.179 PR 89.5
Laboratory QC Samples	LCS	03/17/06	0:00	0.311 PR 77.7, RPD 7.7	0.164 PR 81.9, RPD 8.7
Laboratory QC Samples	Lab Blank	03/17/06	0:00	<0.05	<0.01
Laboratory QC Samples	LCS	04/04/06	0:00	0.329 PR 82.3	0.126 (EUM) PR 62.9
Laboratory QC Samples	LCS	04/04/06	0:00	0.378 PR 94.4, RPD 14	0.12 (EUM) PR 60.1, RPD 4.9
Laboratory QC Samples	Lab Blank	04/04/06	0:00	<0.05	<0.01
Laboratory QC Samples	LCS	04/17/06	0:00	0.308 PR 77.1	0.16 PR 79.8
Laboratory QC Samples	LCS	04/17/06	0:00	0.321 PR 80.3, RPD 4.1	0.162 PR 80.8, RPD 1.2
Laboratory QC Samples	Lab Blank	04/17/06	0:00	<0.05	<0.01
Laboratory QC Samples	LCS	04/27/06	0:00	0.268 (EUM,IL) PR 67.1	0.145 (IL) PR 72.3
Laboratory QC Samples	LCS	04/27/06	0:00	0.368 (IL) PR 92, RPD 31	0.23 (IL) PR 115, RPD 45
Laboratory QC Samples	Lab Blank	04/27/06	0:00	<0.05	<0.01

Table 7a. Paraquat concentrations in samples from the Sacramento River Basin, March-April, 2006.

(All concentrations are in parts per billion (ppb); detected concentrations are in bold; NA=not applicable)

Station Name	Sample Date	Sample Time	Paraquat dichloride
Angel Canal/Comanche Creek at Crouch Avenue	03/14/06	9:50	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	03/28/06	9:20	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	04/11/06	11:40	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	04/25/06	9:40	<0.02
Morrison Slough at Luckehe Road	03/14/06	8:50	<0.02
Morrison Slough at Luckehe Road	03/28/06	8:30	<0.02
Morrison Slough at Luckehe Road	04/11/06	9:30	<0.02
Morrison Slough at Luckehe Road	04/25/06	8:40	<0.02

	Paraquat dichloride
Total Samples	8
Number of Detections	0
Frequency (%)	0
Mean	NA
Median (detects only)	NA
Median (all samples)	0
Minimum	0
Maximum	0
Standard Deviation	NA

Table 7b. Paraquat concentrations in samples from the East Stockton area, March-April, 2006.

(All concentrations are in parts per billion (ppb); detected concentrations are in bold; NA=not applicable)

Station Name	Sample Date	Sample Time	Paraquat dichloride
Littlejohns Creek at Jack Tone Road	03/14/06	13:40	<0.02
Littlejohns Creek at Jack Tone Road	03/28/06	13:10	<0.02
Littlejohns Creek at Jack Tone Road	04/11/06	15:30	<0.02
Littlejohns Creek at Jack Tone Road	04/25/06	13:50	<0.02
Lone Tree Creek at Austin Road	03/14/06	14:00	<0.02
Lone Tree Creek at Austin Road	03/28/06	13:20	<0.02
Lone Tree Creek at Austin Road	04/11/06	16:00	<0.02
Lone Tree Creek at Austin Road	04/25/06	14:00	<0.02
Mormon Slough at Copperopolis Road	03/14/06	13:10	<0.02
Mormon Slough at Copperopolis Road	03/28/06	12:40	<0.02
Mormon Slough at Copperopolis Road	04/11/06	15:10	<0.02
Mormon Slough at Copperopolis Road	04/25/06	13:30	<0.02
Pixley Slough at Ham Lane	03/14/06	12:20	<0.02
Pixley Slough at Ham Lane	03/28/06	12:00	<0.02
Pixley Slough at Ham Lane	04/11/06	14:30	<0.02
Pixley Slough at Ham Lane	04/25/06	12:40	<0.02

	Paraquat dichloride
Total Samples	16
Number of Detections	0
Frequency (%)	0
Mean	NA
Median	0
Minimum	0
Maximum	0
Standard Deviation	NA

Table 8a. Summary of quality control data for paraquat in samples from the Sacramento River Basin, March-May, 2006.

(All concentrations are in parts per billion (ppb); GB=matrix spike recovery was not within control limits; IL=RPD exceeded laboratory control limits; LCS=lab control spike; MS=matrix spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Paraquat dichloride
Morrison Slough at Luckehe Road	Grab	03/14/06	8:50	<0.02
Morrison Slough at Luckehe Road	Lab Dup	03/14/06	8:50	<0.02 RPD NA
Laboratory QC Samples	LCS	03/21/06	0:00	0.375 (IL) PR 74.9
Laboratory QC Samples	LCS	03/21/06	0:00	0.52 (IL) PR 104, RPD 32
Laboratory QC Samples	Lab Blank	03/21/06	0:00	<0.02
Morrison Slough at Luckehe Road	Grab	03/28/06	8:30	<0.02
Morrison Slough at Luckehe Road	Lab Dup	03/28/06	8:30	<0.02 RPD NA
Laboratory QC Samples	LCS	03/30/06	0:00	0.412 PR 82.4
Laboratory QC Samples	LCS	03/30/06	0:00	0.389 PR 77.8, RPD 5.7
Laboratory QC Samples	Lab Blank	03/30/06	0:00	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	Grab	04/11/06	11:40	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	Lab Dup	04/11/06	11:40	<0.02 RPD NA
Laboratory QC Samples	LCS	04/14/06	0:00	0.457 PR 91.3
Laboratory QC Samples	LCS	04/14/06	0:00	0.5 PR 100, RPD 9
Laboratory QC Samples	Lab Blank	04/14/06	0:00	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	Grab	04/25/06	9:40	<0.02
Angel Canal/Comanche Creek at Crouch Avenue	Lab Dup	04/25/06	9:40	<0.02 RPD NA
Angel Canal/Comanche Creek at Crouch Avenue	MS	04/25/06	9:49	0.357 PR 71.4
Angel Canal/Comanche Creek at Crouch Avenue	MS	04/25/06	9:49	0.349 (GB) PR 69.8, RPD 2.3
Laboratory QC Samples	LCS	05/01/06	0:00	0.451 PR 90.2
Laboratory QC Samples	Lab Blank	05/01/06	0:00	<0.02

Table 8b. Summary of quality control data for paraquat in samples from the East Stockton area, March-May, 2006.

