Monitoring Pesticides in the Sacramento and San Joaquin Rivers 2005–2007

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ABSTRACT

From December 5, 2005, through November 26, 2007, the California Department of Pesticide Regulation (DPR) sampled surface water on a weekly basis to monitor for the presence of organophosphate (OP) and herbicide pesticides in the San Joaquin and Sacramento rivers. In addition to weekly sampling, samples were collected during rain events for approximately ten consecutive days per event.

Surface water samples were collected at four sites: the Department of Water Resources' Vernalis Dock on the San Joaquin River, the Freeport Bridge on the Sacramento River, and at two secondary sites along the Sacramento River—the Knights Landing Ridge Cut (KLRC) and Yolo Bypass. A total of 790 water samples were collected; approximately half (394) were analyzed for up to 15 OPs and the remainder (396) were analyzed for up to seven herbicides and three herbicide breakdown products.

Of the 394 samples analyzed for OPs, one or more OP was detected in 13.7 percent of the samples; 54 samples yielded a total of 60 OP detections. Malthion, dimethoate, diazinon, and chlorpyrifos were detected in samples from the San Joaquin and Sacramento rivers. Ethoprop was detected in two San Joaquin River samples; dichlorvos (DDVP) was detected in one Sacramento River sample. Diazinon was detected at the KLRC (13 samples) and the Yolo Bypass (six samples).

Of the 396 samples analyzed for herbicides, one or more herbicide was detected in 54.5 percent of the samples; 216 samples yielded 375 herbicide detections. Simazine, diuron, bromacil, and hexazinone were detected at all four sampling sites. 2,4-diamino-6-chloro-s-triazine (DACT) was detected in 31 samples from the San Joaquin River; 2-amino-4-chloro-6-isopropylamino-s-triazine (DEA) was detected in one sample from the KLRC.

Detected concentrations of OPs and herbicides did not exceed U.S. Environmental Protection Agency's 2011 Aquatic Life Benchmarks.

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DISCLAIMER: The mention of commercial products, their source, or use in connection with material reported herein is not to be construed as an actual or implied endorsement of such product.

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I. INTRODUCTION

California's Central Valley is comprised of more than seven million acres of intensively cultivated agricultural land; it is a major fruit and vegetable production area for the nation. For the past decade, agricultural use pesticide applications in the Central Valley have approached 30,000 tons annually. Because off-site movement of these pesticides can impair surface water quality and cause toxicity to aquatic organisms and wildlife, pesticide movement into the Sacramento and San Joaquin watersheds of the Central Valley is a matter of prime concern for water quality management in the Central Valley, the Delta region, and the San Francisco Bay.

Historically, pesticide runoff monitoring studies in the Sacramento and San Joaquin watersheds have been short-term and focused on pesticide transport associated with individual storms or irrigation events (i.e., McCoy *et al*., 1995; Domagalski *et al*., 2000; Dileanis *et al*., 2002; Spurlock, 2002; Guo *et al*., 2005). By contrast, this watershed study focused on weekly sampling of surface water over a two year period—although storm rain event data was also collected. DPR anticipated the data derived from this sampling approach would enable staff scientists to construct a more complete profile of organophosphate (OP) and herbicide pesticide residue contamination in the study area.

II. MATERIALS AND METHODS

Study Area Watershed Descriptions

California's Central Valley is composed of two sub-sections: the San Joaquin Valley, containing the San Joaquin River watershed to the south, and the Sacramento Valley, containing the Sacramento River watershed to the north. The Sacramento and San Joaquin rivers merge in the Sacramento-San Joaquin Delta and flow into the upper reaches of the San Francisco Bay. The San Joaquin River is 530 kilometers (km) in length and drains approximately 83,000 km^2; the Sacramento River is over 700 km in length and drains approximately 70,000 km^2.

The Sacramento River watershed is a highly engineered hydrological system, and water can be diverted from the river's main stem as flows increase. These diversions eventually rejoin the Sacramento River one mile upstream from Rio Vista, California. River water is diverted to the Knights Landing Ridge Cut (KLRC) (N38 47.3649 W121 43.3216) when the height of the Sacramento River at Knights Landing exceeds 25 feet. River water is diverted to the Yolo Bypass at Interstate 80 (N38 34.2503 W121 34.5868) when Sacramento River flow at the Fremont Weir exceeds 55,000 cubic feet per second.

Surface Water Sample Collection Sites

DPR staff selected one primary monitoring site in each watershed: for the San Joaquin River, samples were collected at the Department of Water Resources' Vernalis Dock (N37 40.760 W121 15.906) (Figure 1); for the Sacramento River, samples were collected at the Freeport Bridge (N38 27.438 W121 30.105) (Figure 2). From August 20, 2008, through October 15, 2008, maintenance projects on the Freeport Bridge displaced sampling efforts on the Sacramento River upstream to the Tower Bridge, Garcia Bend, or the Freeport Marina.

When Sacramento River water was high enough to require diversion to the KLRC or Yolo Bypass, samples were collected at these sites. Since the KLRC joins the Yolo Bypass, when diversions to both watercourses occurred during sampling efforts, samples were collected only from the Yolo Bypass.

Sample Collection Schedule

From December 5, 2005, through November 26, 2007, surface water was collected weekly from at least one primary sample site on either the San Joaquin or Sacramento River, with two exceptions. See tables 1, 2 and 3 for complete sampling date and site information for each water year[1] (WY).

Storm System Monitoring

Precipitation data from the California Data Exchange Center (operated by the Department of Water Resources)—coupled with quantitative prediction forecasts from the National Weather Service and information from local and national weather sources—were evaluated to determine whether incipient precipitation would likely constitute a rain event (see Appendix A for a list of weather forecast data sources). A rain event was generally defined as an accumulation of 0.50 inch of rain within 24 hours, provided it was accompanied by runoff. (Isolated rainfall events of up to 0.75 inch separated by lengthy dry spells were not considered rain events if observable runoff did not occur.) Storm intensity, preceding rainfall, predicted rainfall, measured rainfall and observed runoff were factors that triggered rain event sample collection. Following the determination that a given storm would constitute a rain event, sampling began 24 hours subsequent to the arrival of the major storm front.

For the majority of the rain events, samples were collected on a daily basis for ten consecutive days. However, during the course of this study rainstorms occasionally overlapped the 10 day window. When rainstorms overlapped, the arrival of the second rainstorm initiated the "next" rain event sampling period, resetting the 10-day sampling window. Overlapping rain events occurred once in each watershed during the 2006 WY sampling period, and once in the Sacramento River watershed during the 2007 WY. See Table 4 for dates, duration and location of rain event monitoring. (See Appendix A for California Irrigation Management Information System [CIMIS] precipitation measurements for the study period.)

Water Quality Monitoring

Water quality measurements—pH, temperature (°C), dissolved oxygen (DO) and electrical conductivity (EC)—were taken at the time of sample collection.

Chemical Analyses and Quality Control

Composite samples were collected using a 4.2-L stainless steel Kemmerer sampler (Wildlife Supply Company, Buffalo, New York) from the main flow of the channel. Samples were split into three 1-L amber glass bottles for the following purposes: 1) organophosphate analysis; 2) herbicide analysis; and 3) a backup. Bottles were native rinsed with sample water prior to filling. After filling, bottles were sealed with Teflon® lined lids, placed on wet ice, and delivered to

[1] Water year is defined as the 12-month period beginning in October 1 through September 30 of the following year and is designated by the calendar year in which it ends (USGS, 2010).

DPR's West Sacramento facility for storage. Samples were transported to the analyzing laboratory within seven days of collection and stored at 4 ^{o}C. A chain of custody form accompanied each sample.

All samples were analyzed by the California Department of Food and Agriculture's (CDFA) Center for Analytical Chemistry in Sacramento, California. A complete list of the analytes and their reporting limits are presented in tables 5 and 6.

For the purposes of this report, analytical results are reported as follows:

- **nd --** not detected; concentration below the method detection limit
- **trace --** analyte detected above the method detection limit, but below the reporting limit (designation based upon the chemist's professional judgment)
- **sample concentration in µg/L**

Quality control measures included the preparation and analysis of laboratory matrix spikes, matrix blanks and blind spikes. Duplicate field samples were also collected and analyzed.

Organophosphate Analyses

Samples were analyzed for 15 OPs (the analytical "long screen" OPs—see Table 5) beginning on February 1, 2006 for the San Joaquin and Sacramento rivers. Prior samples (December 5, 2005, through January 25, 2006) from both rivers were analyzed for five OPs (the analytical "short screen" OPs): chloropyrifos, diazinon, dimethoate, malathion and methidathion. Long screen analyses were performed on all samples taken from the KLRC; Yolo Bypass samples were analyzed for short screen OPs from January 3 - 23, 2006, and for long screen OPs for the remainder of sampling at that site.

Herbicide Analyses

For the majority of the study, samples were analyzed for the presence of four herbicides and one breakdown product (the analytical "short screen"—see Table 6): bromacil, diuron, hexazinone, simazine and DACT. Occasionally, samples taken from the KLRC and San Joaquin and Sacramento rivers were analyzed for up to seven herbicides and three breakdown products (the analytical "long screen"): atrazine, bromacil, diuron, hexazinone, norfluazon, prometon, simazine, the atrazine/simazine breakdown products 2-amino-4-chloro-6-ethylamino-s-triazine (ACET) and 2,4-diamino-6-chloro-s-triazine (DACT), and the atrazine breakdown product 2-amino-4-chloro-6-isopropylamino-s-triazine (DEA).

Toxicity Evaluation

All OP and herbicide detections were compared with the U.S. Environmental Protection Agency's (U.S. EPA) 2011 Aquatic Life Benchmarks to determine if OP and herbicide detections exceeded benchmark values.

III. RESULTS AND DISCUSSION

Water Quality

pH, temperature (°C), dissolved oxygen (DO) and electrical conductivity (EC) summary data for the San Joaquin and Sacramento rivers, the KLRC and Yolo Bypass are presented in Table 7. Complete water quality data is presented in Figures 3 through 10 and in Appendix B, tables B-1 through B-16.

Pesticide Detections in Surface Water Samples

Organophosphate Detections

OP pesticides were detected in samples collected from all monitoring sites on both rivers. Table 8 presents a summary of the OP detection frequencies and concentrations. Complete data is presented in Appendix C, Tables C-1 through C-4.

San Joaquin River (Vernalis Dock)

Five OPs were detected in the San Joaquin River during the sample period December 5, 2005, through November 26, 2007. A total of 140 water samples were collected; 132 of the samples were analyzed for 15 OPs; eight samples (taken weekly from December 5, 2005, through January 25, 2006) were analyzed for five OPs. Ethoprop was detected at trace concentrations in two samples (parent sample and the field duplicate); malathion was detected at trace concentrations in three samples. Dimethoate was detected in 21 samples ranging from trace to 0.070 µg/L. Diazinon and chlorpyrifos were detected in single and separate samples at concentrations of 0.011 µg/L and 0.0103 µg/L, respectively.

Sacramento River (Freeport Bridge), KLRC and Yolo Bypass

Five OPs were detected in samples collected from the Sacramento River at the Freeport Bridge for the sample period December 5, 2005, through December 27, 2007. A total of 201 samples were collected at the Freeport site; 193 of the samples were analyzed for 15 OPs; eight samples (taken weekly from December 5, 2005, through January 25, 2006) were analyzed for five OPs. Malathion and dichlorvos (DDVP) were detected at trace amounts in single and separate samples; dimethoate was detected at trace amounts in two samples. Diazinon was detected in six samples at concentrations ranging from 0.0115 to 0.0943 µg/L; chlorpyrifos was detected in three samples ranging from 0.0105 to 0.0346 µg/L.

Diazinon was the only OP detected in surface water samples from the KLRC and Yolo Bypass. The 29 surface water samples collected from the KLRC during the period February 2, 2006, to March 2, 2007, yielded 13 diazinon detections with concentrations ranging from 0.0102 µg/L to 0.0926 µg/L. Twenty-four samples from the Yolo Bypass collected during the period January 3, 2006, to May 3, 2006, yielded six diazinon detections with concentrations ranging from 0.0101 µg/L to 0.0298 µg/L.

Herbicide Detections

Herbicides were detected in samples collected from all monitoring sites on both the San Joaquin and Sacramento rivers. Table 9 presents a summary of the herbicide detection frequencies and concentrations. Complete data, including propazine recovery data,[2] are presented in Appendix D, tables D-1 through D-4.

San Joaquin River (Vernalis Dock)

Four herbicides and one herbicide breakdown product were detected in the San Joaquin River during the sampling period December 5, 2005, through November 26, 2007. A total of 141 surface water samples were collected; 133 of the samples were analyzed for four herbicides and one breakdown product; eight samples (taken weekly from December 11, 2006, through January 8, 2007, and on January 29, 2007, and May 22, 2007) were analyzed for seven herbicides and three herbicide breakdown products. Simazine was detected in 43 samples ranging from trace to 0.708 µg/L; diuron was detected in 90 samples ranging from trace to 2.135 µg/L; bromacil was detected in two samples at trace concentrations; hexazinone was detected in 24 samples ranging from trace to 0.282 µg/L; and the atrazine/simazine breakdown product DACT was detected in 31 samples at trace concentrations.

Sacramento River (Freeport Bridge), KLRC and Yolo Bypass

Four herbicides were detected in the Sacramento River (Freeport Bridge monitoring site) during the sampling period December 5, 2005, through December 27, 2007. A total of 203 surface water samples were collected; 159 were analyzed for four herbicides and one breakdown product; 43 samples (taken weekly from December 10, 2006, through January 8, 2007, January 29, 2007, and daily from December 18 – 27, 2007) were analyzed for seven herbicides and three herbicide breakdown products. Simazine was detected in 19 samples ranging from trace to 0.124 µg/L; diuron was detected in 81 samples ranging from trace to 1.117 µg/L; bromacil was detected in 12 samples ranging from trace to 0.463µg/L; hexazinone was detected in three samples ranging from trace to 0.291 µg/L.

Four herbicides and one herbicide breakdown product were detected at the KLRC during the sampling period February 2, 2006, through March 2, 2007. A total of 28 surface water samples were collected; two samples (December 29 - 30, 2006) were analyzed for seven herbicides and three herbicide breakdown products, the remainder were analyzed for four herbicides and one breakdown product. Simazine was detected in 15 samples ranging from trace to 1.021 µg/L; diuron was detected in 24 samples ranging from trace to 1.660 µg/L; bromacil was detected in three samples ranging from 0.079 µg/L to 0.280 µg/L; hexazinone was detected in six samples ranging from 0.052 µg/L to 0.702 µg/L; the atrazine breakdown product DEA was detected in one sample at trace concentrations.

Four herbicides were detected at the Yolo Bypass during the sampling period January 3, 2006, to May 3, 2006. A total of 24 surface water samples were collected; all samples were analyzed for four herbicides and one herbicide breakdown product. Simazine was detected in seven samples

[2] As a measure of extraction and analysis efficiency, samples were spiked with the triazine surrogate propazine at 0.200 µg/L. Propazine recovery ranged from 69.5 to 109 percent and averaged 88.4 percent. Complete recovery data are presented in Appendix D, tables D-1 through D-4; Appendix E, tables E-3 and E-4.

ranging from 0.061 µg/L to 0.252 µg/L; diuron was detected in nine samples ranging from 0.062 µg/L to 1.120 µg/L; bromacil was detected in one sample at 0.093 µg/L; hexazinone was detected in four samples ranging from 0.050 µg/L to 0.536 µg/L.

Toxicity Evaluation: Pesticide Detections and U.S. EPA Aquatic Life Benchmarks
No OP or herbicide detections exceeded the U.S. EPA Aquatic Life Benchmarks (see tables 10 and 11 for detection/benchmark comparisons). However, one detection of diazinon in the Sacramento River on December 28, 2005, (0.0943 µg/L) approached the acute and chronic benchmark for invertebrates; a detection of diazinon at the KLRC on February 13, 2007, (0.0926 µg/L) approached the acute and chronic benchmark for invertebrates; a detection of chlorpyrifos in the Sacramento River on December 28, 2005, (0.0346 µg/L) approached the chronic benchmark for invertebrates; and a detection of diuron in the San Joaquin River on February 26, 2007, (2.135 µg/L) approached the acute benchmark for nonvascular plants. Three trace detections of malathion in the San Joaquin River, and one trace detection in the Sacramento River approached the chronic benchmark for invertebrates, assuming the detections were close to the reporting limit of 0.04 µg/L.