(All concentrations are in parts per billion (ppb); IL=RPD exceeded laboratory control limits; LCS=lab control spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Paraquat dichloride
Laboratory QA Samples	LCS	03/21/06	0:00	0.375 (IL) PR 74.9
Laboratory QA Samples	LCS	03/21/06	0:00	0.52 (IL) PR 104, RPD 32
Laboratory QA Samples	Lab Blank	03/21/06	0:00	<0.02
Mormon Slough at Copperopolis Road	Integrated	03/28/06	12:40	<0.02
Mormon Slough at Copperopolis Road	Field Dup	03/28/06	12:43	<0.02 RPD NA
Laboratory QA Samples	LCS	03/30/06	0:00	0.412 PR 82.4
Laboratory QA Samples	LCS	03/30/06	0:00	0.389 PR 77.8, RPD 5.7
Laboratory QA Samples	Lab Blank	03/30/06	0:00	<0.02
Laboratory QA Samples	LCS	04/14/06	0:00	0.457 PR 91.3
Laboratory QA Samples	LCS	04/14/06	0:00	0.5 PR 100, RPD 9
Laboratory QA Samples	Lab Blank	04/14/06	0:00	<0.02
Lone Tree Creek at Austin Road	Grab	04/25/06	14:00	<0.02
Lone Tree Creek at Austin Road	Field Blank	04/25/06	14:01	<0.02
Laboratory QA Samples	LCS	05/01/06	0:00	0.451 PR 90.2
Laboratory QA Samples	Lab Blank	05/01/06	0:00	<0.02

Table 9a. Selected herbicide concentrations in samples from the Sacramento River Basin, May-July, 2006.

(All concentrations are in parts per billion (ppb); NA=not applicable)

Station Name	Sample Date	Sample Time	Oxyfluorfen	Propanil	Propargite	Trifluralin
Angel Canal/Comanche Creek at Crouch Avenue	07/05/06	11:20	<0.02	<0.05	<0.2	<0.05
Angel Canal/Comanche Creek at Crouch Avenue	07/12/06	11:30	<0.02	<0.05	<0.2	<0.05
Angel Canal/Comanche Creek at Crouch Avenue	07/19/06	9:20	<0.02	<0.05	<0.2	<0.05
Angel Canal/Comanche Creek at Crouch Avenue	07/26/06	10:10	<0.02	<0.05	<0.2	<0.05
Butte Creek at Afton Road	05/23/06	12:00	<0.02	<0.05	<0.2	<0.05
Butte Creek at Afton Road	05/30/06	11:20	<0.02	<0.05	<0.2	<0.05
Butte Creek at Afton Road	06/06/06	11:00	<0.02	<0.05	<0.2	<0.05
Butte Creek at Afton Road	06/13/06	11:20	<0.02	<0.05	<0.2	<0.05
Butte Creek at Afton Road	06/20/06	11:10	<0.02	<0.05	<0.2	<0.05
Butte Creek at Afton Road	06/27/06	10:50	<0.02	2.6	<0.2	<0.05
Butte Creek at Afton Road	07/03/06	9:50	<0.02	0.506	<0.2	<0.05
Butte Creek at Afton Road	07/11/06	11:40	<0.02	<0.05	<0.2	<0.05
Colusa Basin Drain #1	05/23/06	9:30	<0.02	<0.05	<0.2	<0.05
Colusa Basin Drain #1	05/30/06	9:40	<0.02	<0.05	<0.2	<0.05
Colusa Basin Drain #1	06/06/06	9:10	<0.02	<0.05	<0.2	<0.05
Colusa Basin Drain #1	06/13/06	9:00	<0.02	0.573	<0.2	<0.05
Colusa Basin Drain #1	06/20/06	9:00	<0.02	3.37	<0.2	<0.05
Colusa Basin Drain #1	06/27/06	9:10	<0.02	0.436	<0.2	<0.05
Colusa Basin Drain #1	07/03/06	8:00	<0.02	<0.05	1.4	<0.05
Colusa Basin Drain #1	07/11/06	9:30	<0.02	<0.05	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	05/23/06	13:40	<0.02	<0.05	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	05/30/06	12:50	<0.02	<0.05	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	06/06/06	12:20	<0.02	<0.05	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	06/13/06	13:10	<0.02	<0.05	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	06/20/06	13:00	<0.02	8.98	<0.2	<0.05

Station Name	Sample Date	Sample Time	Oxyfluorfen	Propanil	Propargite	Trifluralin
Freshwater Creek at Old Hwy 99 West	06/27/06	12:30	<0.02	1.01	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	07/03/06	11:00	<0.02	<0.05	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	07/11/06	12:50	<0.02	0.586	<0.2	<0.05
Gilsizer Slough at South Township Road	07/05/06	9:10	<0.02	<0.05	<0.2	<0.05
Gilsizer Slough at South Township Road	07/12/06	9:20	<0.02	<0.05	<0.2	<0.05
Gilsizer Slough at South Township Road	07/19/06	7:30	<0.02	<0.05	<0.2	<0.05
Gilsizer Slough at South Township Road	07/26/06	7:50	<0.02	<0.05	<0.2	<0.05
Little Dry Creek at Afton Road	05/23/06	11:40	<0.02	<0.05	<0.2	<0.05
Little Dry Creek at Afton Road	05/30/06	11:10	<0.02	<0.05	<0.2	<0.05
Little Dry Creek at Afton Road	06/06/06	10:40	<0.02	0.545	<0.2	<0.05
Little Dry Creek at Afton Road	06/13/06	11:00	<0.02	<0.05	<0.2	<0.05
Little Dry Creek at Afton Road	06/20/06	11:00	<0.02	13.2	<0.2	<0.05
Little Dry Creek at Afton Road	06/27/06	10:40	<0.02	4.18	<0.2	<0.05
Little Dry Creek at Afton Road	07/03/06	9:40	<0.02	<0.05	<0.2	<0.05
Little Dry Creek at Afton Road	07/11/06	11:20	<0.02	<0.05	<0.2	<0.05
Live Oak Slough at Nuestro Road	07/05/06	9:50	<0.02	<0.05	<0.2	<0.05
Live Oak Slough at Nuestro Road	07/12/06	9:50	<0.02	<0.05	<0.2	<0.05
Live Oak Slough at Nuestro Road	07/19/06	8:00	<0.02	<0.05	<0.2	<0.05
Live Oak Slough at Nuestro Road	07/26/06	8:50	<0.02	<0.05	<0.2	<0.05
Morrison Slough at Luckehe Road	07/05/06	10:20	<0.02	<0.05	<0.2	<0.05
Morrison Slough at Luckehe Road	07/12/06	10:15	<0.02	<0.05	<0.2	<0.05
Morrison Slough at Luckehe Road	07/19/06	8:30	<0.02	<0.05	<0.2	<0.05
Morrison Slough at Luckehe Road	07/26/06	9:10	<0.02	<0.05	<0.2	<0.05
Stone Corral Creek at Four Mile Road	05/23/06	13:10	<0.02	<0.05	<0.2	<0.05
Stone Corral Creek at Four Mile Road	05/30/06	12:20	<0.02	<0.05	<0.2	<0.05
Stone Corral Creek at Four Mile Road	06/06/06	11:50	<0.02	0.866	<0.2	<0.05
Stone Corral Creek at Four Mile Road	06/13/06	12:30	<0.02	<0.05	<0.2	<0.05

Station Name	Sample Date	Sample Time	Oxyfluorfen	Propanil	Propargite	Trifluralin
Stone Corral Creek at Four Mile Road	06/20/06	12:30	<0.02	4.3	<0.2	<0.05
Stone Corral Creek at Four Mile Road	06/27/06	12:00	<0.02	4.09	<0.2	<0.05
Stone Corral Creek at Four Mile Road	07/03/06	10:30	<0.02	6.4	<0.2	<0.05
Stone Corral Creek at Four Mile Road	07/11/06	12:20	<0.02	<0.05	<0.2	<0.05

	Oxyfluorfen	Propanil	Propargite	Trifluralin
Total Samples	56	56	56	56
Number of Detections	0	15	1	0
Frequency (%)	0.00	26.79	1.79	0.00
Mean	NA	3.443	1.400	NA
Median (detects only)	NA	2.600	1.400	NA
Median (all samples)	0	0	0	0
Minimum	0	0.436	1.4	0
Maximum	0	13.2	1.4	0
Standard Deviation	NA	3.704	NA	NA

Table 9b. Selected herbicide concentrations in samples from the East Stockton area, July, 2006.

(All concentrations are in parts per billion (ppb); J=estimated value; NA=not applicable)

Station Name	Sample Date	Sample Time	Oxyfluorfen	Propanil	Propargite	Trifluralin
Littlejohns Creek at Jack Tone Road	07/06/06	13:00	<0.02	<0.05	<0.2	<0.05
Littlejohns Creek at Jack Tone Road	07/13/06	13:00	<0.02	<0.05	1.48	<0.05
Littlejohns Creek at Jack Tone Road	07/20/06	11:50	<0.02	<0.05	<0.2	<0.05
Littlejohns Creek at Jack Tone Road	07/27/06	13:50	<0.02	<0.05	<0.2	<0.05
Lone Tree Creek at Austin Road	07/06/06	12:40	<0.02	<0.05	<0.2	<0.05
Lone Tree Creek at Austin Road	07/13/06	12:10	<0.02	<0.05	<0.2	<0.05
Lone Tree Creek at Austin Road	07/20/06	11:30	<0.02	<0.05	<0.2	<0.05
Lone Tree Creek at Austin Road	07/27/06	13:40	<0.02	<0.05	<0.2	0.05 (J)
Mormon Slough at Copperopolis Road	07/06/06	13:20	<0.02	<0.05	<0.2	<0.05
Mormon Slough at Copperopolis Road	07/13/06	13:20	<0.02	<0.05	0.8	<0.05
Mormon Slough at Copperopolis Road	07/20/06	12:10	<0.02	<0.05	<0.2	<0.05
Mormon Slough at Copperopolis Road	07/27/06	14:10	<0.02	<0.05	<0.2	<0.05
Pixley Slough at Ham Lane	07/06/06	13:50	<0.02	<0.05	<0.2	<0.05
Pixley Slough at Ham Lane	07/13/06	14:10	<0.02	<0.05	<0.2	<0.05
Pixley Slough at Ham Lane	07/20/06	12:40	<0.02	<0.05	<0.2	<0.05
Pixley Slough at Ham Lane	07/27/06	14:50	<0.02	<0.05	<0.2	<0.05

	Oxyfluorfen	Propanil	Propargite	Trifluralin
Total Samples	16	16	16	16
Number of Detections	0	0	2	1
Frequency (%)	0	0	12.5	6.25
Mean	NA	NA	1.14	0.05
Median (detects only)	NA	NA	1.14	0.05
Median (all samples)	0	0	0	0
Minimum	0	0	0.8	0.05
Maximum	0	0	1.48	0.05
Standard Deviation	NA	NA	0.48	NA

Table 10a. Summary of quality control data for selected herbicides in samples from the Sacramento River Basin, May-July, 2006.

(All concentrations are in parts per billion (ppb); EUM=lab control spike was outside of acceptance limits; IL=RPD exceeded laboratory control limits; LCS=lab control spike; MS=matrix spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Oxyfluorfen	Propanil
Little Dry Creek at Afton Road	Grab	05/23/06	11:40	<0.02	<0.05
Little Dry Creek at Afton Road	Field Blank	05/23/06	11:41	<0.02	<0.05
Laboratory QC Samples	LCS	05/25/06	0:00	0.363 PR 72.6	0.817 PR 81.7
Laboratory QC Samples	LCS	05/25/06	0:00	0.417 PR 83.3, RPD 14	0.714 PR 71.4, RPD 13
Laboratory QC Samples	Lab Blank	05/25/06	0:00	<0.02	<0.05
Butte Creek at Afton Road	Integrated	06/06/06	11:00	<0.02	<0.05
Butte Creek at Afton Road	MS	06/06/06	11:09	0.473 PR 94.5	0.787 PR 78.7
Butte Creek at Afton Road	MS	06/06/06	11:09	0.479 PR 95.8, RPD 1.3	0.779 PR 77.9, RPD 1
Laboratory QC Samples	Lab Blank	06/07/06	0:00	<0.02	<0.05
Laboratory QC Samples	LCS	06/08/06	0:00	0.535 PR 107	0.739 PR 73.9
Stone Corral Creek at Four Mile Road	Grab	06/13/06	12:30	<0.02	<0.05
Stone Corral Creek at Four Mile Road	Field Dup	06/13/06	12:33	<0.02 RPD NA	<0.05 RPD NA
Laboratory QC Samples	Lab Blank	06/14/06	0:00	<0.02	<0.05
Laboratory QC Samples	LCS	06/22/06	0:00	0.386 PR 77.2	0.586 (EUM) PR 58.6
Laboratory QC Samples	LCS	06/22/06	0:00	0.417 PR 83.4, RPD 7.7	0.717 PR 71.7, RPD 20
Laboratory QC Samples	Lab Blank	06/22/06	0:00	<0.02	<0.05
Freshwater Creek at Old Hwy 99 West	Grab	06/27/06	12:30	<0.02	1.01
Freshwater Creek at Old Hwy 99 West	Field Dup	06/27/06	12:39	<0.02 RPD NA	0.978 RPD 3.2
Laboratory QC Samples	Lab Blank	06/28/06	0:00	<0.02	<0.05
Gilsizer Slough at South Township Road	Grab	07/05/06	9:10	<0.02	<0.05
Gilsizer Slough at South Township Road	Field Blank	07/05/06	9:11	<0.02	<0.05
Laboratory QC Samples	LCS	07/07/06	0:00	0.448 PR 89.5	0.772 PR 77.2
Laboratory QC Samples	LCS	07/07/06	0:00	0.491 PR 98.2, RPD 9.2	0.861 PR 86.1, RPD 11
Laboratory QC Samples	Lab Blank	07/07/06	0:00	<0.02	<0.05