Quality Control
Laboratory matrix spikes, matrix blanks and blind spikes were prepared and analyzed during the course of the study. One matrix spike was analyzed per each field sample set received by the laboratory, for a total of 125 matrix spikes analyzed (62 for OPs; 63 for herbicides). A single matrix blank was analyzed in conjunction with each matrix spike. In addition, 22 blind spikes were prepared and analyzed. Duplicate field samples were also collected and analyzed: 16 duplicate sets were collected for OPs; 17 sets for herbicides. Complete quality control information is presented in Appendix E.

IV. CONCLUSIONS

- OPs were detected less frequently than herbicides over the course of the study.
- The relatively low number of OP detections may be due to a shift in insecticide choice; monitoring for substitute pesticides may be warranted.
- Based on the relatively high detection frequency of the herbicides evaluated in this study, additional monitoring may be warranted.
- OP and herbicide detections did not exceed U.S. EPA's Aquatic Life Benchmarks. However, Sacramento River watershed monitoring sites yielded two detections of diazinon and one detection of chlorpyrifos that approached the benchmarks for invertebrates. A single detection of diuron from the San Joaquin River approached the benchmark for nonvascular plants. Trace detections of malathion on both the San Joaquin and Sacramento Rivers likely approached the benchmark for invertebrates.

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Table 1. Sample collection dates for sampling performed during the 2006 WY (December 5, 2005 – September 25, 2006) for the Sacramento River (S), San Joaquin River (SJ), the Knights Landing Ridge Cut (KLRC) and the Yolo Bypass (Y). Sequential dates indicate sampling was conducted during a rain event.

Date	Site(s)	Date	Site(s)	Date	Site(s)	Date	Site(s)
05-Dec-05	S/SJ	22-Feb-06	S	30-Mar-06	SJ	28-May-06	S/SJ/KLRC
12-Dec-05	S/SJ	23-Feb-06	S	31-Mar-06	SJ	29-May-06	S/SJ
21-Dec-05	S/SJ	24-Feb-06	S	01-Apr-06	SJ	30-May-06	S/SJ
28-Dec-05	S/SJ	25-Feb-06	S	02-Apr-06	SJ	31-May-06	S/SJ
03-Jan-06	S/SJ/Y	26-Feb-06	S	03-Apr-06	SJ	06-Jun-06	S/SJ
09-Jan-06	S/SJ/Y	27-Feb-06	S/SJ	04-Apr-06	SJ	13-Jun-06	S/SJ
17-Jan-06	S/SJ/Y	28-Feb-06	S/SJ	05-Apr-06	S/SJ	20-Jun-06	S/SJ
25-Jan-06	S/SJ/Y	01-Mar-06	S/SJ/KLRC	06-Apr-06	SJ	26-Jun-06	S/SJ
01-Feb-06	S/SJ	02-Mar-06	S/SJ/Y	10-Apr-06	S/SJ/Y	05-Jul-06	S/SJ
02-Feb-06	S/KLRC	03-Mar-06	S/SJ/Y	17-Apr-06	S/SJ/Y	10-Jul-06	S/SJ
03-Feb-06	S/KLRC	04-Mar-06	S/SJ/Y	26-Apr-06	S/SJ/Y	17-Jul-06	S/SJ
04-Feb-06	S/KLRC	05-Mar-06	S/SJ/Y	01-May-06	S/SJ	24-Jul-06	S/SJ
05-Feb-06	S/KLRC	06-Mar-06	S/SJ/Y	03-May-06	Y	31-Jul-06	S/SJ
06-Feb-06	S/KLRC	07-Mar-06	S/SJ/Y	08-May-06	S/SJ/KLRC	07-Aug-06	S/SJ
07-Feb-06	S/SJ/Y	08-Mar-06	S/SJ/Y	16-May-06	S/SJ/KLRC	22-Aug-06	S/SJ
08-Feb-06	S/Y	09-Mar-06	S/SJ/Y	22-May-06	S/SJ/KLRC	28-Aug-06	S/SJ
09-Feb-06	S/Y	10-Mar-06	S/SJ/Y	23-May-06	S/SJ/KLRC	05-Sep-06	S/SJ
10-Feb-06	S/Y	14-Mar-06	S/SJ	24-May-06	S/SJ/KLRC	11-Sep-06	S/SJ
14-Feb-06	S/SJ	21-Mar-06	S/SJ/Y	25-May-06	S/SJ/KLRC	18-Sep-06	S/SJ
20-Feb-06	S	28-Mar-06	S/SJ/Y	26-May-06	S/SJ/KLRC	25-Sep-06	S/SJ
21-Feb-06	S/SJ	29-Mar-06	SJ	27-May-06	S/SJ/KLRC		

Table 2. Sample collection dates for sampling performed during the 2007 WY (October 2, 2006 – September 25, 2007) for the Sacramento River (S), San Joaquin River (SJ) and the Knights Landing Ridge Cut (KLRC). Sequential dates indicate sampling was conducted during a rain event.

Date	Site(s)	Date	Site(s)	Date	Site(s)	Date	Site(s)
02-Oct-06	S/SJ	27-Dec-06	S	23-Feb-07	S	29-Apr-07	S
06-Oct-06	S/SJ	28-Dec-06	S	24-Feb-07	S	30-Apr-07	S
10-Oct-06	S/SJ	29-Dec-06	S/KLRC	25-Feb-07	S	01-May-07	S/SJ
16-Oct-06	S/SJ	30-Dec-06	S/KLRC	26-Feb-07	S/SJ	02-May-07	S
24-Oct-06	S/SJ	31-Dec-06	S	27-Feb-07	S/SJ/KLRC	09-May-07	S/SJ
30-Oct-06	S/SJ	01-Jan-07	S/SJ	28-Feb-07	S/SJ/KLRC	14-May-07	S/SJ
06-Nov-06	S/SJ	02-Jan-07	S	01-Mar-07	S/SJ/KLRC	22-May-07	S/SJ
13-Nov-06	S/SJ	03-Jan-07	S	02-Mar-07	S/SJ/KLRC	30-May-07	S/SJ
20-Nov-06	S/SJ	04-Jan-07	S	03-Mar-07	S/SJ	05-Jun-07	S/SJ
27-Nov-06	S/SJ	05-Jan-07	S	04-Mar-07	S/SJ	13-Jun-07	S/SJ
04-Dec-06	S/SJ	08-Jan-07	S/SJ	05-Mar-07	S/SJ	19-Jun-07	S/SJ
11-Dec-06	S/SJ	16-Jan-07	S/SJ	06-Mar-07	SJ	26-Jun-07	S/SJ
12-Dec-06	S	22-Jan-07	S/SJ	07-Mar-07	SJ	03-Jul-07	S/SJ
13-Dec-06	S	29-Jan-07	S/SJ	12-Mar-07	S/SJ	09-Jul-07	S/SJ
14-Dec-06	S	05-Feb-07	S/SJ	19-Mar-07	S/SJ	17-Jul-07	S/SJ
15-Dec-06	S	09-Feb-07	S	26-Mar-07	S/SJ	24-Jul-07	S/SJ
16-Dec-06	S	10-Feb-07	S	02-Apr-07	S/SJ	30-Jul-07	S/SJ
17-Dec-06	S	11-Feb-07	S/KLRC	10-Apr-07	S/SJ	06-Aug-07	S/SJ
18-Dec-06	S/SJ	12-Feb-07	S/SJ/KLRC	17-Apr-07	S/SJ	13-Aug-07	S/SJ
19-Dec-06	S	13-Feb-07	S/KLRC	23-Apr-07	S	20-Aug-07	S/SJ
22-Dec-06	S	14-Feb-07	S/KLRC	24-Apr-07	S/SJ	28-Aug-07	S/SJ
23-Dec-06	S	15-Feb-07	S/KLRC	25-Apr-07	S	04-Sep-07	S/SJ
24-Dec-06	S	16-Feb-07	S/KLRC	26-Apr-07	S	10-Sep-07	S/SJ
25-Dec-06	S	17-Feb-07	S/KLRC	27-Apr-07	S	17-Sep-07	S/SJ
26-Dec-06	S/SJ	18-Feb-07	S/SJ	28-Apr-07	S	25-Sep-07	S/SJ

Table 3. Sample collection dates for sampling performed during the 2008 WY (October 2, 2007 – December 27, 2007) for the Sacramento River (S) and San Joaquin River (SJ). Sequential dates indicate sampling was conducted during a rain event.

Date	Site(s)	Date	Site(s)	Date	Site(s)	Date	Site(s)
02-Oct-07	S/SJ	03-Nov-07	S/SJ	18-Dec-07	S	23-Dec-07	S
09-Oct-07	S/SJ	06-Nov-07	S/SJ	19-Dec-07	S	24-Dec-07	S
15-Oct-07	S/SJ	13-Nov-07	S/SJ	20-Dec-07	S	25-Dec-07	S
22-Oct-07	S/SJ	20-Nov-07	S/SJ	21-Dec-07	S	26-Dec-07	S
29-Oct-07	S/SJ	26-Nov-07	S/SJ	22-Dec-07	S	27-Dec-07	S

Table 4. Rain event sampling dates in the San Joaquin and Sacramento River watersheds.

Rain Events: 2006 WY
San Joaquin River (Vernalis Dock): • Event 1: February 27 – 28, 2006 (sampling truncated by Event 2) • Event 2: March 1 – 10, 2006 • Event 3: March 28 – April 6, 2006 • Event 4: May 22 – 31, 2006
Sacramento River (Freeport Bridge): • Event 1: February 1 – 10, 2006 • Event 2: February 20 – 28, 2006 (sampling truncated by Event 3) • Event 3: March 1 – 10, 2006 • Event 4: May 22 – 31, 2006
Sacramento River: (KLRC): • Event 1: February 2 – 6, 2006 • Event 2: May 22 – 28, 2006
Sacramento River: (Yolo Bypass): • Event 1: February 7 – 10, 2006 • Event 2: March 2 – 10, 2006
Rain Events: 2007 WY
San Joaquin River (Vernalis Dock): • Event 1: February 26 – March 7, 2007
Sacramento River (Freeport Bridge): • Event 1: December 10 – 19, 2006 • Event 2: December 22 – 26, 2006 (sampling truncated by Event 3) • Event 3: December 27, 2006 – January 5, 2007 • Event 4: February 9 – 18, 2007 • Event 5: February 23 – March 5, 2007 • Event 6: April 23 – May 2, 2007
Sacramento River (KLRC): • Event 1: December 29 – 30, 2006 • Event 2: February 11 – 17, 2007 • Event 3: February 27 – 28, 2007 • Event 4: March 1 – 2, 2007
Rain Event: 2008 WY
Sacramento River (Freeport Bridge): • Event 1: December 18 – 27, 2007

Table 5. Organophosphate (OP) compounds analyzed and their reporting limits.

Analytical Screens		Organophosphates (OP)	Reporting Limit (µg/L)
Long Screen	Short Screen	Chlorpyrifos	0.01
		Diazinon	0.01
		Dimethoate	0.04
		Malathion	0.04
		Methidathion	0.05
		Azinphos-methyl	0.05
		Dichlorvos (DDVP)	0.05
		Disulfoton	0.04
		Ethoprop	0.05
		Fenamiphos	0.05
		Fonofos	0.04
		Methyl Parathion	0.03
		Profenofos	0.05
		Thimet (Phorate)	0.05
		Tribufos (DEF)	0.05

Table 6. Herbicide compounds analyzed and their reporting limits.

Analytical Screens		Herbicides	Reporting Limit (µg/L)
Long Screen	Short Screen	Bromacil	0.05
		DACT†	0.05
		Diuron	0.05
		Hexazinone	0.05
		Simazine	0.05
		ACET†	0.05
		Atrazine	0.05
		DEA††	0.05
		Norflurazon	0.05
		Prometon	0.05
Propazine‡			0.05

† Atrazine and simazine breakdown product

†† Atrazine breakdown product

‡ Propazine is a lab surrogate included in all samples at 0.200 µg/L; propazine percent recovery facilitates quantification of triazine herbicide recovery

Table 7. Summary of pH, temperature (°C), pH, dissolved oxygen (DO) and electrical conductivity (EC) measurements for the San Joaquin and Sacramento rivers, the KLRC and Yolo Bypass.

Sample Collection Site	Measurement Range			
	pH	°C	DO	EC
San Joaquin River	6.18 – 9.99	6.0 – 25.9	4.10 – 18.70	99.9 – 782.0
Sacramento River	6.50 – 8.33†	5.6 – 23.5	4.70 – 12.93	68.8 – 201.4
KLRC	7.01 – 8.32	6.1 – 25.6	4.18 – 10.20	315.6 – 933.0
Yolo Bypass	7.10 – 8.06	8.6 – 17.8	8.30 – 10.91	72.8 – 471.3

† A single value of pH 10.19 was recorded on February 6, 2006

Table 8. Summary of OP detections.

Sample Collection Site	Pesticides Detected	Number of Samples Collected at Each Site	Number of Samples Containing one or More Detection	Total Number of Detections	Number of Trace* Detections	Concentration (µg/L)		
						Range	Mean†	Median††
San Joaquin River		140	25					
	Malathion			3	3	trace	----	trace
	Dimethoate			21	17	trace-0.070	0.056	trace
	Diazinon			1	0	0.011	----	----
	Chlorpyrifos			1	0	0.0103	----	----
	Ethoprop	(132)‡		2+	2	trace	----	trace
Sacramento River		201	10					
	Malathion			1	1	trace	----	----
	Dimethoate			2	2	trace	----	trace
	Diazinon			6	0	0.0115-0.0943	0.029	0.014
	Chlorpyrifos			3	0	0.0105-0.0346	0.022	0.022
	DDVP	(193)‡‡		1	1	trace	----	----
KLRC		29	13					
	Diazinon			13++	0	0.0102-0.0926	0.032	0.015
Yolo Bypass		24	6					
	Diazinon			6	0	0.0101-0.0298	0.014	0.012
TOTALS		**394**	**54**	**60**	**26**			

***** Trace detection (concentration below the reporting limit but above the method detection limit)
† Trace values not used to calculate means
†† Trace values used to calculate median values
‡ 132 samples analyzed for ethoprop out of 140 collected at monitoring site
‡‡ 193 samples analyzed for DDVP out of 201 collected at monitoring site
+ Parent sample plus field duplicate tested positive for ethoprop
++ Includes one set of parent/duplicate sample detections

Table 9. Summary of herbicide detections.[1]

Sample Collection Site	Pesticides Detected	Number of Samples Collected at Each Site	Number of Samples Containing One or More Detection	Total Number of Detections	Number of Trace* Detections	Concentration (µg/L)		
						Range	Mean†	Median††
San Joaquin River		141	99					
	Simazine			43	17	trace-0.708	0.139	0.056
	Diuron			90	7	trace-2.135	0.434	0.226
	Bromacil			2	2	trace	----	trace
	Hexazinone			24	1	trace-0.282	0.112	0.088
	DACT+			31	31	trace	----	trace
Sacramento River		203	84					
	Simazine			19	13	trace-0.124	0.072	trace
	Diuron			81	46	trace-1.117	0.132	trace
	Bromacil			12	3	trace-0.436	0.107	0.053
	Hexazinone			3	2	trace-0.291	----	trace
KLRC		28	24					
	Simazine			15	4	trace-1.021	0.304	0.120
	Diuron			24	4	trace-1.660	0.282	0.110
	Bromacil			3	0	0.079-0.280	0.152	0.098
	Hexazinone			6	0	0.052-0.702	0.313	0.255
	DEA++	(2)‡		1	1	trace	----	----
Yolo Bypass		24	9					
	Simazine			7	0	0.061-0.252	0.111	0.088
	Diuron			9	0	0.062-1.120	0.252	0.170
	Bromacil			1	0	0.093	----	----
	Hexazinone			4	0	0.050-0.536	0.179	0.065
TOTALS		**396**	**216**	**375**	**131**			

[1] Detection count for the San Joaquin and Sacramento rivers and the KLRC includes parent/duplicate sample detections
***** Trace detection (concentration below the reporting limit but above the method detection limit)
† Trace values not used to calculate means
†† Trace values used to calculate median values
‡ Two samples analyzed for DEA out of 28 collected at KLRC
+ Atrazine/simazine breakdown product
++ Atrazine breakdown product

Table 10. Comparison of surface water OP detections and U.S. EPA Aquatic Life Benchmarks.

	Number of Detections	Maximum Concentration Detected (µg/L)	Aquatic Life Benchmark† (µg/L)			
			Fish		Invertebrates	
			Acute	Chronic	Acute	Chronic
San Joaquin River						
Ethoprop	2	trace	150	24	22	0.8
Malathion	3	trace	16.4	8.6	0.3	0.035
Dimethoate	21	0.070	3,100	430	21.5	0.5
Diazinon	1	0.0110	45	< 0.55	0.11	0.17
Chlorpyrifos	1	0.0103	0.9	0.57	0.05	0.04
Sacramento River						
Malathion	1	trace	16.4	8.6	0.3	0.035
Dimethoate	2	trace	3,100	430	21.5	0.5
Diazinon	6	0.0943	45	< 0.55	0.11	0.17
Chlorpyrifos	3	0.0346	0.9	0.57	0.05	0.04
KLRC						
Diazinon	13	0.0926	45	< 0.55	0.11	0.17
Yolo Bypass						
Diazinon	6	0.0298	45	< 0.55	0.11	0.17

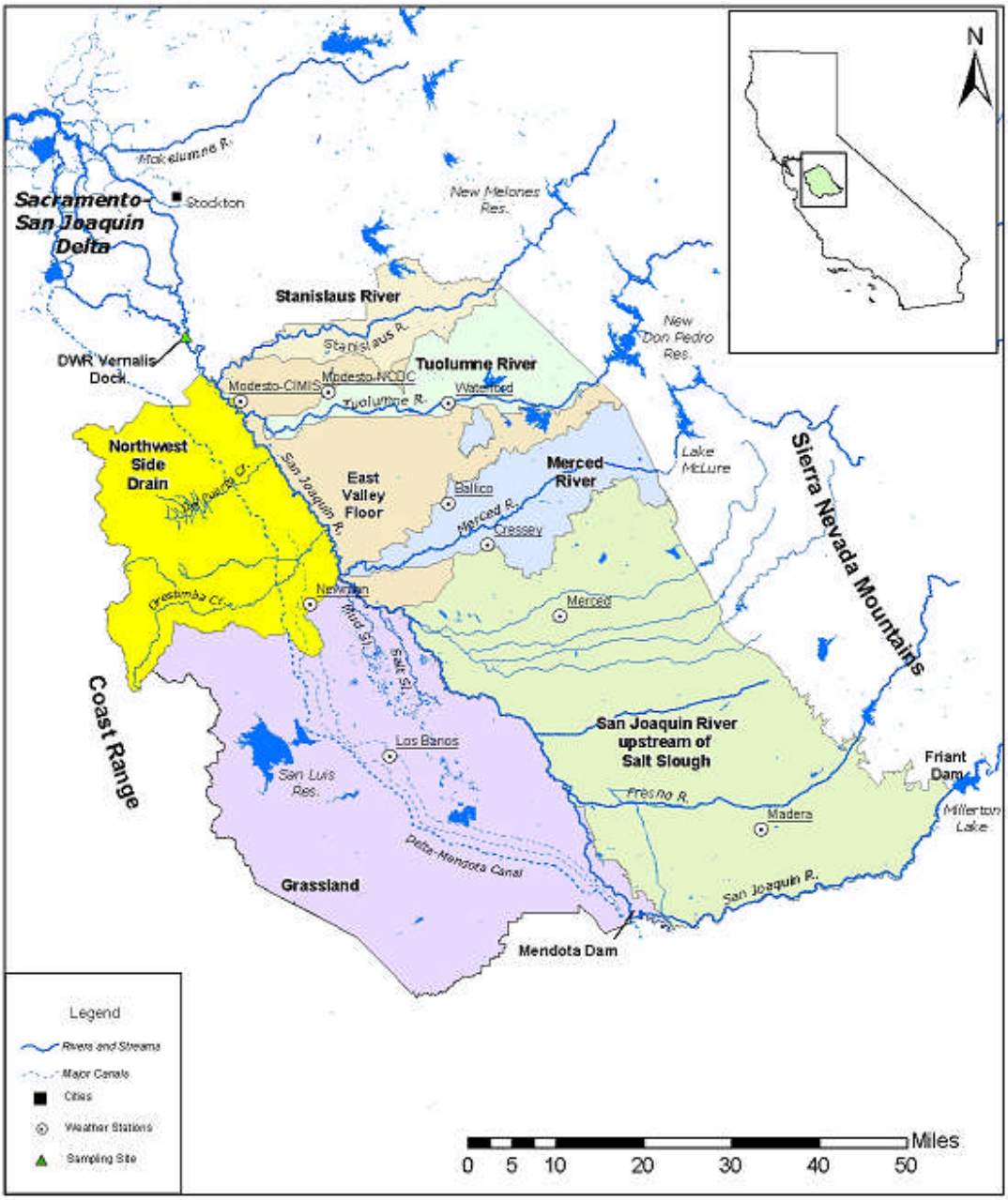
† Aquatic Life Benchmark data source: U.S. EPA, 2011

Table 11. Comparison of surface water herbicide detections and U.S. EPA Aquatic Life Benchmarks.

	Number of Detections	Maximum Concentration Detected (µg/L)	Aquatic Life Benchmark† (µg/L)		
			Invertebrates		Nonvascular Plants
			Acute	Chronic	Acute
San Joaquin River					
Simazine	43	0.708	500	2,000	36
Diuron	71	2.135	80	200	2.4
Bromacil	2	trace	60,500	8,200	6.8
Hexazinone	24	0.282	75,800	20,000	7
DACT	31	trace	> 50,000	----	----
Sacramento River					
Simazine	19	0.124	500	2,000	36
Diuron	80	1.117	80	200	2.4
Bromacil	12	0.463	60,500	8,200	6.8
Hexazinone	3	0.291	75,800	20,000	7
KLRC					
Simazine	15	1.021	500	2,000	36
Diuron	24	1.660	80	200	2.4
Bromacil	3	0.280	60,500	8,200	6.8
Hexazinone	6	0.702	75,800	20,000	7
DEA	1	trace	----	----	1,000
Yolo Bypass					
Simazine	7	0.252	500	2,000	36
Diuron	9	1.120	80	200	2.4
Bromacil	1	0.093	60,500	8,200	6.8
Hexazinone	4	0.536	75,800	20,000	7

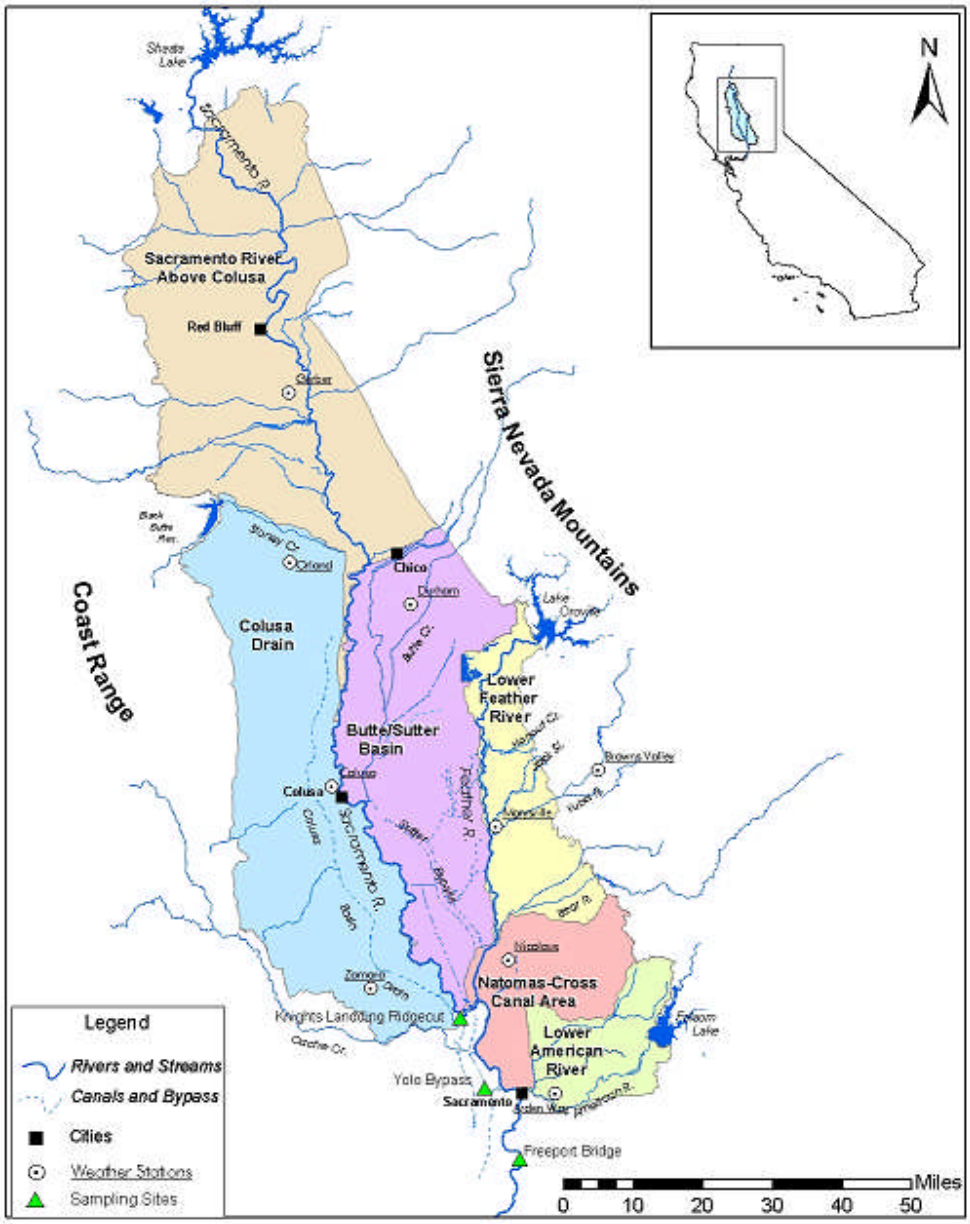
† Aquatic Life Benchmark data source: U.S. EPA, 2011

Figure 1. San Joaquin River watershed showing sub-basins and sampling site.†



† Based on a Regional Water Quality Control Board map by Tim Tadock

Figure 2. Sacramento River watershed showing sub-basins and sampling sites.†



† Based on a Regional Water Quality Control Board map by Tim Tadock

Figure 3. San Joaquin River pH, temperature and dissolved oxygen (DO) data for the December 5, 2005 - November 26, 2007 sampling period.

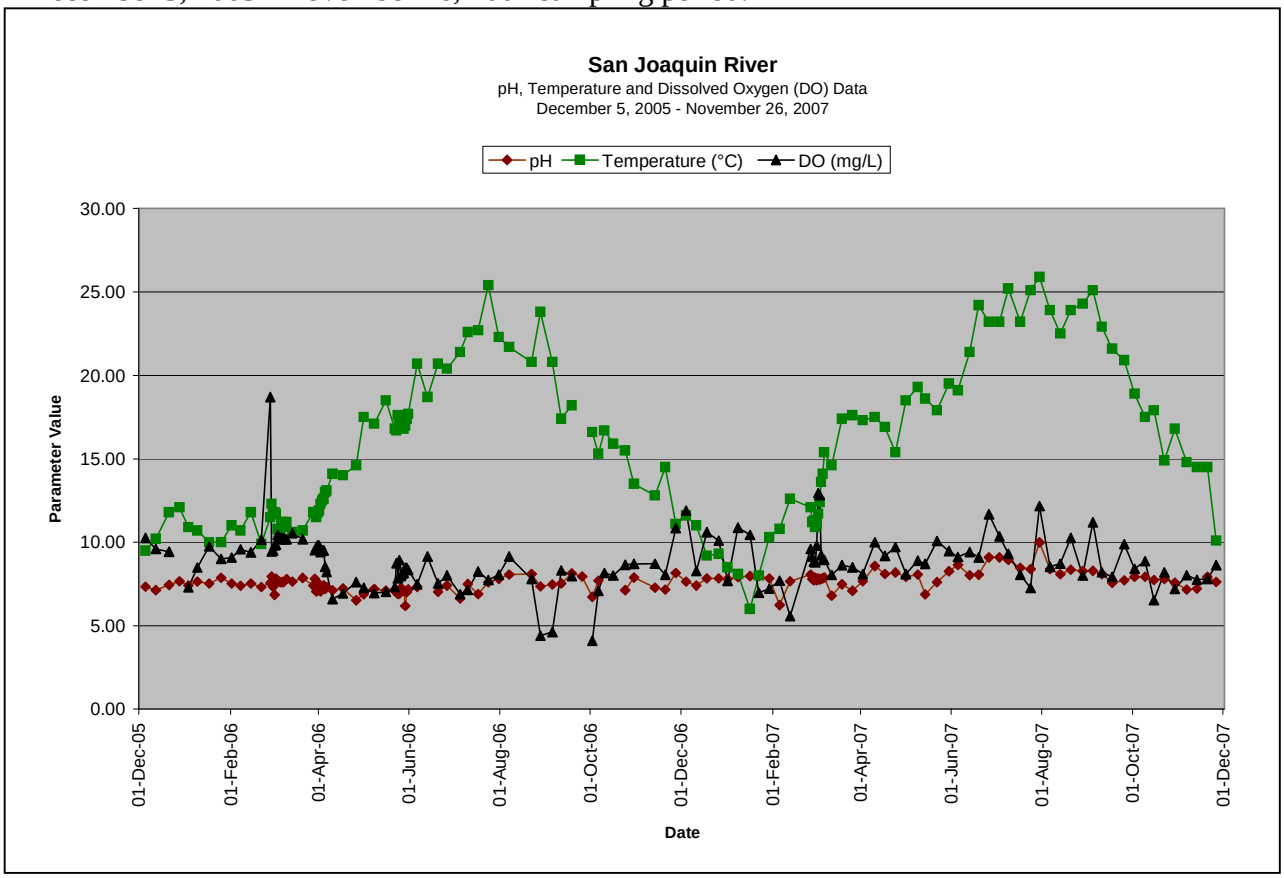


Figure 4. San Joaquin River electrical conductivity (EC) data for the December 5, 2005 - November 26, 2007 sampling period.

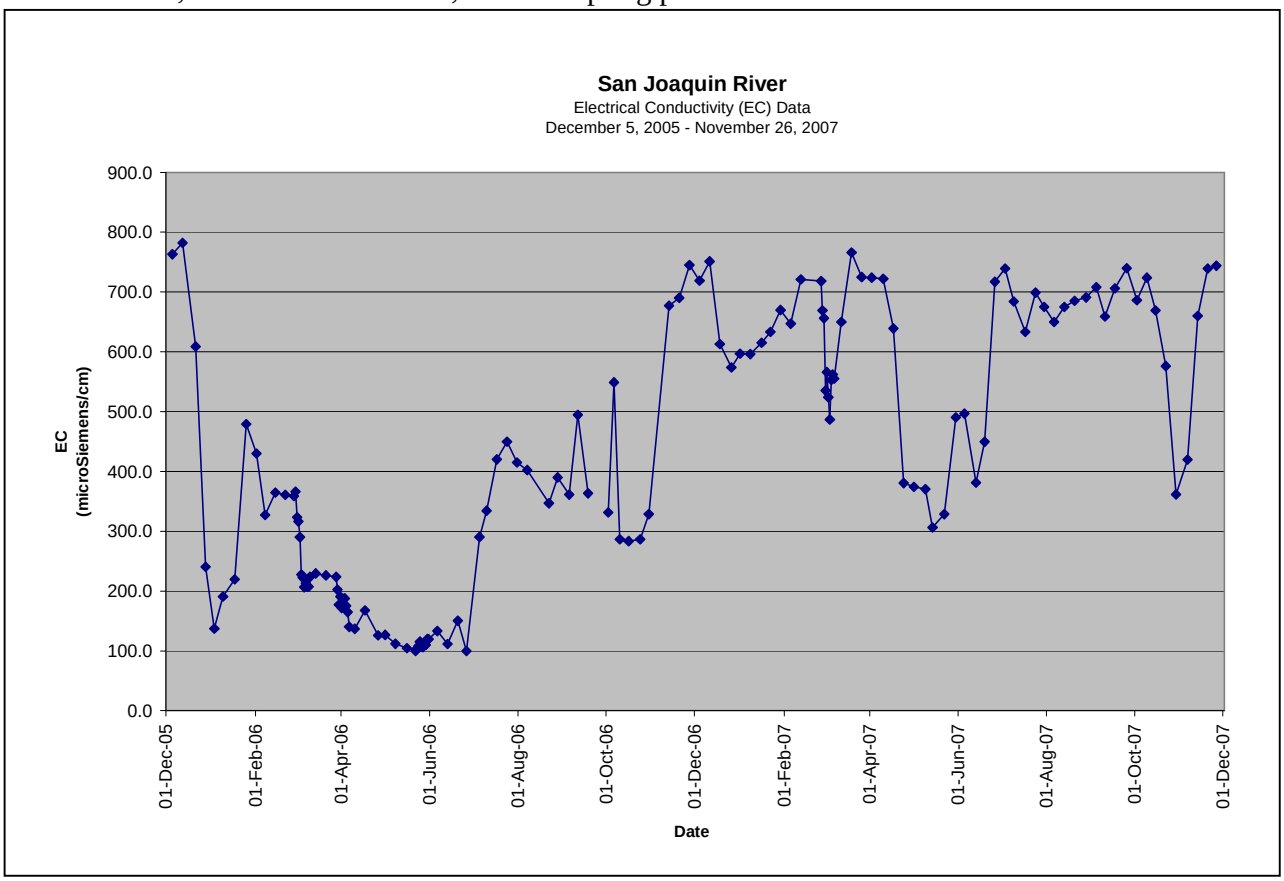


Figure 5. Sacramento River pH, temperature and dissolved oxygen (DO) data for the December 5, 2005 - December 27, 2007 sampling period.