Station Name	Sample Type	Sample Date	Sample Time	Oxyfluorfen	Propanil
Colusa Basin Drain #1	Integrated	07/11/06	9:30	<0.02	<0.05
Colusa Basin Drain #1	MS	07/11/06	9:39	0.51 PR 102	0.893 PR 89.3
Colusa Basin Drain #1	MS	07/11/06	9:39	0.491 PR 98.2, RPD 3.8	0.915 PR 91.5, RPD 2.4
Laboratory QC Samples	Lab Blank	07/12/06	0:00	<0.02	<0.05
Live Oak Slough at Nuestro Road	Field Dup	07/12/06	9:53	<0.02 RPD NA	<0.05 RPD NA
Laboratory QC Samples	Lab Blank	07/14/06	0:00	<0.02	<0.05
Laboratory QC Samples	LCS	07/15/06	0:00	0.51 PR 102	0.801 PR 80.1
Laboratory QC Samples	LCS	07/15/06	0:00	0.456 PR 91.2, RPD 11	0.796 PR 79.6, RPD 0.63
Morrison Slough at Luckehe Road	Grab	07/19/06	8:30	<0.02	<0.05
Morrison Slough at Luckehe Road	Field Blank	07/19/06	8:31	<0.02	<0.05
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.02	<0.05
Laboratory QC Samples	LCS	07/26/06	0:00	0.437 PR 87.4	0.838 PR 83.8
Laboratory QC Samples	LCS	07/26/06	0:00	0.445 PR 88.9, RPD 1.8	0.795 PR 79.5, RPD 5.3
Angel Canal/Comanche Cr at Crouch Ave	Grab	07/26/06	10:10	<0.02	<0.05
Angel Canal/Comanche Cr at Crouch Ave	MS	07/26/06	10:19	0.429 PR 85.7	0.809 PR 80.9
Angel Canal/Comanche Cr at Crouch Ave	MS	07/26/06	10:19	0.471 PR 94.1, RPD 9.3	0.826 PR 82.6, RPD 2.1

Station Name	Sample Type	Sample Date	Sample Time	Propargite	Trifluralin
Little Dry Creek at Afton Road	Grab	05/23/06	11:40	<0.2	<0.05
Little Dry Creek at Afton Road	Field Blank	05/23/06	11:41	<0.2	<0.05
Laboratory QC Samples	LCS	05/25/06	0:00	3.93 (IL) PR 78.6	0.911 PR 91.1
Laboratory QC Samples	LCS	05/25/06	0:00	5.95 (IL) PR 119, RPD 41	0.726 PR 72.6, RPD 23
Laboratory QC Samples	Lab Blank	05/25/06	0:00	<0.2	<0.05
Butte Creek at Afton Road	Integrated	06/06/06	11:00	<0.2	<0.05
Butte Creek at Afton Road	MS	06/06/06	11:09	5.9 PR 118	0.745 PR 74.5
Butte Creek at Afton Road	MS	06/06/06	11:09	5.95 PR 119, RPD 0.84	0.754 PR 75.4, RPD 1.2
Laboratory QC Samples	Lab Blank	06/07/06	0:00	<0.2	<0.05

Station Name	Sample Type	Sample Date	Sample Time	Propargite	Trifluralin
Laboratory QC Samples	LCS	06/08/06	0:00	5.4 PR 108	1.13 PR 113
Stone Corral Creek at Four Mile Road	Grab	06/13/06	12:30	<0.2	<0.05
Stone Corral Creek at Four Mile Road	Field Dup	06/13/06	12:33	<0.2 RPD NA	<0.05 RPD NA
Laboratory QC Samples	Lab Blank	06/14/06	0:00	<0.2	<0.05
Laboratory QC Samples	LCS	06/22/06	0:00	5.75 PR 115	0.652 (EUM) PR 65.2
Laboratory QC Samples	LCS	06/22/06	0:00	5.9 PR 118, RPD 2.6	0.727 PR 72.7, RPD 11
Laboratory QC Samples	Lab Blank	06/22/06	0:00	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	Grab	06/27/06	12:30	<0.2	<0.05
Freshwater Creek at Old Hwy 99 West	Field Dup	06/27/06	12:39	<0.2 RPD NA	<0.05 RPD NA
Laboratory QC Samples	Lab Blank	06/28/06	0:00	<0.2	<0.05
Gilsizer Slough at South Township Road	Grab	07/05/06	9:10	<0.2	<0.05
Gilsizer Slough at South Township Road	Field Blank	07/05/06	9:11	<0.2	<0.05
Laboratory QC Samples	LCS	07/07/06	0:00	5.9 PR 118	0.874 PR 87.4
Laboratory QC Samples	LCS	07/07/06	0:00	5.95 PR 119, RPD 0.8	1.04 PR 104, RPD 17
Laboratory QC Samples	Lab Blank	07/07/06	0:00	<0.2	<0.05
Colusa Basin Drain #1	Integrated	07/11/06	9:30	<0.2	<0.05
Colusa Basin Drain #1	MS	07/11/06	9:39	6.0 PR 120	1.18 PR 118
Colusa Basin Drain #1	MS	07/11/06	9:39	6.05 PR 121, RPD 0.8	1.02 PR 102, RPD 15
Laboratory QC Samples	Lab Blank	07/12/06	0:00	<0.2	<0.05
Live Oak Slough at Nuestro Road	Field Dup	07/12/06	9:53	<0.2 RPD NA	<0.05 RPD NA
Laboratory QC Samples	Lab Blank	07/14/06	0:00	<0.2	<0.05
Laboratory QC Samples	LCS	07/15/06	0:00	5.85 PR 117	1.0 PR 100
Laboratory QC Samples	LCS	07/15/06	0:00	5.6 PR 112, RPD 4.4	1.02 PR 102, RPD 2
Morrison Slough at Luckehe Road	Grab	07/19/06	8:30	<0.2	<0.05
Morrison Slough at Luckehe Road	Field Blank	07/19/06	8:31	<0.2	<0.05
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.2	<0.05
Laboratory QC Samples	LCS	07/26/06	0:00	5.4 PR 108	0.763 PR 76.3
Laboratory QC Samples	LCS	07/26/06	0:00	5.25 PR 105, RPD 2.8	0.871 PR 87.1, RPD 13
Angel Canal/Comanche Cr at Crouch Ave	Grab	07/26/06	10:10	<0.2	<0.05
Angel Canal/Comanche Cr at Crouch Ave	MS	07/26/06	10:19	4.84 PR 96.8	0.909 PR 90.9
Angel Canal/Comanche Cr at Crouch Ave	MS	07/26/06	10:19	5.15 PR 103, RPD 6.2	0.936 PR 93.6, RPD 2.9

Table 10b. Summary of quality control data for selected herbicides in samples from the East Stockton area, July, 2006.