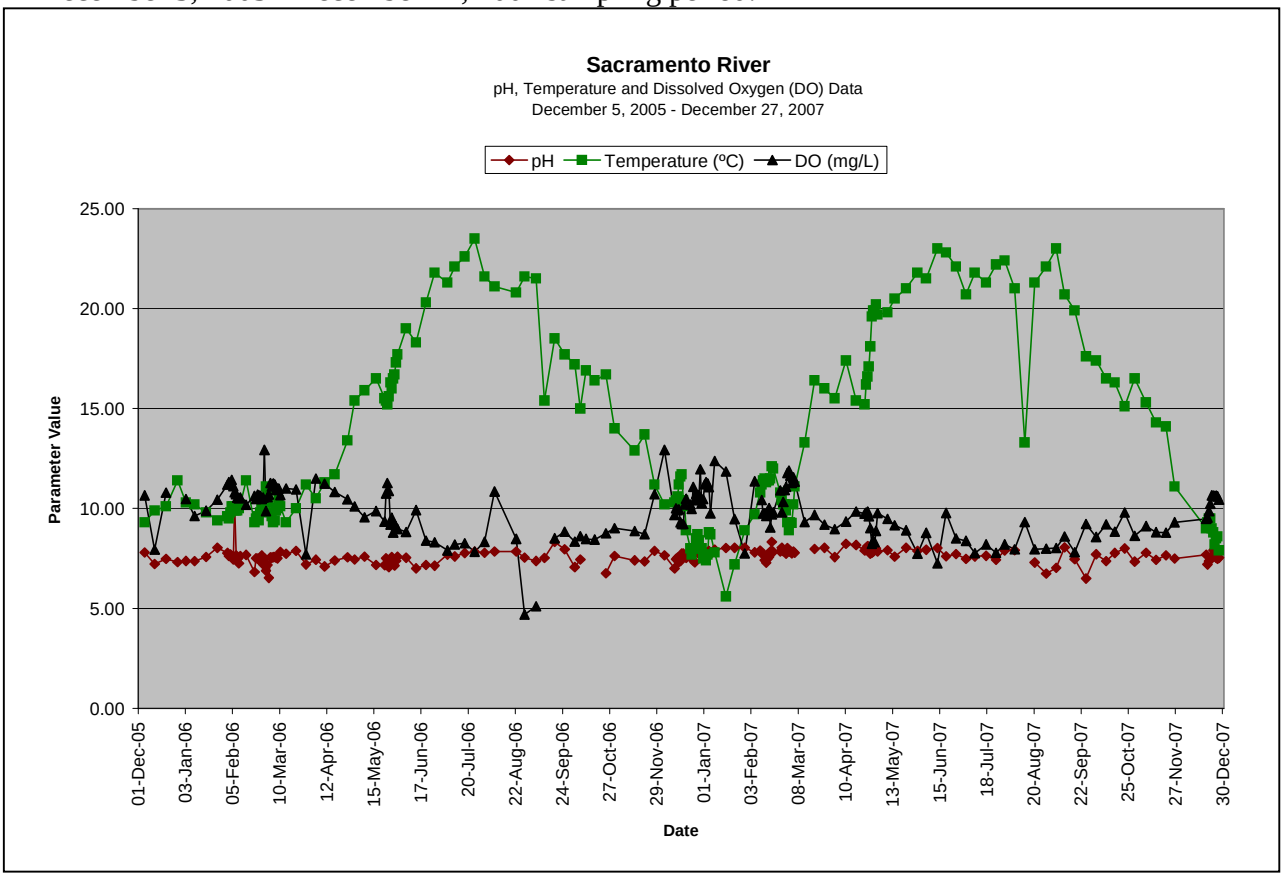


Figure 6. Sacramento River electrical conductivity (EC) data for the December 5, 2005 - December 27, 2007 sampling period.

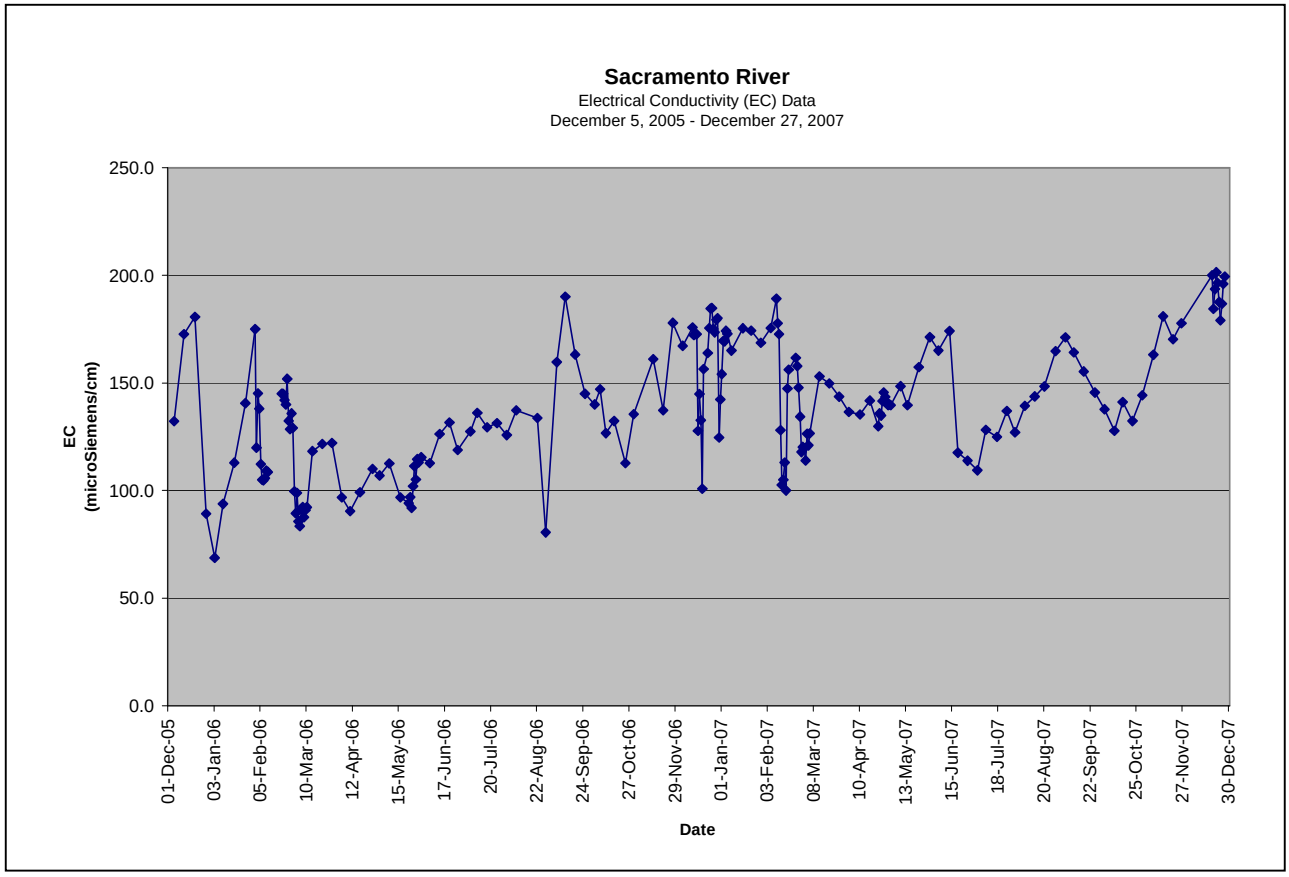


Figure 7. Knights Landing Ridge Cut (KLRC) pH, temperature and dissolved oxygen (DO) data for the February 2, 2006 – March 2, 2007 sampling period.

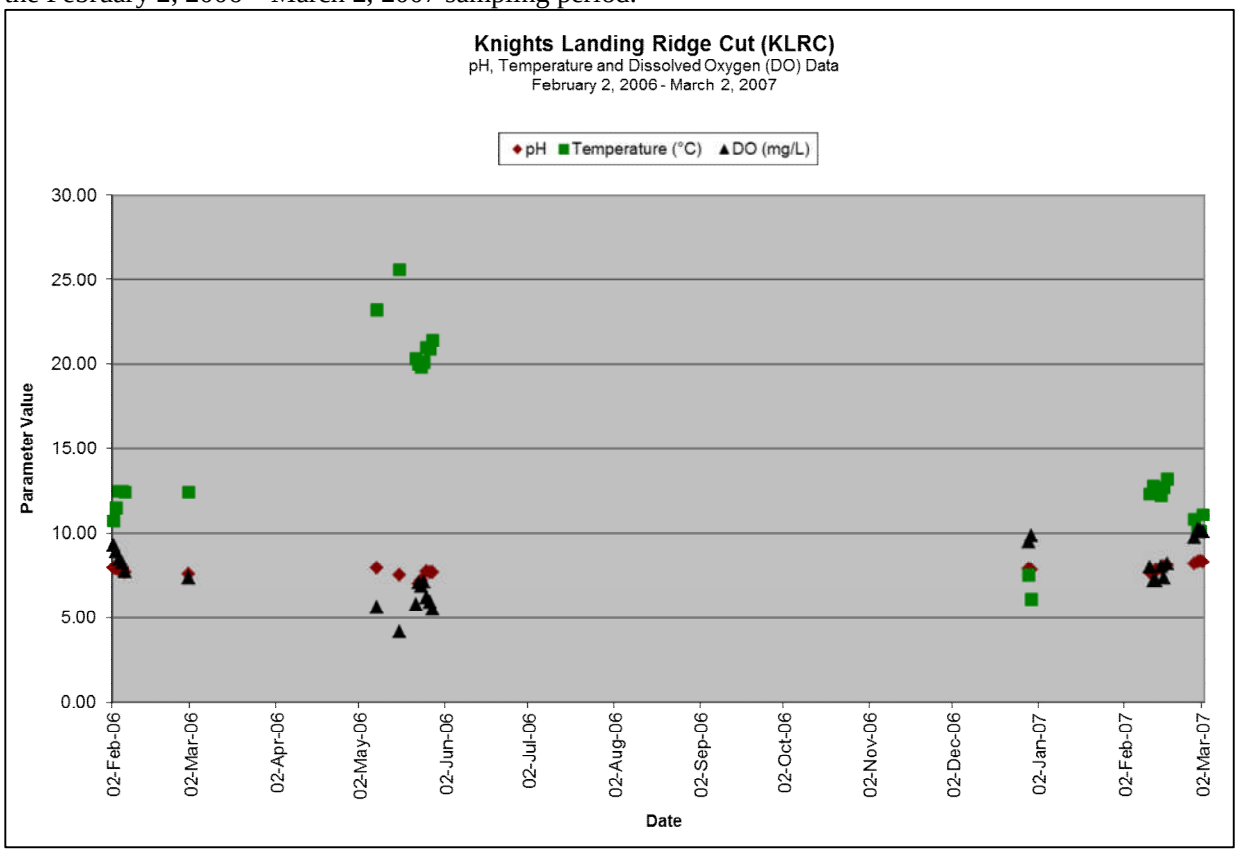


Figure 8. Knights Landing Ridge Cut (KLRC) electrical conductivity (EC) data for the February 2, 2006 – March 2, 2007 sampling period.

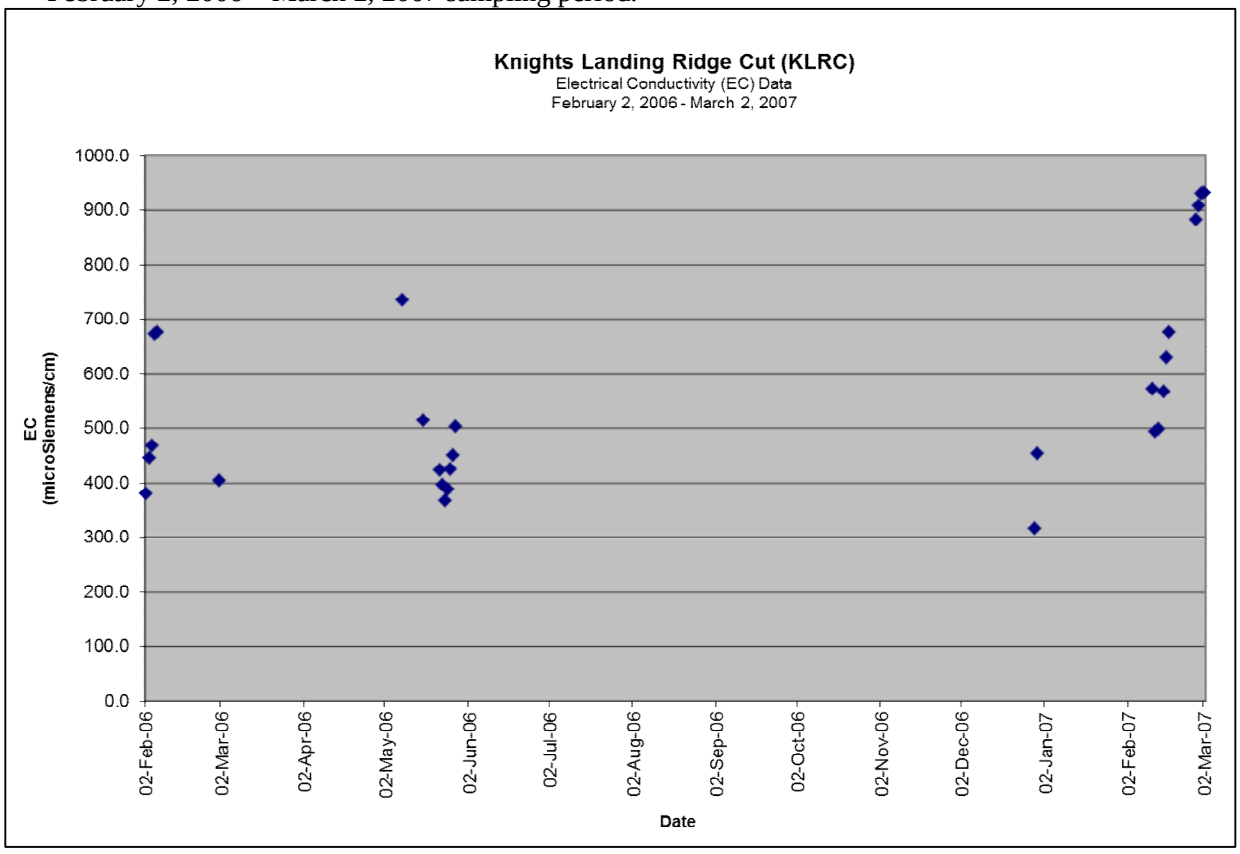


Figure 9. Yolo Bypass pH, temperature and dissolved oxygen (DO) data for the January 3, 2006 - May 3, 2006 sampling period.

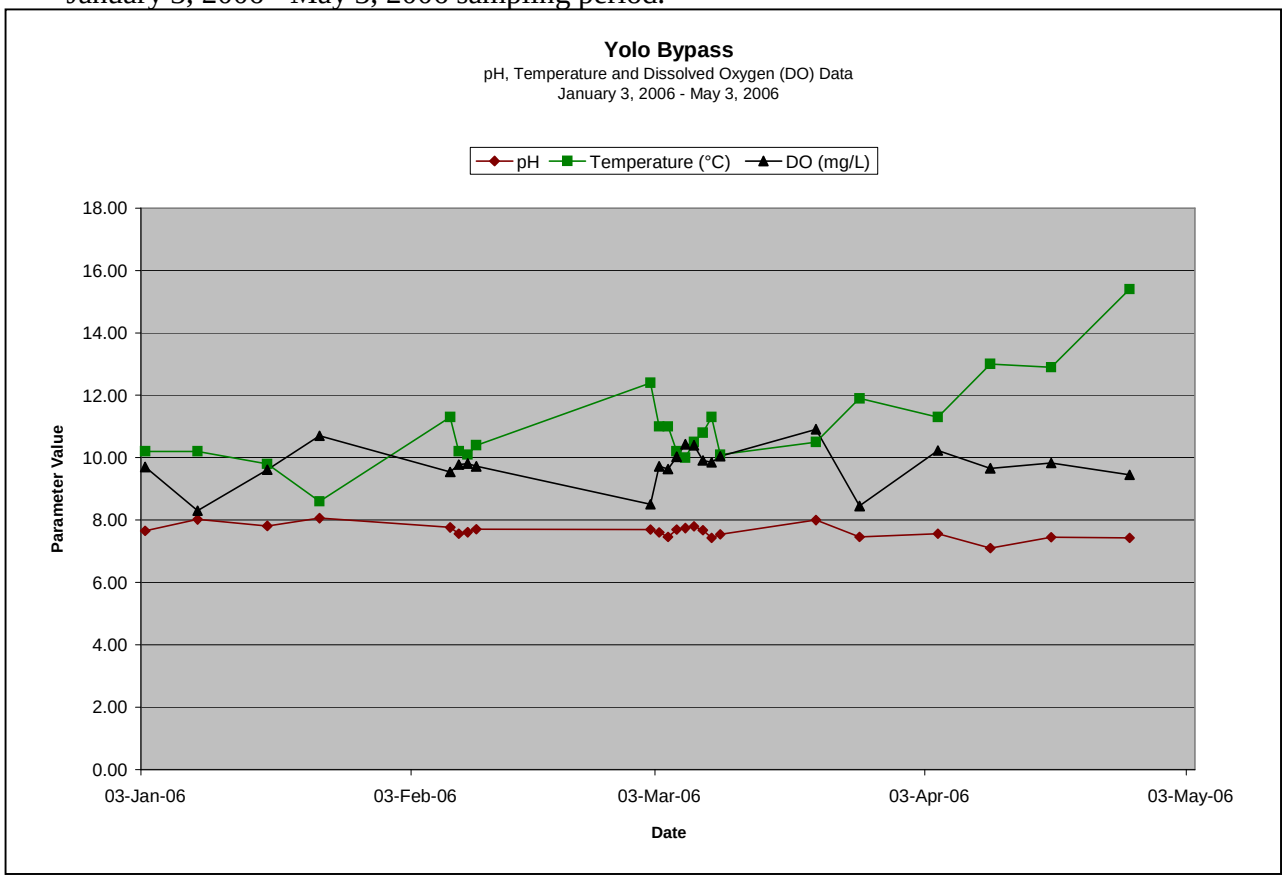
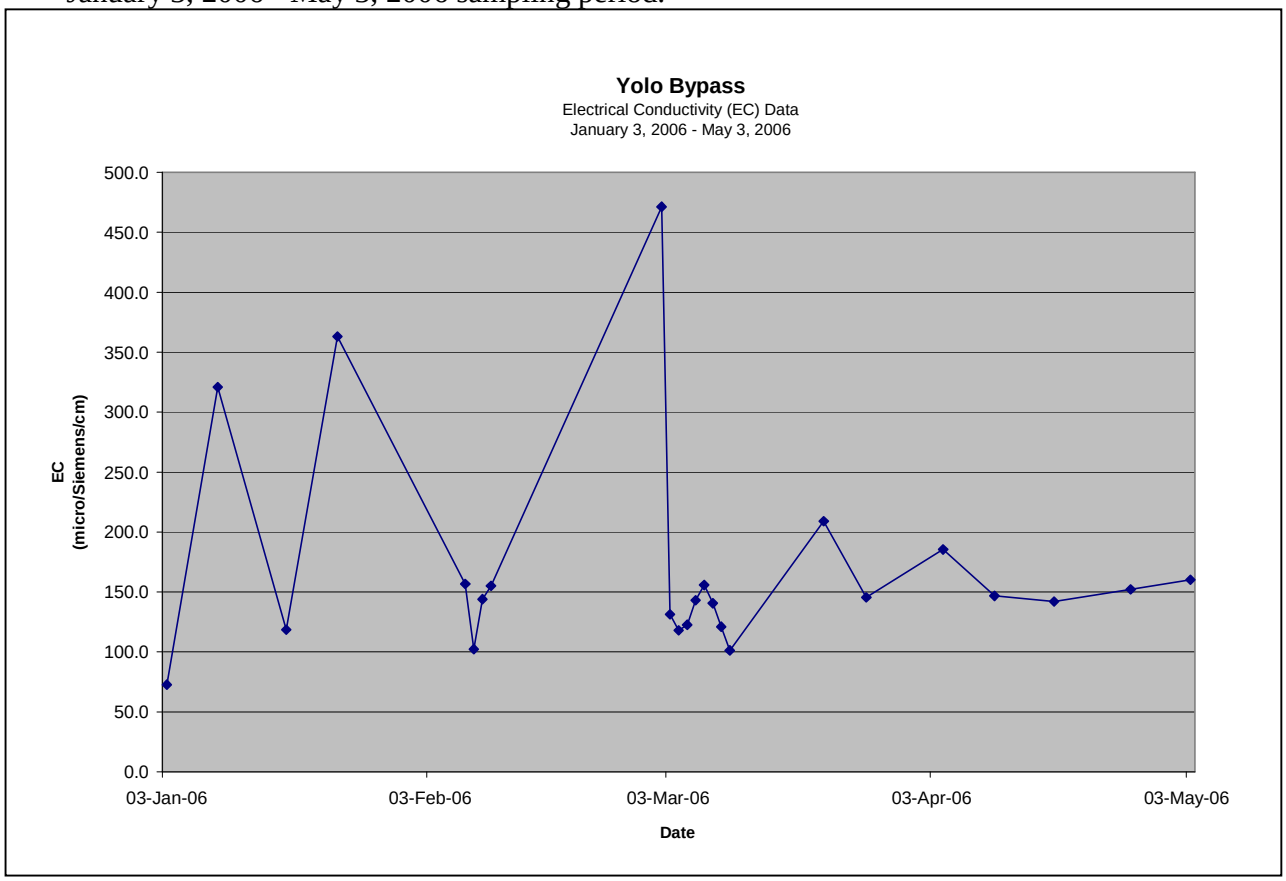


Figure 10. Yolo Bypass electrical conductivity (EC) data for the January 3, 2006 - May 3, 2006 sampling period.



Appendix A:
Weather Forecast Data Sources and Precipitation Data

San Joaquin Watershed **Weather Forecast and River Stage Data Sources** (Fresno, Merced, Modesto)
South Central California Weather National Weather Service Forecast Office, San Joaquin Valley/Hanford, CA Available at: http://www.wrh.noaa.gov/hnx/
Rainfall Maps for Southern California Department of Water Resources/California Nevada River Forecast Center Department of Water Resources, California Data Exchange Center Available at: http://cdec.water.ca.gov/precip_maps/
River Stage Maps National Weather Service/California Nevada River Forecast Center Department of Water Resources, California Data Exchange Center Available at: http://cdec.water.ca.gov/stage_maps/
Quantitative Precipitation Forecasts (QPF) National Weather Service, California Nevada River Forecast Center Available at: http://www.cnrfc.noaa.gov/precipForecast.php?cwa=RSA&day=1&img=5

Sacramento Watershed **Weather Forecast and River Stage Data Sources** (Chico, Orland, Sacramento, Yuba City/Marysville)
North Central California Weather National Weather Service Forecast Office, Sacramento, CA Available at: http://www.wrh.noaa.gov/sto/
Precipitation Maps for the Sacramento Area National Weather Service Forecast Office, Sacramento, CA Available at: http://www.wrh.noaa.gov/sto/precipitation.php
River Stage Maps National Weather Service/California Nevada River Forecast Center Department of Water Resources, California Data Exchange Center Available at: http://cdec.water.ca.gov/stage_maps/
Quantitative Precipitation Forecasts (QPF) National Weather Service, California Nevada River Forecast Center Available at: http://www.cnrfc.noaa.gov/precipForecast.php?cwa=RSA&day=1&img=5

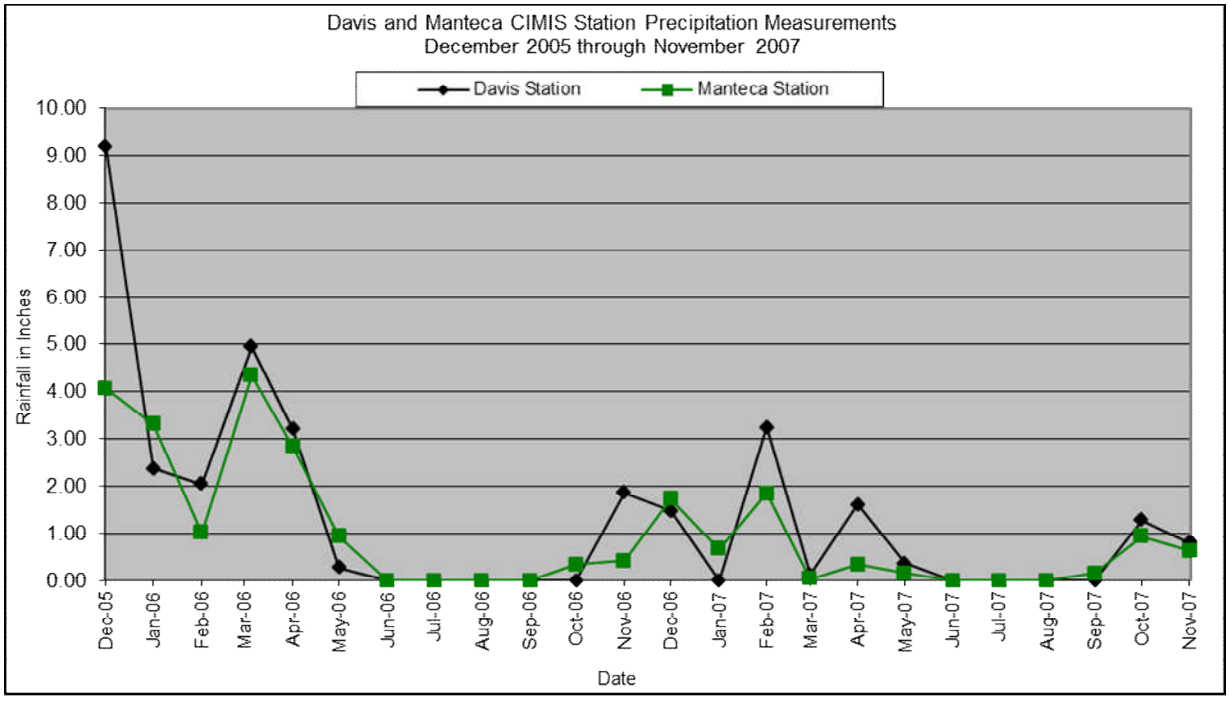
Rainfall Measurement

Table A-1 and Figure A-1 present precipitation measurements for the study period from two California Irrigation Management Information System (CIMIS) stations, station six at Davis and station 70 at Manteca. These stations were chosen based upon their proximity to sampling sites in the two watersheds: Davis was chosen to represent precipitation in the Sacramento River watershed; Manteca was chosen to represent the San Joaquin River watershed.

Table A-1. Precipitation measurements from the Davis and Manteca CIMIS weather stations for the study period December 2005 through November 2007.

Date	Precipitation Davis	Precipitation Manteca	Date	Precipitation Davis	Precipitation Manteca
Dec-05	9.19	4.06	Dec-06	1.48	1.73
Jan-06	2.37	3.31	Jan-07	0.00	0.67
Feb-06	2.04	1.02	Feb-07	3.24	1.85
Mar-06	4.94	4.33	Mar-07	0.13	0.04
Apr-06	3.20	2.83	Apr-07	1.61	0.35
May-06	0.28	0.94	May-07	0.37	0.16
Jun-06	0.00	0.00	Jun-07	0.01	0.00
Jul-06	0.00	0.00	Jul-07	0.00	0.00
Aug-06	0.00	0.00	Aug-07	0.00	0.00
Sep-06	0.00	0.00	Sep-07	0.00	0.16
Oct-06	0.00	0.35	Oct-07	1.28	0.94
Nov-06	1.86	0.43	Nov-07	0.81	0.63
PRECIPITATION TOTALS FOR THE STUDY PERIOD				32.81	23.80

Figure A-1. Plot of precipitation measurements from the Davis and Manteca CIMIS weather stations for the study period December 2005 through November 2007.



Appendix B:
Water Quality Measurements

Table B-1. San Joaquin River pH data.

Date	pH	Date	pH	Date	pH	Date	pH	Date	pH
05-Dec-05	7.34	30-Mar-06	7.05	05-Jul-06	6.62	22-Jan-07	7.97	19-Jun-07	8.06
12-Dec-05	7.13	31-Mar-06	7.48	10-Jul-06	7.50	29-Jan-07	7.84	26-Jun-07	9.10
21-Dec-05	7.44	01-Apr-06	7.50	17-Jul-06	6.90	05-Feb-07	6.23	03-Jul-07	9.10
28-Dec-05	7.67	02-Apr-06	7.06	24-Jul-06	7.60	12-Feb-07	7.66	09-Jul-07	8.95
03-Jan-06	7.41	03-Apr-06	7.21	31-Jul-06	7.81	26-Feb-07	8.07	17-Jul-07	8.47
09-Jan-06	7.64	04-Apr-06	7.41	07-Aug-06	8.07	27-Feb-07	7.79	24-Jul-07	8.39
17-Jan-06	7.52	05-Apr-06	7.21	22-Aug-06	8.10	28-Feb-07	7.72	30-Jul-07	9.99
25-Jan-06	7.88	06-Apr-06	7.32	28-Aug-06	7.35	01-Mar-07	7.86	06-Aug-07	8.39
01-Feb-06	7.52	10-Apr-06	7.12	05-Sep-06	7.47	02-Mar-07	7.72	13-Aug-07	8.08
07-Feb-06	7.39	17-Apr-06	7.24	11-Sep-06	7.53	03-Mar-07	7.84	20-Aug-07	8.36
14-Feb-06	7.52	26-Apr-06	6.52	18-Sep-06	8.15	04-Mar-07	7.77	28-Aug-07	8.28
21-Feb-06	7.31	01-May-06	6.88	25-Sep-06	7.95	05-Mar-07	7.79	04-Sep-07	8.29
27-Feb-06	7.56	08-May-06	7.20	02-Oct-06	6.73	06-Mar-07	7.85	10-Sep-07	8.10
28-Feb-06	7.95	16-May-06	7.11	06-Oct-06	7.71	07-Mar-07	7.89	17-Sep-07	7.57
01-Mar-06	7.33	22-May-06	7.10	10-Oct-06	----	12-Mar-07	6.80	25-Sep-07	7.72
02-Mar-06	6.85	23-May-06	7.07	16-Oct-06	----	19-Mar-07	7.49	02-Oct-07	7.92
03-Mar-06	7.81	24-May-06	6.90	24-Oct-06	7.13	26-Mar-07	7.10	09-Oct-07	7.92
04-Mar-06	7.68	25-May-06	6.91	30-Oct-06	7.89	02-Apr-07	7.67	15-Oct-07	7.74
05-Mar-06	7.64	26-May-06	7.26	13-Nov-06	7.27	10-Apr-07	8.57	22-Oct-07	7.79
06-Mar-06	7.60	27-May-06	7.19	20-Nov-06	7.16	17-Apr-07	8.11	29-Oct-07	7.59
07-Mar-06	7.62	28-May-06	7.10	27-Nov-06	8.16	24-Apr-07	8.18	06-Nov-07	7.16
08-Mar-06	7.62	29-May-06	6.18	04-Dec-06	7.64	01-May-07	7.92	13-Nov-07	7.22
09-Mar-06	----	30-May-06	7.02	11-Dec-06	7.40	09-May-07	8.07	20-Nov-07	7.92
10-Mar-06	7.80	31-May-06	7.19	18-Dec-06	7.83	14-May-07	6.87	26-Nov-07	7.63
14-Mar-06	7.64	06-Jun-06	7.33	26-Dec-06	7.83	22-May-07	7.61		
21-Mar-06	7.86	13-Jun-06	----	01-Jan-07	7.80	30-May-07	8.26		
28-Mar-06	7.40	20-Jun-06	7.03	08-Jan-07	7.91	05-Jun-07	8.64		
29-Mar-06	7.81	26-Jun-06	7.40	16-Jan-07	7.98	13-Jun-07	8.03		

Table B-2. San Joaquin River temperature data (^{o}C).