(All concentrations are in parts per billion (ppb); IL=RPD exceeded laboratory control limits; LCS=lab control spike; MS=matrix spike; NA=not applicable; PR=percent recovery; QC=quality control; RPD=relative percent difference)

Station Name	Sample Type	Sample Date	Sample Time	Oxyfluorfen	Propanil
Pixley Slough at Ham Lane	Grab	07/06/06	13:50	<0.02	<0.05
Pixley Slough at Ham Lane	Field Blank	07/06/06	13:51	<0.02	<0.05
Laboratory QC Samples	LCS	07/07/06	0:00	0.448 PR 89.5	0.772 PR 77.2
Laboratory QC Samples	LCS	07/07/06	0:00	0.491 PR 98.2, RPD 9.2	0.861 PR 86.1, RPD 11
Laboratory QC Samples	Lab Blank	07/07/06	0:00	<0.02	<0.05
Mormon Slough at Copperopolis Road	Grab	07/13/06	13:20	<0.02	<0.05
Mormon Slough at Copperopolis Road	MS	07/13/06	13:29	0.396 PR 79.2	0.845 PR 84.5
Mormon Slough at Copperopolis Road	MS	07/13/06	13:29	0.448 PR 89.5, RPD 12	0.76 PR 76, RPD 11
Laboratory QC Samples	Lab Blank	07/14/06	0:00	<0.02	<0.05
Laboratory QC Samples	LCS	07/15/06	0:00	0.51 PR 102	0.801 PR 80.1
Laboratory QC Samples	LCS	07/15/06	0:00	0.456 PR 91.2, RPD 11	0.796 PR 79.6, RPD 0.63
Littlejohns Creek at Jack Tone Road	Field Blank	07/20/06	11:51	<0.02	<0.05
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.02	<0.05
Laboratory QC Samples	LCS	07/26/06	0:00	0.437 PR 87.4	0.838 PR 83.8
Laboratory QC Samples	LCS	07/26/06	0:00	0.445 PR 88.9, RPD 1.8	0.795 PR 79.5, RPD 5.3
Lone Tree Creek at Austin Road	Grab	07/27/06	13:40	<0.02	<0.05
Lone Tree Creek at Austin Road	Field Dup	07/27/06	13:43	<0.02 RPD NA	<0.05 RPD NA
Laboratory QC Samples	LCS	07/31/06	0:00	0.428 PR 85.5	0.802 PR 80.2
Laboratory QC Samples	LCS	07/31/06	0:00	0.535 PR 107, RPD 22	0.887 PR 88.7, RPD 10
Laboratory QC Samples	Lab Blank	07/31/06	0:00	<0.02	<0.05

Station Name	Sample Type	Sample Date	Sample Time	Propargite	Trifluralin
Pixley Slough at Ham Lane	Grab	07/06/06	13:50	<0.2	<0.05
Pixley Slough at Ham Lane	Field Blank	07/06/06	13:51	<0.2	<0.05
Laboratory QC Samples	LCS	07/07/06	0:00	5.9 PR 118	0.874 PR 87.4
Laboratory QC Samples	LCS	07/07/06	0:00	5.95 PR 119, RPD 0.8	1.04 PR 104, RPD 17
Laboratory QC Samples	Lab Blank	07/07/06	0:00	<0.2	<0.05
Mormon Slough at Copperopolis Road	Grab	07/13/06	13:20	0.8	<0.05
Mormon Slough at Copperopolis Road	MS	07/13/06	13:29	6 PR 120	1.09 PR 109
Mormon Slough at Copperopolis Road	MS	07/13/06	13:29	6.1 PR 122, RPD 1.7	1.05 PR 105, RPD 3.7
Laboratory QC Samples	Lab Blank	07/14/06	0:00	<0.2	<0.05
Laboratory QC Samples	LCS	07/15/06	0:00	5.85 PR 117	1 PR 100
Laboratory QC Samples	LCS	07/15/06	0:00	5.6 PR 112, RPD 4.4	1.02 PR 102, RPD 2
Littlejohns Creek at Jack Tone Road	Field Blank	07/20/06	11:51	<0.2	<0.05
Laboratory QC Samples	Lab Blank	07/26/06	0:00	<0.2	<0.05
Laboratory QC Samples	LCS	07/26/06	0:00	5.4 PR 108	0.763 PR 76.3
Laboratory QC Samples	LCS	07/26/06	0:00	5.25 PR 105, RPD 2.8	0.871 PR 87.1, RPD 13
Lone Tree Creek at Austin Road	Grab	07/27/06	13:40	<0.2	0.05
Lone Tree Creek at Austin Road	Field Dup	07/27/06	13:43	<0.2 RPD NA	0.05 RPD NA
Laboratory QC Samples	LCS	07/31/06	0:00	5.2 (IL) PR 104	0.843 PR 84.3
Laboratory QC Samples	LCS	07/31/06	0:00	3.81 (IL) PR 76.2, RPD 31	1.01 PR 101, RPD 18
Laboratory QC Samples	Lab Blank	07/31/06	0:00	<0.2	<0.05

Table 11a. Summary of water quality parameters measured in the Sacramento Basin.