Date	^{o}C	Date	^{o}C	Date	^{o}C	Date	^{o}C	Date	^{o}C
05-Dec-05	9.5	30-Mar-06	11.5	05-Jul-06	21.4	22-Jan-07	8.0	19-Jun-07	24.2
12-Dec-05	10.2	31-Mar-06	11.8	10-Jul-06	22.6	29-Jan-07	10.3	26-Jun-07	23.2
21-Dec-05	11.8	01-Apr-06	11.9	17-Jul-06	22.7	05-Feb-07	10.8	03-Jul-07	23.2
28-Dec-05	12.1	02-Apr-06	12.3	24-Jul-06	25.4	12-Feb-07	12.6	09-Jul-07	25.2
03-Jan-06	10.9	03-Apr-06	12.5	31-Jul-06	22.3	26-Feb-07	12.1	17-Jul-07	23.2
09-Jan-06	10.7	04-Apr-06	12.6	07-Aug-06	21.7	27-Feb-07	11.2	24-Jul-07	25.1
17-Jan-06	10.0	05-Apr-06	13.0	22-Aug-06	20.8	28-Feb-07	11.3	30-Jul-07	25.9
25-Jan-06	10.0	06-Apr-06	13.1	28-Aug-06	23.8	01-Mar-07	10.9	06-Aug-07	23.9
01-Feb-06	11.0	10-Apr-06	14.1	05-Sep-06	20.8	02-Mar-07	11.1	13-Aug-07	22.5
07-Feb-06	10.7	17-Apr-06	14.0	11-Sep-06	17.4	03-Mar-07	11.7	20-Aug-07	23.9
14-Feb-06	11.8	26-Apr-06	14.6	18-Sep-06	18.2	04-Mar-07	12.4	28-Aug-07	24.3
21-Feb-06	9.9	01-May-06	17.5	25-Sep-06	----	05-Mar-07	13.6	04-Sep-07	25.1
27-Feb-06	11.5	08-May-06	17.1	02-Oct-06	16.6	06-Mar-07	14.1	10-Sep-07	22.9
28-Feb-06	12.3	16-May-06	18.5	06-Oct-06	15.3	07-Mar-07	15.4	17-Sep-07	21.6
01-Mar-06	11.7	22-May-06	16.8	10-Oct-06	16.7	12-Mar-07	14.6	25-Sep-07	20.9
02-Mar-06	11.8	23-May-06	16.7	16-Oct-06	15.9	19-Mar-07	17.4	02-Oct-07	18.9
03-Mar-06	11.7	24-May-06	17.6	24-Oct-06	15.5	26-Mar-07	17.6	09-Oct-07	17.5
04-Mar-06	10.8	25-May-06	17.4	30-Oct-06	13.5	02-Apr-07	17.3	15-Oct-07	17.9
05-Mar-06	10.6	26-May-06	17.4	13-Nov-06	12.8	10-Apr-07	17.5	22-Oct-07	14.9
06-Mar-06	10.7	27-May-06	17.0	20-Nov-06	14.5	17-Apr-07	16.9	29-Oct-07	16.8
07-Mar-06	11.2	28-May-06	16.8	27-Nov-06	11.1	24-Apr-07	15.4	06-Nov-07	14.8
08-Mar-06	10.9	29-May-06	17.0	04-Dec-06	11.6	01-May-07	18.5	13-Nov-07	14.5
09-Mar-06	11.2	30-May-06	17.4	11-Dec-06	11.0	09-May-07	19.3	20-Nov-07	14.5
10-Mar-06	11.2	31-May-06	17.7	18-Dec-06	9.2	14-May-07	18.6	26-Nov-07	10.1
14-Mar-06	10.6	06-Jun-06	20.7	26-Dec-06	9.3	22-May-07	17.9		
21-Mar-06	10.7	13-Jun-06	18.7	01-Jan-07	8.5	30-May-07	19.5		
28-Mar-06	11.8	20-Jun-06	20.7	08-Jan-07	8.1	05-Jun-07	19.1		
29-Mar-06	11.8	26-Jun-06	20.4	16-Jan-07	6.0	13-Jun-07	21.4		

Table B-3. San Joaquin River dissolved oxygen (DO) data (mg/L).

Date	DO	Date	DO	Date	DO	Date	DO	Date	DO
05-Dec-05	10.26	30-Mar-06	9.70	05-Jul-06	6.90	22-Jan-07	6.98	19-Jun-07	9.09
12-Dec-05	9.60	31-Mar-06	9.82	10-Jul-06	7.15	29-Jan-07	7.23	26-Jun-07	11.68
21-Dec-05	9.43	01-Apr-06	9.79	17-Jul-06	8.25	05-Feb-07	7.71	03-Jul-07	10.35
28-Dec-05	----	02-Apr-06	9.41	24-Jul-06	7.75	12-Feb-07	5.58	09-Jul-07	9.32
03-Jan-06	7.30	03-Apr-06	9.52	31-Jul-06	8.05	26-Feb-07	9.60	17-Jul-07	8.05
09-Jan-06	8.49	04-Apr-06	9.51	07-Aug-06	9.15	27-Feb-07	9.14	24-Jul-07	7.26
17-Jan-06	9.76	05-Apr-06	8.54	22-Aug-06	7.79	28-Feb-07	8.83	30-Jul-07	12.18
25-Jan-06	9.00	06-Apr-06	8.23	28-Aug-06	4.40	01-Mar-07	8.80	06-Aug-07	8.54
01-Feb-06	9.08	10-Apr-06	6.59	05-Sep-06	4.63	02-Mar-07	9.79	13-Aug-07	8.72
07-Feb-06	9.58	17-Apr-06	6.94	11-Sep-06	8.31	03-Mar-07	12.95	20-Aug-07	10.26
14-Feb-06	9.40	26-Apr-06	7.62	18-Sep-06	7.96	04-Mar-07	12.82	28-Aug-07	8.00
21-Feb-06	10.16	01-May-06	7.28	25-Sep-06	----	05-Mar-07	9.22	04-Sep-07	11.20
27-Feb-06	18.70	08-May-06	6.95	02-Oct-06	4.10	06-Mar-07	8.95	10-Sep-07	8.20
28-Feb-06	9.45	16-May-06	7.03	06-Oct-06	7.10	07-Mar-07	8.95	17-Sep-07	7.93
01-Mar-06	9.51	22-May-06	7.31	10-Oct-06	8.16	12-Mar-07	8.04	25-Sep-07	9.89
02-Mar-06	9.81	23-May-06	8.74	16-Oct-06	8.00	19-Mar-07	8.63	02-Oct-07	8.40
03-Mar-06	9.85	24-May-06	7.83	24-Oct-06	8.65	26-Mar-07	8.50	09-Oct-07	8.88
04-Mar-06	10.44	25-May-06	8.93	30-Oct-06	8.71	02-Apr-07	8.10	15-Oct-07	6.53
05-Mar-06	10.30	26-May-06	7.97	13-Nov-06	8.72	10-Apr-07	10.00	22-Oct-07	8.20
06-Mar-06	10.17	27-May-06	8.11	20-Nov-06	8.06	17-Apr-07	9.18	29-Oct-07	7.20
07-Mar-06	10.26	28-May-06	8.17	27-Nov-06	10.85	24-Apr-07	9.72	06-Nov-07	8.03
08-Mar-06	10.23	29-May-06	8.48	04-Dec-06	11.90	01-May-07	8.09	13-Nov-07	7.76
09-Mar-06	10.19	30-May-06	8.46	11-Dec-06	8.27	09-May-07	8.90	20-Nov-07	7.81
10-Mar-06	10.17	31-May-06	8.33	18-Dec-06	10.60	14-May-07	8.70	26-Nov-07	8.63
14-Mar-06	10.55	06-Jun-06	7.49	26-Dec-06	10.10	22-May-07	10.08		
21-Mar-06	10.18	13-Jun-06	9.15	01-Jan-07	7.69	30-May-07	9.47		
28-Mar-06	----	20-Jun-06	7.53	08-Jan-07	10.87	05-Jun-07	9.12		
29-Mar-06	9.53	26-Jun-06	8.02	16-Jan-07	10.45	13-Jun-07	9.42		

Table B-4. San Joaquin River electrical conductivity (EC) data (µS/cm).

Date	EC	Date	EC	Date	EC	Date	EC	Date	EC
05-Dec-05	763.0	30-Mar-06	177.1	05-Jul-06	290.4	22-Jan-07	633.0	19-Jun-07	449.6
12-Dec-05	782.0	31-Mar-06	190.5	10-Jul-06	334.2	29-Jan-07	670.0	26-Jun-07	717.0
21-Dec-05	609.0	01-Apr-06	171.6	17-Jul-06	419.9	05-Feb-07	647.0	03-Jul-07	739.0
28-Dec-05	240.2	02-Apr-06	187.1	24-Jul-06	449.7	12-Feb-07	721.0	09-Jul-07	684.0
03-Jan-06	137.1	03-Apr-06	187.6	31-Jul-06	414.8	26-Feb-07	718.0	17-Jul-07	633.0
09-Jan-06	190.5	04-Apr-06	175.3	07-Aug-06	402.2	27-Feb-07	669.0	24-Jul-07	699.0
17-Jan-06	219.5	05-Apr-06	165.0	22-Aug-06	346.6	28-Feb-07	656.0	30-Jul-07	675.0
25-Jan-06	479.2	06-Apr-06	140.0	28-Aug-06	389.8	01-Mar-07	535.0	06-Aug-07	650.0
01-Feb-06	430.0	10-Apr-06	137.0	05-Sep-06	361.2	02-Mar-07	566.0	13-Aug-07	675.0
07-Feb-06	327.0	17-Apr-06	167.7	11-Sep-06	494.5	03-Mar-07	524.0	20-Aug-07	685.0
14-Feb-06	364.4	26-Apr-06	126.0	18-Sep-06	363.5	04-Mar-07	487.0	28-Aug-07	691.0
21-Feb-06	360.8	01-May-06	126.7	25-Sep-06	----	05-Mar-07	553.0	04-Sep-07	708.0
27-Feb-06	358.7	08-May-06	112.0	02-Oct-06	331.5	06-Mar-07	562.0	10-Sep-07	659.0
28-Feb-06	366.2	16-May-06	104.7	06-Oct-06	549.0	07-Mar-07	555.0	17-Sep-07	706.0
01-Mar-06	323.5	22-May-06	99.9	10-Oct-06	286.3	12-Mar-07	650.0	25-Sep-07	740.0
02-Mar-06	316.1	23-May-06	104.4	16-Oct-06	283.4	19-Mar-07	766.0	02-Oct-07	686.0
03-Mar-06	290.0	24-May-06	108.2	24-Oct-06	286.3	26-Mar-07	725.0	09-Oct-07	724.0
04-Mar-06	227.7	25-May-06	115.5	30-Oct-06	328.4	02-Apr-07	724.0	15-Oct-07	669.0
05-Mar-06	222.4	26-May-06	106.9	13-Nov-06	677.0	10-Apr-07	722.0	22-Oct-07	576.0
06-Mar-06	206.4	27-May-06	106.1	20-Nov-06	690.0	17-Apr-07	639.0	29-Oct-07	361.7
07-Mar-06	213.1	28-May-06	110.6	27-Nov-06	745.0	24-Apr-07	380.4	06-Nov-07	419.6
08-Mar-06	207.7	29-May-06	110.0	04-Dec-06	719.0	01-May-07	374.4	13-Nov-07	660.0
09-Mar-06	207.2	30-May-06	120.0	11-Dec-06	751.0	09-May-07	370.2	20-Nov-07	739.0
10-Mar-06	223.5	31-May-06	119.5	18-Dec-06	613.0	14-May-07	306.5	26-Nov-07	744.0
14-Mar-06	229.6	06-Jun-06	133.4	26-Dec-06	574.0	22-May-07	328.7		
21-Mar-06	226.1	13-Jun-06	111.6	01-Jan-07	597.0	30-May-07	490.4		
28-Mar-06	223.5	20-Jun-06	150.4	08-Jan-07	596.0	05-Jun-07	496.8		
29-Mar-06	202.1	26-Jun-06	100.0	16-Jan-07	615.0	13-Jun-07	381.1		

Table B-5. Sacramento River pH data.

Date	pH	Date	pH	Date	pH	Date	pH	Date	pH
05-Dec-05	7.80	14-Mar-06	7.73	10-Oct-06	----	10-Feb-07	7.75	22-May-07	8.03
12-Dec-05	7.22	21-Mar-06	7.88	16-Oct-06	----	11-Feb-07	7.72	30-May-07	7.88
20-Dec-05	7.48	28-Mar-06	7.20	24-Oct-06	6.76	12-Feb-07	7.42	05-Jun-07	7.94
28-Dec-05	7.32	04-Apr-06	7.44	30-Oct-06	7.62	13-Feb-07	7.29	13-Jun-07	8.02
03-Jan-06	7.37	10-Apr-06	7.10	13-Nov-06	7.41	14-Feb-07	7.48	19-Jun-07	7.61
09-Jan-06	7.36	17-Apr-06	7.40	20-Nov-06	7.35	15-Feb-07	7.58	26-Jun-07	7.72
17-Jan-06	7.58	26-Apr-06	7.56	27-Nov-06	7.88	16-Feb-07	7.85	03-Jul-07	7.48
25-Jan-06	8.03	01-May-06	7.45	04-Dec-06	7.65	17-Feb-07	8.33	09-Jul-07	7.60
01-Feb-06	7.77	08-May-06	7.59	11-Dec-06	7.00	18-Feb-07	7.83	17-Jul-07	7.63
02-Feb-06	7.62	16-May-06	7.18	12-Dec-06	7.47	23-Feb-07	7.85	24-Jul-07	7.43
03-Feb-06	7.70	22-May-06	7.17	13-Dec-06	7.55	24-Feb-07	8.03	30-Jul-07	7.89
04-Feb-06	7.62	23-May-06	7.50	14-Dec-06	7.33	25-Feb-07	7.87	06-Aug-07	7.91
05-Feb-06	7.45	24-May-06	7.16	15-Dec-06	7.37	26-Feb-07	7.86	13-Aug-07	----
06-Feb-06	10.19	25-May-06	7.06	16-Dec-06	7.74	27-Feb-07	7.74	20-Aug-07	7.30
07-Feb-06	7.66	26-May-06	7.41	17-Dec-06	7.74	28-Feb-07	8.02	28-Aug-07	6.75
08-Feb-06	7.48	27-May-06	7.58	18-Dec-06	7.64	01-Mar-07	7.87	04-Sep-07	7.03
09-Feb-06	7.25	28-May-06	7.35	19-Dec-06	7.52	02-Mar-07	7.84	10-Sep-07	8.06
10-Feb-06	7.62	29-May-06	7.15	22-Dec-06	7.88	03-Mar-07	7.75	17-Sep-07	7.47
14-Feb-06	7.68	30-May-06	7.38	23-Dec-06	7.90	04-Mar-07	7.84	25-Sep-07	6.50
20-Feb-06	6.82	31-May-06	7.59	24-Dec-06	7.41	05-Mar-07	7.78	02-Oct-07	7.71
21-Feb-06	7.51	06-Jun-06	7.54	25-Dec-06	7.31	12-Mar-07	----	09-Oct-07	7.36
22-Feb-06	7.49	13-Jun-06	7.01	26-Dec-06	7.86	19-Mar-07	7.98	15-Oct-07	7.77
23-Feb-06	7.44	20-Jun-06	7.18	27-Dec-06	7.86	26-Mar-07	8.03	22-Oct-07	8.00
24-Feb-06	7.48	26-Jun-06	7.13	28-Dec-06	7.72	02-Apr-07	7.57	29-Oct-07	7.34
25-Feb-06	7.64	05-Jul-06	7.70	29-Dec-06	7.73	10-Apr-07	8.23	06-Nov-07	7.78
26-Feb-06	7.21	10-Jul-06	7.60	30-Dec-06	7.73	17-Apr-07	8.17	13-Nov-07	7.43
27-Feb-06	7.51	17-Jul-06	7.77	31-Dec-06	7.51	23-Apr-07	7.89	20-Nov-07	7.65
28-Feb-06	6.89	24-Jul-06	7.84	01-Jan-07	7.86	24-Apr-07	8.02	26-Nov-07	7.49
01-Mar-06	7.18	31-Jul-06	7.78	02-Jan-07	7.63	25-Apr-07	8.12	18-Dec-07	7.69
02-Mar-06	6.53	07-Aug-06	7.85	03-Jan-07	7.57	26-Apr-07	8.08	19-Dec-07	7.20
03-Mar-06	7.56	22-Aug-06	7.85	04-Jan-07	7.88	27-Apr-07	7.73	20-Dec-07	7.37
04-Mar-06	7.54	28-Aug-06	7.55	05-Jan-07	7.76	28-Apr-07	7.78	21-Dec-07	7.50
05-Mar-06	7.57	05-Sep-06	7.37	08-Jan-07	7.94	29-Apr-07	7.84	22-Dec-07	7.60
06-Mar-06	7.58	11-Sep-06	7.52	16-Jan-07	8.02	30-Apr-07	7.94	23-Dec-07	7.91
07-Mar-06	7.55	18-Sep-06	8.33	22-Jan-07	8.03	01-May-07	8.00	24-Dec-07	7.74
08-Mar-06	7.50	25-Sep-06	7.96	29-Jan-07	8.03	02-May-07	7.85	25-Dec-07	7.53
09-Mar-06	----	02-Oct-06	7.07	05-Feb-07	7.81	09-May-07	7.92	26-Dec-07	7.48
10-Mar-06	7.83	06-Oct-06	7.45	09-Feb-07	7.89	14-May-07	7.59	27-Dec-07	7.54

Table B-6. Sacramento River temperature data (^{o}C).

Date	^{o}C	Date	^{o}C	Date	^{o}C	Date	^{o}C	Date	^{o}C
05-Dec-05	9.3	14-Mar-06	9.3	10-Oct-06	16.9	10-Feb-07	11.2	22-May-07	21.0
12-Dec-05	9.9	21-Mar-06	10.0	16-Oct-06	16.4	11-Feb-07	11.4	30-May-07	21.8
20-Dec-05	10.1	28-Mar-06	11.2	24-Oct-06	16.7	12-Feb-07	11.5	05-Jun-07	21.5
28-Dec-05	11.4	04-Apr-06	10.5	30-Oct-06	14.0	13-Feb-07	11.3	13-Jun-07	23.0
03-Jan-06	10.3	10-Apr-06	11.3	13-Nov-06	12.9	14-Feb-07	11.4	19-Jun-07	22.8
09-Jan-06	10.2	17-Apr-06	11.7	20-Nov-06	13.7	15-Feb-07	11.4	26-Jun-07	22.1
17-Jan-06	9.8	26-Apr-06	13.4	27-Nov-06	11.2	16-Feb-07	11.5	03-Jul-07	20.7
25-Jan-06	9.4	01-May-06	15.4	04-Dec-06	10.2	17-Feb-07	12.1	09-Jul-07	21.8
01-Feb-06	9.6	08-May-06	15.9	11-Dec-06	10.3	18-Feb-07	12.0	17-Jul-07	21.3
02-Feb-06	9.5	16-May-06	16.5	12-Dec-06	10.4	23-Feb-07	10.8	24-Jul-07	22.2
03-Feb-06	9.8	22-May-06	15.5	13-Dec-06	10.6	24-Feb-07	10.4	30-Jul-07	22.4
04-Feb-06	10.1	23-May-06	15.4	14-Dec-06	11.2	25-Feb-07	10.2	06-Aug-07	21.0
05-Feb-06	10.1	24-May-06	15.2	15-Dec-06	11.6	26-Feb-07	10.2	13-Aug-07	13.3
06-Feb-06	9.9	25-May-06	15.6	16-Dec-06	11.7	27-Feb-07	9.9	20-Aug-07	21.3
07-Feb-06	9.9	26-May-06	16.3	17-Dec-06	10.4	28-Feb-07	9.3	28-Aug-07	22.1
08-Feb-06	9.9	27-May-06	16.0	18-Dec-06	10.1	01-Mar-07	8.9	04-Sep-07	23.0
09-Feb-06	10.0	28-May-06	16.5	19-Dec-06	8.9	02-Mar-07	9.3	10-Sep-07	20.7
10-Feb-06	10.2	29-May-06	16.7	22-Dec-06	8.0	03-Mar-07	9.3	17-Sep-07	19.9
14-Feb-06	11.4	30-May-06	17.3	23-Dec-06	7.7	04-Mar-07	10.2	25-Sep-07	17.6
20-Feb-06	9.3	31-May-06	17.7	24-Dec-06	8.0	05-Mar-07	11.1	02-Oct-07	17.4
21-Feb-06	9.5	06-Jun-06	19.0	25-Dec-06	8.0	12-Mar-07	13.3	09-Oct-07	16.5
22-Feb-06	9.6	13-Jun-06	18.3	26-Dec-06	8.5	19-Mar-07	16.4	15-Oct-07	16.3
23-Feb-06	9.4	20-Jun-06	20.3	27-Dec-06	8.7	26-Mar-07	16.0	22-Oct-07	15.1
24-Feb-06	9.8	26-Jun-06	21.8	28-Dec-06	8.4	02-Apr-07	15.5	29-Oct-07	16.5
25-Feb-06	10.1	05-Jul-06	21.3	29-Dec-06	8.0	10-Apr-07	17.4	06-Nov-07	15.3
26-Feb-06	10.4	10-Jul-06	22.1	30-Dec-06	8.0	17-Apr-07	15.4	13-Nov-07	14.3
27-Feb-06	10.4	17-Jul-06	22.6	31-Dec-06	7.5	23-Apr-07	15.2	20-Nov-07	14.1
28-Feb-06	11.1	24-Jul-06	23.5	01-Jan-07	7.6	24-Apr-07	16.2	26-Nov-07	11.1
01-Mar-06	10.6	31-Jul-06	21.6	02-Jan-07	7.4	25-Apr-07	16.6	18-Dec-07	9.0
02-Mar-06	10.3	07-Aug-06	21.1	03-Jan-07	7.7	26-Apr-07	17.1	19-Dec-07	9.3
03-Mar-06	9.8	22-Aug-06	20.8	04-Jan-07	8.8	27-Apr-07	18.1	20-Dec-07	9.5
04-Mar-06	9.6	28-Aug-06	21.6	05-Jan-07	8.7	28-Apr-07	19.6	21-Dec-07	9.5
05-Mar-06	9.3	05-Sep-06	21.5	08-Jan-07	7.8	29-Apr-07	19.9	22-Dec-07	9.0
06-Mar-06	9.4	11-Sep-06	15.4	16-Jan-07	5.6	30-Apr-07	19.9	23-Dec-07	8.8
07-Mar-06	9.9	18-Sep-06	18.5	22-Jan-07	7.2	01-May-07	20.2	24-Dec-07	8.2
08-Mar-06	10.0	25-Sep-06	17.7	29-Jan-07	8.9	02-May-07	19.7	25-Dec-07	8.5
09-Mar-06	10.4	02-Oct-06	17.2	05-Feb-07	9.7	09-May-07	19.8	26-Dec-07	8.6
10-Mar-06	10.1	06-Oct-06	15.0	09-Feb-07	10.8	14-May-07	20.5	27-Dec-07	7.9

Table B-7. Sacramento River dissolved oxygen (DO) data (mg/L).

Date	DO	Date	DO	Date	DO	Date	DO	Date	DO
05-Dec-05	10.65	14-Mar-06	11.00	10-Oct-06	8.48	10-Feb-07	10.43	22-May-07	8.91
12-Dec-05	7.95	21-Mar-06	10.96	16-Oct-06	8.44	11-Feb-07	9.75	30-May-07	7.74
20-Dec-05	10.80	28-Mar-06	7.71	24-Oct-06	8.76	12-Feb-07	9.76	05-Jun-07	8.78
28-Dec-05	----	04-Apr-06	11.50	30-Oct-06	9.02	13-Feb-07	9.63	13-Jun-07	7.25
03-Jan-06	10.47	10-Apr-06	11.24	13-Nov-06	8.87	14-Feb-07	9.73	19-Jun-07	9.78
09-Jan-06	9.62	17-Apr-06	10.83	20-Nov-06	8.72	15-Feb-07	10.03	26-Jun-07	8.50
17-Jan-06	9.88	26-Apr-06	10.46	27-Nov-06	10.71	16-Feb-07	9.05	03-Jul-07	8.38
25-Jan-06	10.44	01-May-06	10.10	04-Dec-06	12.93	17-Feb-07	9.70	09-Jul-07	7.76
01-Feb-06	11.20	08-May-06	9.56	11-Dec-06	9.67	18-Feb-07	9.82	17-Jul-07	8.21
02-Feb-06	11.33	16-May-06	9.87	12-Dec-06	10.00	23-Feb-07	10.90	24-Jul-07	7.78
03-Feb-06	11.26	22-May-06	9.34	13-Dec-06	9.92	24-Feb-07	9.81	30-Jul-07	8.21
04-Feb-06	11.43	23-May-06	10.75	14-Dec-06	9.96	25-Feb-07	10.33	06-Aug-07	7.96
05-Feb-06	11.12	24-May-06	11.27	15-Dec-06	9.31	26-Feb-07	10.93	13-Aug-07	9.32
06-Feb-06	10.81	25-May-06	10.87	16-Dec-06	9.23	27-Feb-07	11.08	20-Aug-07	7.96
07-Feb-06	10.72	26-May-06	9.19	17-Dec-06	9.22	28-Feb-07	11.78	28-Aug-07	7.99
08-Feb-06	10.55	27-May-06	9.54	18-Dec-06	10.20	01-Mar-07	11.90	04-Sep-07	8.02
09-Feb-06	10.51	28-May-06	8.80	19-Dec-06	10.49	02-Mar-07	11.65	10-Sep-07	8.60
10-Feb-06	10.56	29-May-06	9.20	22-Dec-06	10.20	03-Mar-07	11.27	17-Sep-07	7.82
14-Feb-06	10.19	30-May-06	9.11	23-Dec-06	9.98	04-Mar-07	11.55	25-Sep-07	9.23
20-Feb-06	10.62	31-May-06	8.98	24-Dec-06	11.08	05-Mar-07	11.35	02-Oct-07	8.58
21-Feb-06	10.47	06-Jun-06	8.82	25-Dec-06	10.42	12-Mar-07	9.32	09-Oct-07	9.20
22-Feb-06	10.70	13-Jun-06	9.92	26-Dec-06	10.73	19-Mar-07	9.68	15-Oct-07	8.84
23-Feb-06	10.65	20-Jun-06	8.39	27-Dec-06	10.45	26-Mar-07	9.19	22-Oct-07	9.80
24-Feb-06	10.62	26-Jun-06	8.31	28-Dec-06	10.68	02-Apr-07	8.96	29-Oct-07	8.63
25-Feb-06	10.47	05-Jul-06	7.90	29-Dec-06	11.96	10-Apr-07	9.34	06-Nov-07	9.12
26-Feb-06	10.55	10-Jul-06	8.20	30-Dec-06	10.27	17-Apr-07	9.85	13-Nov-07	8.81
27-Feb-06	12.93	17-Jul-06	8.26	31-Dec-06	10.47	23-Apr-07	9.73	20-Nov-07	8.79
28-Feb-06	9.87	24-Jul-06	7.84	01-Jan-07	11.21	24-Apr-07	9.80	26-Nov-07	9.31
01-Mar-06	10.57	31-Jul-06	8.34	02-Jan-07	11.32	25-Apr-07	9.84	18-Dec-07	9.49
02-Mar-06	10.70	07-Aug-06	10.85	03-Jan-07	11.25	26-Apr-07	9.60	19-Dec-07	9.55
03-Mar-06	11.27	22-Aug-06	8.48	04-Jan-07	11.07	27-Apr-07	9.02	20-Dec-07	9.87
04-Mar-06	11.10	28-Aug-06	4.70	05-Jan-07	9.76	28-Apr-07	8.23	21-Dec-07	10.23
05-Mar-06	11.25	05-Sep-06	5.11	08-Jan-07	12.38	29-Apr-07	8.38	22-Dec-07	10.65
06-Mar-06	11.21	11-Sep-06	----	16-Jan-07	11.85	30-Apr-07	8.31	23-Dec-07	10.64
07-Mar-06	10.93	18-Sep-06	8.51	22-Jan-07	9.47	01-May-07	8.88	24-Dec-07	10.62
08-Mar-06	10.99	25-Sep-06	8.84	29-Jan-07	7.75	02-May-07	9.77	25-Dec-07	10.64
09-Mar-06	11.00	02-Oct-06	8.35	05-Feb-07	11.36	09-May-07	9.49	26-Dec-07	10.61
10-Mar-06	10.68	06-Oct-06	8.62	09-Feb-07	----	14-May-07	9.16	27-Dec-07	10.45

Table B-8. Sacramento River electrical conductivity (EC) data (µS/cm).

Date	EC	Date	EC	Date	EC	Date	EC	Date	EC
05-Dec-05	132.2	14-Mar-06	118.3	10-Oct-06	126.7	10-Feb-07	177.7	22-May-07	157.3
12-Dec-05	172.7	21-Mar-06	121.6	16-Oct-06	132.3	11-Feb-07	172.7	30-May-07	171.2
20-Dec-05	180.6	28-Mar-06	122.1	24-Oct-06	112.7	12-Feb-07	128.1	05-Jun-07	165.0
28-Dec-05	89.2	04-Apr-06	96.8	30-Oct-06	135.4	13-Feb-07	102.6	13-Jun-07	174.1
03-Jan-06	68.8	10-Apr-06	90.5	13-Nov-06	161.1	14-Feb-07	105.0	19-Jun-07	117.6
09-Jan-06	93.8	17-Apr-06	99.2	20-Nov-06	137.3	15-Feb-07	113.1	26-Jun-07	113.9
17-Jan-06	112.9	26-Apr-06	110.0	27-Nov-06	177.9	16-Feb-07	100.0	03-Jul-07	109.4
25-Jan-06	140.6	01-May-06	107.0	04-Dec-06	167.2	17-Feb-07	147.3	09-Jul-07	128.2
01-Feb-06	175.0	08-May-06	112.5	11-Dec-06	175.8	18-Feb-07	156.1	17-Jul-07	124.9
02-Feb-06	119.9	16-May-06	96.8	12-Dec-06	172.2	23-Feb-07	161.7	24-Jul-07	136.9
03-Feb-06	145.1	22-May-06	94.1	13-Dec-06	172.6	24-Feb-07	157.8	30-Jul-07	127.1
04-Feb-06	138.1	23-May-06	96.9	14-Dec-06	172.6	25-Feb-07	147.8	06-Aug-07	139.4
05-Feb-06	112.2	24-May-06	92.0	15-Dec-06	127.8	26-Feb-07	134.3	13-Aug-07	143.7
06-Feb-06	105.0	25-May-06	102.1	16-Dec-06	144.8	27-Feb-07	117.9	20-Aug-07	148.3
07-Feb-06	104.7	26-May-06	111.3	17-Dec-06	132.6	28-Feb-07	120.2	28-Aug-07	164.8
08-Feb-06	105.8	27-May-06	105.2	18-Dec-06	100.8	01-Mar-07	119.7	04-Sep-07	171.1
09-Feb-06	109.2	28-May-06	114.6	19-Dec-06	156.4	02-Mar-07	114.0	10-Sep-07	164.2
10-Feb-06	108.6	29-May-06	113.0	22-Dec-06	163.9	03-Mar-07	126.4	17-Sep-07	155.3
14-Feb-06	----	30-May-06	114.7	23-Dec-06	175.5	04-Mar-07	121.0	25-Sep-07	145.5
20-Feb-06	145.0	31-May-06	115.5	24-Dec-06	184.6	05-Mar-07	126.6	02-Oct-07	137.8
21-Feb-06	145.0	06-Jun-06	112.7	25-Dec-06	184.8	12-Mar-07	153.0	09-Oct-07	127.8
22-Feb-06	142.0	13-Jun-06	126.3	26-Dec-06	175.1	19-Mar-07	149.8	15-Oct-07	141.1
23-Feb-06	140.0	20-Jun-06	131.6	27-Dec-06	173.5	26-Mar-07	143.6	22-Oct-07	132.3
24-Feb-06	151.9	26-Jun-06	118.8	28-Dec-06	179.3	02-Apr-07	136.5	29-Oct-07	144.2
25-Feb-06	132.4	05-Jul-06	127.5	29-Dec-06	180.0	10-Apr-07	135.3	06-Nov-07	163.1
26-Feb-06	128.5	10-Jul-06	136.0	30-Dec-06	124.6	17-Apr-07	141.8	13-Nov-07	180.9
27-Feb-06	135.8	17-Jul-06	129.4	31-Dec-06	142.3	23-Apr-07	129.9	20-Nov-07	170.2
28-Feb-06	129.1	24-Jul-06	131.3	01-Jan-07	154.1	24-Apr-07	135.8	26-Nov-07	177.7
01-Mar-06	99.6	31-Jul-06	125.8	02-Jan-07	169.5	25-Apr-07	134.8	18-Dec-07	200.0
02-Mar-06	89.5	07-Aug-06	137.3	03-Jan-07	169.3	26-Apr-07	141.6	19-Dec-07	184.3
03-Mar-06	98.9	22-Aug-06	133.7	04-Jan-07	174.2	27-Apr-07	145.5	20-Dec-07	193.5
04-Mar-06	85.6	28-Aug-06	80.6	05-Jan-07	172.9	28-Apr-07	143.5	21-Dec-07	201.4
05-Mar-06	83.5	05-Sep-06	159.6	08-Jan-07	165.0	29-Apr-07	141.0	22-Dec-07	196.4
06-Mar-06	91.2	11-Sep-06	190.0	16-Jan-07	175.4	30-Apr-07	139.7	23-Dec-07	187.6
07-Mar-06	92.4	18-Sep-06	163.2	22-Jan-07	174.3	01-May-07	140.0	24-Dec-07	179.0
08-Mar-06	87.6	25-Sep-06	144.9	29-Jan-07	168.6	02-May-07	139.7	25-Dec-07	186.8
09-Mar-06	90.9	02-Oct-06	140.0	05-Feb-07	175.5	09-May-07	148.4	26-Dec-07	195.9
10-Mar-06	92.3	06-Oct-06	147.0	09-Feb-07	189.1	14-May-07	139.7	27-Dec-07	199.4

Table B-9. KLRC pH data.