Station Name	Sample Date	Sample Time	pH	Spec Cond (µS)	Temp (C)
Angel Canal/Comanche Cr at Crouch Ave	03/14/06	9:50	7.25	94.6	9.6
Angel Canal/Comanche Cr at Crouch Ave	03/28/06	9:20	7.49	123.8	12.3
Angel Canal/Comanche Cr at Crouch Ave	04/11/06	11:40	7.47	194	12.5
Angel Canal/Comanche Cr at Crouch Ave	04/25/06	9:40	7.59	98.3	13.9
Angel Canal/Comanche Cr at Crouch Ave	07/05/06	11:20	7.51	102.5	19.7
Angel Canal/Comanche Cr at Crouch Ave	07/12/06	11:30	7.67	107	19.5
Angel Canal/Comanche Cr at Crouch Ave	07/19/06	9:20	7.49	109.6	22.7
Angel Canal/Comanche Cr at Crouch Ave	07/26/06	10:10	7.58	111.1	24
Butte Creek at Afton Road	05/23/06	12:00	7.56	101.8	15.3
Butte Creek at Afton Road	05/30/06	11:20	7.62	139	18.3
Butte Creek at Afton Road	06/06/06	11:00	7.57	138.6	21.8
Butte Creek at Afton Road	06/13/06	11:20	7.77	159.4	18.9
Butte Creek at Afton Road	06/20/06	11:10	8.38	172.7	22.9
Butte Creek at Afton Road	06/27/06	10:50	7.51	185.5	26.6
Butte Creek at Afton Road	07/03/06	9:50	7.61	182.1	24.8
Butte Creek at Afton Road	07/11/06	11:40	7.44	228	26.6
Colusa Basin Drain #1	05/23/06	9:30	7.61	423	20.6
Colusa Basin Drain #1	05/30/06	9:40	7.8	573	23.7
Colusa Basin Drain #1	06/06/06	9:10	7.71	541	26.6
Colusa Basin Drain #1	06/13/06	9:00	7.83	497	23.1
Colusa Basin Drain #1	06/20/06	9:00	7.6	500	27.6
Colusa Basin Drain #1	06/27/06	9:10	7.47	569	30.6
Colusa Basin Drain #1	07/03/06	8:00	7.59	543	27.6
Colusa Basin Drain #1	07/11/06	9:30	7.58	551	28.4
Freshwater Creek at Old Hwy 99 West	05/23/06	13:40	8.2	363	19
Freshwater Creek at Old Hwy 99 West	05/30/06	12:50	8.32	560	23.1
Freshwater Creek at Old Hwy 99 West	06/06/06	12:20	7.96	425	23.6
Freshwater Creek at Old Hwy 99 West	06/13/06	13:10	7.98	446	21.1
Freshwater Creek at Old Hwy 99 West	06/20/06	13:00	7.81	382	25
Freshwater Creek at Old Hwy 99 West	06/27/06	12:33	7.82	483	27.6
Freshwater Creek at Old Hwy 99 West	07/03/06	11:00	7.72	484	25.9
Freshwater Creek at Old Hwy 99 West	07/11/06	12:50	7.54	424	25.4
Gilsizer Slough at South Township Road	03/14/06	7:30	7.89	957	11.2
Gilsizer Slough at South Township Road	03/28/06	7:20	7.45	566	13.7
Gilsizer Slough at South Township Road	04/11/06	8:30	7.91	569	14.6
Gilsizer Slough at South Township Road	04/25/06	7:40	7.69	1240	17.7
Gilsizer Slough at South Township Road	07/05/06	9:10	6.99	579	22.1
Gilsizer Slough at South Township Road	07/12/06	9:20	6.9	547	23.2
Gilsizer Slough at South Township Road	07/19/06	7:30	6.97	415	26.6
Gilsizer Slough at South Township Road	07/26/06	7:50	6.76	574	27.6

Station Name	Sample Date	Sample Time	pH	Spec Cond (µS)	Temp (C)
Little Dry Creek at Afton Road	05/23/06	11:40	7.37	226	18.9
Little Dry Creek at Afton Road	05/30/06	11:10	7.44	381	20.7
Little Dry Creek at Afton Road	06/06/06	10:40	7.15	214	24.6
Little Dry Creek at Afton Road	06/13/06	11:00	7.35	184.8	21
Little Dry Creek at Afton Road	06/20/06	11:00	8.19	217	25.1
Little Dry Creek at Afton Road	06/27/06	10:40	7.14	199	28
Little Dry Creek at Afton Road	07/03/06	9:40	7.2	177.8	24.3
Little Dry Creek at Afton Road	07/11/06	11:20	7.1	214	25.7
Live Oak Slough at Nuestro Road	03/14/06	8:20	7.45	438	11.6
Live Oak Slough at Nuestro Road	03/28/06	8:00	7.42	427	13.8
Live Oak Slough at Nuestro Road	04/11/06	9:00	7.46	508	14.5
Live Oak Slough at Nuestro Road	04/25/06	8:10	7.56	560	16.8
Live Oak Slough at Nuestro Road	07/05/06	9:50	6.76	111.1	22.4
Live Oak Slough at Nuestro Road	07/12/06	9:50	7.1	98.8	22.3
Live Oak Slough at Nuestro Road	07/19/06	8:00	6.95	131.8	26.2
Live Oak Slough at Nuestro Road	07/26/06	8:50	7.32	109.3	25.8
Morrison Slough at Luckehe Road	03/14/06	8:50	7.48	608	13.4
Morrison Slough at Luckehe Road	03/28/06	8:30	7.39	634	14.3
Morrison Slough at Luckehe Road	04/11/06	9:30	7.46	690	14.6
Morrison Slough at Luckehe Road	04/25/06	8:40	7.56	808	16.7
Morrison Slough at Luckehe Road	07/05/06	10:20	7.37	194.6	22.9
Morrison Slough at Luckehe Road	07/12/06	10:15	7.11	219	21.8
Morrison Slough at Luckehe Road	07/19/06	8:30	7.08	208	24.2
Morrison Slough at Luckehe Road	07/26/06	9:10	7.1	202	25.4
Stone Corral Creek at Four Mile Road	05/23/06	13:10	7.91	280	18.1
Stone Corral Creek at Four Mile Road	05/30/06	12:20	7.88	300	22
Stone Corral Creek at Four Mile Road	06/06/06	11:50	7.72	296	24.1
Stone Corral Creek at Four Mile Road	06/13/06	12:30	7.87	291	21.1
Stone Corral Creek at Four Mile Road	06/20/06	12:30	7.66	327	25.5
Stone Corral Creek at Four Mile Road	06/27/06	12:00	7.47	324	27.8
Stone Corral Creek at Four Mile Road	07/03/06	10:30	7.54	326	25.1
Stone Corral Creek at Four Mile Road	07/11/06	12:20	7.26	319	25.2

Table 11b. Summary of water quality parameters measured in the East Stockton area.

Station Name	Sample Date	Sample Time	pH	Spec Cond (µS)	Temp (C)
Littlejohns Creek at Jack Tone Road	03/14/06	13:40	7.58	174.3	11.8
Littlejohns Creek at Jack Tone Road	03/28/06	13:10	7.39	151.5	14.3
Littlejohns Creek at Jack Tone Road	04/11/06	15:30	7	131.8	14.5
Littlejohns Creek at Jack Tone Road	04/25/06	13:50	7.73	248	19.3
Littlejohns Creek at Jack Tone Road	07/06/06	13:00	7.62	63.3	24.6
Littlejohns Creek at Jack Tone Road	07/13/06	13:00	7.43	65.2	25.3
Littlejohns Creek at Jack Tone Road	07/20/06	11:50	7.21	72.5	26.8
Littlejohns Creek at Jack Tone Road	07/27/06	13:50	7.66	69	28.6
Lone Tree Creek at Austin Road	03/14/06	14:00	7.75	240	13.6
Lone Tree Creek at Austin Road	03/28/06	13:20	7.53	252	15.5
Lone Tree Creek at Austin Road	04/11/06	16:00	7.63	452	16.7
Lone Tree Creek at Austin Road	04/25/06	14:00	7.72	118.6	18.2
Lone Tree Creek at Austin Road	07/06/06	12:40	7.39	109.8	21.9
Lone Tree Creek at Austin Road	07/13/06	12:10	7.51	147.9	23.7
Lone Tree Creek at Austin Road	07/20/06	11:30	7.41	136.2	23.9
Lone Tree Creek at Austin Road	07/27/06	13:40	8.15	253	31.3
Mormon Slough at Copperopolis Road	03/14/06	13:10	7.61	192.6	12.8
Mormon Slough at Copperopolis Road	03/28/06	12:40	7.75	186	11.5
Mormon Slough at Copperopolis Road	04/11/06	15:10	7.56	199.7	12.3
Mormon Slough at Copperopolis Road	04/25/06	13:30	8.1	162	14.4
Mormon Slough at Copperopolis Road	07/06/06	13:20	8.37	148.4	22.8
Mormon Slough at Copperopolis Road	07/13/06	13:20	8.11	147.4	23.3
Mormon Slough at Copperopolis Road	07/20/06	12:10	7.98	146	23.8
Mormon Slough at Copperopolis Road	07/27/06	14:10	8.45	143.9	25.1
Pixley Slough at Ham Lane	03/14/06	12:20	7.19	179.2	12.2
Pixley Slough at Ham Lane	03/28/06	12:00	7.19	130.9	15.1
Pixley Slough at Ham Lane	04/11/06	14:30	7.1	145.5	15.7
Pixley Slough at Ham Lane	04/25/06	12:40	7.32	351	18.2
Pixley Slough at Ham Lane	07/06/06	13:50	7.2	63.9	21.7
Pixley Slough at Ham Lane	07/13/06	14:10	7.24	67.4	23.2
Pixley Slough at Ham Lane	07/20/06	12:40	7.2	87.9	24.7
Pixley Slough at Ham Lane	07/27/06	14:50	7.52	69.5	24.1

Table 11c. Summary of water quality parameters measured in the San Joaquin Basin.

Station Name	Sample Date	Sample Time	pH	Spec Cond (µS)	Temp (C)
Merced River at River Road	03/07/06	12:50	7.57	59.3	11.1
Merced River at River Road	03/13/06	12:10	7.13	70.9	9.3
Merced River at River Road	03/20/06	12:40	7.41	63.9	11.6
Merced River at River Road	03/27/06	12:20	6.95	73.9	13.6
Merced River at River Road	07/06/06	11:10	7	84	20.9
Merced River at River Road	07/13/06	10:10	6.84	87.5	23.1
Merced River at River Road	07/20/06	10:10	6.83	101.9	24.1
Merced River at River Road	07/27/06	12:10	7.08	79.8	26
Merced River at River Road	08/03/06	11:10	7.26	94.7	22.4
Merced River at River Road	08/10/06	13:20	6.83	94.3	24.4
Merced River at River Road	08/17/06	14:20	7.2	98.2	22.5
Merced River at River Road	08/24/06	12:00	7.04	107	22
Merced River at River Road	08/31/06	9:50	7.35	105.3	21.4
San Joaquin River at Lander Ave	03/13/06	12:30	7.63	388	11.1
San Joaquin River at Lander Ave	03/27/06	12:50	7.38	203	15.8
San Joaquin River at Lander Ave	07/13/06	10:40	8.28	666	27.1
San Joaquin River at Lander Ave	07/27/06	12:30	8.63	786	33.2
San Joaquin River at Lander Ave	08/10/06	13:50	8.04	835	27.6
San Joaquin River at Lander Ave	08/24/06	12:30	8.06	663	26.4
San Joaquin River at Patterson	03/07/06	12:10	7.83	537	11.9
San Joaquin River at Patterson	03/20/06	12:10	7.66	494	12.8
San Joaquin River at Patterson	07/06/06	10:40	7.28	366	24.9
San Joaquin River at Patterson	07/20/06	10:40	7.86	776	27.4
San Joaquin River at Patterson	08/03/06	10:30	7.57	772	25.3
San Joaquin River at Patterson	08/17/06	15:10	7.83	786	25
San Joaquin River at Patterson	08/31/06	9:20	7.53	749	23.7
San Joaquin River at Vernalis	03/07/06	10:10	7.45	260	11.7
San Joaquin River at Vernalis	03/13/06	9:40	6.88	335	10.3
San Joaquin River at Vernalis	03/20/06	10:10	7.12	266	11.9
San Joaquin River at Vernalis	03/27/06	10:00	7.14	247	14
San Joaquin River at Vernalis	07/06/06	8:50	6.83	281	22.2
San Joaquin River at Vernalis	07/13/06	8:00		421	21.8
San Joaquin River at Vernalis	07/20/06	8:00	7.16	415	24.3
San Joaquin River at Vernalis	07/27/06	10:10	7.87	459	25.9
San Joaquin River at Vernalis	08/03/06	9:00	7.39	403	22.6
San Joaquin River at Vernalis	08/10/06	10:20	7.6	420	23.1
San Joaquin River at Vernalis	08/17/06	11:50	7.58	406	21.5
San Joaquin River at Vernalis	08/24/06	9:50	7.64	380	21.2

Station Name	Sample Date	Sample Time	pH	Spec Cond (µS)	Temp (C)
San Joaquin River at Vernalis	08/31/06	7:30	7.39	384	21.8
Stanislaus River at Caswell S.P.	03/07/06	10:50	7.49	77.6	10.4
Stanislaus River at Caswell S.P.	03/13/06	10:30	7.19	86.5	9.6
Stanislaus River at Caswell S.P.	03/20/06	10:40	7.09	75.5	11
Stanislaus River at Caswell S.P.	03/27/06	10:40	7.07	76	11.9
Stanislaus River at Caswell S.P.	07/06/06	9:10	7.12	74.1	17.5
Stanislaus River at Caswell S.P.	07/13/06	8:30	7.05	79.5	17.9
Stanislaus River at Caswell S.P.	07/20/06	8:30	7.12	75.5	18.8
Stanislaus River at Caswell S.P.	07/27/06	10:30	7.09	73.4	19.1
Stanislaus River at Caswell S.P.	08/03/06	9:20	6.36	76.2	17.9
Stanislaus River at Caswell S.P.	08/10/06	11:30	7.01	75.1	18.5
Stanislaus River at Caswell S.P.	08/17/06	12:30	7.38	77	16.9
Stanislaus River at Caswell S.P.	08/24/06	10:20	7.35	77.8	17.2
Stanislaus River at Caswell S.P.	08/31/06	8:00	7.1	75.2	17.5
Tuolumne River at Shiloh Road	03/07/06	11:30	7.21	62.9	11.6
Tuolumne River at Shiloh Road	03/13/06	11:10	7.22	80.8	10.8
Tuolumne River at Shiloh Road	03/20/06	11:30	7.04	64.9	12
Tuolumne River at Shiloh Road	03/27/06	11:30	7.16	54.4	14.1
Tuolumne River at Shiloh Road	07/06/06	10:00	7.07	98.6	19.5
Tuolumne River at Shiloh Road	07/13/06	9:10	7.01	121.9	20.8
Tuolumne River at Shiloh Road	07/20/06	9:20	7.15	139.7	23.7
Tuolumne River at Shiloh Road	07/27/06	11:10	7.17	136.2	25.3
Tuolumne River at Shiloh Road	08/03/06	10:10	7.19	132.6	22.2
Tuolumne River at Shiloh Road	08/10/06	12:30	7.05	162	25
Tuolumne River at Shiloh Road	08/17/06	13:20	7.1	138.5	22.4
Tuolumne River at Shiloh Road	08/24/06	11:10	7.08	147.1	21.6
Tuolumne River at Shiloh Road	08/31/06	8:40	7.01	125.1	21.6

Appendix II: California Department of Fish and Game analysis method for Diquat and Paraquat in water by LC-MSD

Diquat and Paraquat in water (C_8 cartridge) by LC-MSD

1.0 Reagent and Buffer Solutions

a. Conditioning solution A: Dissolve 0.500 g of cetyl trimethyl ammonium bromide and 5 ml of concentrated ammonium hydroxide in 500 ml of deionized water and dilute to 1000 ml in volumetric flask.

b. Conditioning solution B: Dissolve 10.0 g of 1-hexanesul-fonic acid, sodium salt and 10 ml of concentrated ammonium hydroxide in 250 ml deionized water and dilute to 500 ml in volumetric flask.

c. Sodium hydroxide solution, 10% w/v: Dissolve 50 g of sodium hydroxide into 400 ml of deionized water and dilute to 500 ml in volumetric flask.

d. Hydrochloric acid, 10% v/v: Add 50 ml of concentrated hydrochloric acid to 400 ml of DI water and dilute to 500 ml in a volumetric flask.

e. Disk or cartridge eluting solution: Add 13.5 ml of orthophosphoric acid and 10.3 ml of diethylamine to 500 ml of deionized water and dilute to 1000 ml in volumetric flask.

f. Ion-pair concentrate: Dissolve 3.75 g of 1-hexanesul-fonic acid in 15 ml of the disk or cartridge eluting solution and dilute to 25 ml in volumetric flask with the disk eluting solution.

g. Buffer solution: Dissolve 3.5 ml of triethylamine and 1.0 g of 1-hexane-sulfonic acid sodium salt in 500 ml HPLC water. Adjust pH 2.5 with phosphoric acid (1.0-2.0 ml) and dilute to 1000 ml in volumetric flask. Filter first through 0.45 μm, then through 0.20 μm.

All chemical supply from Aldrich company.

2.0 Solid Phase Extraction

Before sample extraction, the C_8 extraction cartridges (Supelclean™ LC-8, 6 mL, 0.5g) must be conditioned by the following procedure.

a. Elute the following solutions through the cartridge in the stated order. Take special care not to let the column go dry. The flow rate through the cartridge should be approximately 10 ml/min.

Deionized water, 5 ml
Methanol, 5 ml
Deionized water, 5 ml
Conditioning solution A, 5 ml

Deionized water, 5 ml
Methanol, 10 ml
Deionized water, 5 ml
Conditioning solution B, 10 ml

b. Retain conditioning solution B in the C_8 cartridge to keep it activated.

c. Measure a 500 ml aliquot of the sample.

d. Filter samples through Whatman filter paper (filter # 4, 2 or 5) if necessary.

e. Immediately before extraction, adjust the pH of the sample to 10.5 ± 0.2 with 10% w/v NaOH (aq) or 10% v/v HCl (aq). It's about 23-25 drops of 10% NaOH for DI water pH 7.0

f. Filter sample through glass microfiber filter 1.2 µm.

g. Attach a 60 ml reservoir to the conditioned C_8 cartridge. Turn on the vacuum pump and adjust the flow rate to 3-6 ml/min. Filter the sample through the cartridge. DO NOT LET COLUMN GO DRY. Wash the column with 5 ml of HPLC grade methanol. Continue to draw the vacuum through the cartridge for one additional minute to dry the cartridge. Release the vacuum and discard the waste.

h. Align cartridges with 13 mm culture tubes in a dry vacuum box and add 4.5 ml of the eluting solution to the sample cartridge. Turn on the vacuum and adjust the flow rate to 1-2 ml/min.

i. Fortify the extract with 100 µL of the ion-pair concentrate. Adjust the volume to the mark with eluting solution, mix thoroughly, and seal tightly until analyzed.

j. Filter sample through 0.45 µm to the vial before analyzed.

3.0 LC-MS Conditions

Instrument: Agilent LC-MSD 1100 equipped with DAD, auto sampler, and data system.

Chromatographic Conditions

- Column: Waters Atlantis dC-18 column, 10cm x 2.1mm i.d. x 3µm
- Mobile phase A: 5mM tridecafluoroheptanoic acid (TDFHA)
- Mobile phase B: acetonitrile
- Pump parameters: isocratic A: 75% B: 25%
- Flow rate: 0.35 ml/min
- Run time: 17 minutes
- Column temperature: 36ºC

- Injection volume: 20 µL
- Diode array detector (DAD):

Signal, Bw (nm)		Reference, Bw (nm)		
308	4	400	8	Diquat
257	4	400	8	Paraquat

MS Conditions: API-ES in positive ion mode

- Drying gas flow: 12 L/min
- Drying gas temperature: 350ºC
- Nebulizer gas pressure: 40 psig
- Capillary voltage: 3000
- Fragmentor voltage: 90
- Selected ion monitoring (SIM): m/z 183.0 (Diquat), m/z 185.0 (Paraquat)
- Scan: m/z 150-250
- Threshold: 150 counts
- Gain: 2
- Step size: 0.1 amu
- Peak width: 0.1 min
- Time filter: On

	Method Detection Limit	Estimated Reporting Limit
Diquat	0.050 ug/L	0.050 ug/L
Paraquat	0.100 ug/L	0.100 ug/L