Date	pH	Date	pH	Date	pH	Date	pH
02-Feb-06	7.94	16-May-06	7.52	28-May-06	7.67	16-Feb-07	8.02
03-Feb-06	7.89	22-May-06	----	29-Dec-06	7.90	17-Feb-07	8.11
04-Feb-06	7.84	23-May-06	7.01	30-Dec-06	7.82	27-Feb-07	8.21
05-Feb-06	7.94	24-May-06	7.21	11-Feb-07	7.68	28-Feb-07	8.30
06-Feb-06	7.70	25-May-06	----	12-Feb-07	7.58	01-Mar-07	8.32
01-Mar-06	7.56	26-May-06	7.71	13-Feb-07	7.81	02-Mar-07	8.27
08-May-06	7.94	27-May-06	7.67	15-Feb-07	7.91		

Table B-10. KLRC temperature data (^{o}C).

Date	^{o}C	Date	^{o}C	Date	^{o}C	Date	^{o}C
02-Feb-06	10.7	16-May-06	25.6	28-May-06	21.4	16-Feb-07	12.7
03-Feb-06	11.5	22-May-06	20.3	29-Dec-06	7.5	17-Feb-07	13.2
04-Feb-06	12.5	23-May-06	20.0	30-Dec-06	6.1	27-Feb-07	10.8
05-Feb-06	12.5	24-May-06	19.8	11-Feb-07	12.3	28-Feb-07	10.1
06-Feb-06	12.4	25-May-06	20.1	12-Feb-07	12.8	01-Mar-07	10.1
01-Mar-06	12.4	26-May-06	21.0	13-Feb-07	12.3	02-Mar-07	11.1
08-May-06	23.2	27-May-06	20.9	15-Feb-07	12.2		

Table B-11. KLRC dissolved oxygen (DO) data.

Date	DO	Date	DO	Date	DO	Date	DO
02-Feb-06	9.26	16-May-06	4.18	28-May-06	5.51	16-Feb-07	7.36
03-Feb-06	8.92	22-May-06	5.78	29-Dec-06	9.47	17-Feb-07	8.17
04-Feb-06	8.47	23-May-06	7.03	30-Dec-06	9.83	27-Feb-07	9.75
05-Feb-06	8.25	24-May-06	6.85	11-Feb-07	7.98	28-Feb-07	10.20
06-Feb-06	7.75	25-May-06	7.10	12-Feb-07	7.17	01-Mar-07	10.15
01-Mar-06	7.35	26-May-06	6.17	13-Feb-07	7.15	02-Mar-07	10.12
08-May-06	5.62	27-May-06	5.91	15-Feb-07	8.04		

Table B-12. KLRC electrical conductivity (EC) data.

Date	EC	Date	EC	Date	EC	Date	EC
02-Feb-06	380.0	16-May-06	515.0	28-May-06	503.0	16-Feb-07	630.0
03-Feb-06	445.2	22-May-06	424.0	29-Dec-06	315.6	17-Feb-07	676.0
04-Feb-06	467.8	23-May-06	397.0	30-Dec-06	453.5	27-Feb-07	883.0
05-Feb-06	673.0	24-May-06	368.0	11-Feb-07	573.0	28-Feb-07	908.0
06-Feb-06	677.0	25-May-06	388.7	12-Feb-07	493.5	01-Mar-07	931.0
01-Mar-06	403.9	26-May-06	425.9	13-Feb-07	499.1	02-Mar-07	933.0
08-May-06	742.0	27-May-06	451.1	15-Feb-07	567.0		

Table B-13. Yolo Bypass pH data.

Date	pH	Date	pH	Date	pH	Date	pH
03-Jan-06	7.65	09-Feb-06	7.61	06-Mar-06	7.74	26-Mar-06	7.46
09-Jan-06	8.02	10-Feb-06	7.71	07-Mar-06	7.80	04-Apr-06	7.56
17-Jan-06	7.81	02-Mar-06	7.69	08-Mar-06	7.67	10-Apr-06	7.10
23-Jan-06	8.06	03-Mar-06	7.60	09-Mar-06	7.43	17-Apr-06	7.45
07-Feb-06	7.76	04-Mar-06	7.46	10-Mar-06	7.54	26-Apr-06	7.43
08-Feb-06	7.56	05-Mar-06	7.69	21-Mar-06	8.00	03-May-06	7.57

Table B-14. Yolo Bypass temperature data (^{o}C).

Date	^{o}C	Date	^{o}C	Date	^{o}C	Date	^{o}C
03-Jan-06	10.2	09-Feb-06	10.1	06-Mar-06	10.0	26-Mar-06	11.9
09-Jan-06	10.2	10-Feb-06	10.4	07-Mar-06	10.5	04-Apr-06	11.3
17-Jan-06	9.8	02-Mar-06	12.4	08-Mar-06	10.8	10-Apr-06	13.0
23-Jan-06	8.6	03-Mar-06	11.0	09-Mar-06	11.3	17-Apr-06	12.9
07-Feb-06	11.3	04-Mar-06	11.0	10-Mar-06	10.1	26-Apr-06	15.4
08-Feb-06	10.2	05-Mar-06	10.2	21-Mar-06	10.5	03-May-06	17.8

Table B-15. Yolo Bypass dissolved oxygen (DO) data.

Date	DO	Date	DO	Date	DO	Date	DO
03-Jan-06	9.70	09-Feb-06	9.81	06-Mar-06	10.43	26-Mar-06	8.45
09-Jan-06	8.30	10-Feb-06	9.72	07-Mar-06	10.40	04-Apr-06	10.23
17-Jan-06	9.61	02-Mar-06	8.51	08-Mar-06	9.91	10-Apr-06	9.66
23-Jan-06	10.70	03-Mar-06	9.72	09-Mar-06	9.85	17-Apr-06	9.83
07-Feb-06	9.54	04-Mar-06	9.63	10-Mar-06	10.04	26-Apr-06	9.45
08-Feb-06	9.78	05-Mar-06	10.03	21-Mar-06	10.91	03-May-06	8.55

Table B-16. Yolo Bypass electrical conductivity (EC) data.

Date	EC	Date	EC	Date	EC	Date	EC
03-Jan-06	72.8	09-Feb-06	144.0	06-Mar-06	143.1	26-Mar-06	145.5
09-Jan-06	320.9	10-Feb-06	155.0	07-Mar-06	155.8	04-Apr-06	185.5
17-Jan-06	118.6	02-Mar-06	471.3	08-Mar-06	140.6	10-Apr-06	146.8
23-Jan-06	363.0	03-Mar-06	131.4	09-Mar-06	121.0	17-Apr-06	142.1
07-Feb-06	156.7	04-Mar-06	117.9	10-Mar-06	101.3	26-Apr-06	152.2
08-Feb-06	102.5	05-Mar-06	122.7	21-Mar-06	209.1	03-May-06	160.1

Appendix C:
OP Pesticide Detections

Table C-1. OP pesticides detected in the San Joaquin River at Vernalis: December 5, 2005 – November 26, 2007. Concentrations listed in µg/L.

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
05-Dec-05	--[†]	nd[‡]	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
12-Dec-05	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
21-Dec-05	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
28-Dec-05	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
03-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
09-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
17-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
25-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
01-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
21-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Feb-06[††]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
21-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	trace[‡‡]	nd	nd	nd	nd	nd
28-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-1, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
17-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Jul-06	nd	0.0103	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31-Jul-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Aug-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Aug-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Aug-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Sep-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11-Sep-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd
18-Sep-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Sep-06	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-1, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
27-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
18-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Mar-07	nd	nd	nd	nd	0.0688	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Mar-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Apr-07	nd	nd	0.011	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-May-07[++]	nd	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd
14-May-07	nd	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd
22-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-1, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
26-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Jul-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Jul-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Jul-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Jul-07	nd	nd	nd	nd	0.070	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Jul-07	nd	nd	nd	nd	0.046	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Aug-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Aug-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd
20-Aug-07	nd	nd	nd	nd	0.040	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Aug-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Sep-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Sep-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Sep-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Sep-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15-Oct-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

† Analysis did not include this compound: analytical short screen performed during this sampling period

‡ nd (not detected): concentration below the method detection limit

†† Shaded dates indicate rain event sampling

‡‡ Trace detection (above the method detection limit, but below the reporting limit)

++ Field duplicate sample

Table C-2. OP pesticides detected in the Sacramento River at Freeport: December 5, 2005 – December 27, 2007. Concentrations listed in µg/L.

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
05-Dec-05	--[†]	nd[‡]	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
12-Dec-05	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
21-Dec-05	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
28-Dec-05	--	0.0346	0.0943	--	trace[‡‡]	--	--	--	--	trace	nd	--	--	--	--
03-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
09-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
17-Jan-06	--	nd	0.0115	--	nd	--	--	--	--	nd	nd	--	--	--	--
25-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
01-Feb-06[††]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
21-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Mar-06	nd	nd	0.0118	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-2, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
10-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
21-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-May-06	nd	0.0105	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Jun-06	nd	0.0216	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Jun-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31-Jul-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Aug-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Aug-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Aug-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Sep-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11-Sep-06	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
18-Sep-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Sep-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-2, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
02-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Oct-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Nov-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
18-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-2, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
05-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Feb-07	nd	nd	0.0163	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
18-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Mar-07[++]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Apr-07	nd	nd	0.0120	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Apr-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-2, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
01-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-May-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Jun-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Jul-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Jul-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Jul-07	nd	nd	nd	nd	trace	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Jul-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Jul-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Aug-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Aug-07	nd	nd	0.0248	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Aug-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Aug-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Sep-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Sep-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Sep-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Sep-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Oct-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Nov-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
18-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
18-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
19-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
20-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table C-2, Continued

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
21-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
21-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Dec-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

† Analysis did not include this compound: analytical short screen performed during this sampling period

‡ nd (not detected): concentration below the method detection limit

†† Shaded dates indicate rain event sampling

‡‡ Trace detection (above the method detection limit, but below the reporting limit)

++ Field duplicate sample

Table C-3. OP pesticides detected at the KLRC: February 2, 2006 – March 2, 2007. Concentrations listed in µg/L.

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
02-Feb-06	nd‡	nd	0.0105	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Feb-06††	nd	nd	0.0116	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Feb-06	nd	nd	0.0102	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Feb-06	nd	nd	0.0117	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Feb-06	nd	nd	0.0102	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Mar-06	nd	nd	0.0551	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11-Feb-07	nd	nd	0.0149	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Feb-07++	nd	nd	0.0619	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12-Feb-07	nd	nd	0.0714	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13-Feb-07	nd	nd	0.0926	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15-Feb-07	nd	nd	0.0345	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16-Feb-07	nd	nd	0.0214	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Feb-07	nd	nd	0.0130	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Feb-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
01-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Mar-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

‡ nd (not detected): concentration below the method detection limit

†† Shaded dates indicate rain event sampling

++ Field duplicate sample

Table C-4. OP pesticides detected at the Yolo Bypass: January 3, 2006 – May 3, 2006. Concentrations listed in µg/L.

Date Sampled	Azinphos-Methyl	Chloropyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
03-Jan-06	--†	nd‡	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
09-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
17-Jan-06	--	nd	0.0120	--	nd	--	--	--	--	nd	nd	--	--	--	--
23-Jan-06	--	nd	nd	--	nd	--	--	--	--	nd	nd	--	--	--	--
07-Feb-06††	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Feb-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
02-Mar-06	nd	nd	0.0298	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-Mar-06	nd	nd	0.0113	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Mar-06	nd	nd	0.0123	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
05-Mar-06	nd	nd	0.0101	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
06-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
07-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
08-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
09-Mar-06	nd	nd	0.0101	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
21-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28-Mar-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
04-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
10-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26-Apr-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
03-May-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

† Analysis did not include this compound: analytical short screen performed during this sampling period
‡ nd (not detected): concentration below the method detection limit
†† Shaded dates indicate rain event sampling

Appendix D:
Herbicide Detections

Table D-1. Herbicides detected in the San Joaquin River at Vernalis: December 5, 2005 – November 26, 2007. Concentrations listed in µg/L.

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
05-Dec-05	--[†]	--	nd[‡]	nd	--	0.171	nd	--	--	nd	86.0
12-Dec-05	--	--	nd	nd	--	0.114	nd	--	--	nd	85.0
21-Dec-05	--	--	nd	nd	--	0.542	nd	--	--	nd	90.5
28-Dec-05	--	--	nd	nd	--	0.407	nd	--	--	nd	96.5
03-Jan-06	--	--	nd	nd	--	0.287	nd	--	--	nd	83.0
09-Jan-06	--	--	nd	nd	--	0.154	nd	--	--	nd	80.0
17-Jan-06	--	--	nd	nd	--	0.077	nd	--	--	nd	92.0
25-Jan-06	--	--	nd	nd	--	0.083	nd	--	--	nd	88.0
01-Feb-06	--	--	nd	nd	--	0.111	nd	--	--	nd	83.5
07-Feb-06	--	--	nd	nd	--	0.053	nd	--	--	nd	89.0
14-Feb-06	--	--	nd	nd	--	0.227	nd	--	--	nd	96.5
21-Feb-06	--	--	nd	nd	--	0.948	0.197	--	--	nd	86.5
27-Feb-06[††]	--	--	nd	nd	--	0.870	0.098	--	--	nd	86.0
28-Feb-06	--	--	nd	nd	--	0.867	0.083	--	--	nd	91.0
01-Mar-06	--	--	nd	nd	--	0.828	0.080	--	--	nd	94.0
02-Mar-06	--	--	nd	nd	--	0.803	0.064	--	--	nd	94.5
03-Mar-06	--	--	nd	nd	--	0.647	0.075	--	--	0.093	97.0
04-Mar-06	--	--	nd	nd	--	0.362	nd	--	--	nd	91.5
05-Mar-06	--	--	nd	nd	--	0.358	nd	--	--	0.060	95.0
06-Mar-06	--	--	nd	nd	--	0.270	nd	--	--	nd	101.0
07-Mar-06	--	--	nd	nd	--	0.311	nd	--	--	0.050	98.0
08-Mar-06	--	--	nd	nd	--	0.262	nd	--	--	0.054	96.0
09-Mar-06	--	--	nd	nd	--	0.258	nd	--	--	0.047	102.0
10-Mar-06	--	--	nd	nd	--	0.250	nd	--	--	0.062	90.0
14-Mar-06	--	--	nd	nd	--	0.185	nd	--	--	nd	93.5
21-Mar-06	--	--	nd	nd	--	0.116	nd	--	--	0.052	86.0
28-Mar-06	--	--	nd	nd	--	0.118	nd	--	--	nd	92.0
29-Mar-06	--	--	nd	nd	--	0.102	nd	--	--	nd	81.5
30-Mar-06	--	--	nd	nd	--	0.157	nd	--	--	0.163	85.5
31-Mar-06	--	--	nd	nd	--	0.100	nd	--	--	0.061	91.0
01-Apr-06	--	--	nd	nd	--	0.224	nd	--	--	0.063	83.5
02-Apr-06	--	--	nd	nd	--	0.167	nd	--	--	0.117	84.5
03-Apr-06	--	--	nd	nd	--	0.128	nd	--	--	0.059	82.5
04-Apr-06	--	--	nd	nd	--	0.146	nd	--	--	nd	82.5
05-Apr-06	--	--	nd	nd	--	0.166	nd	--	--	0.105	79.5
06-Apr-06	--	--	nd	nd	--	0.200	nd	--	--	0.200	83.5
10-Apr-06	--	--	nd	nd	--	0.074	nd	--	--	0.083	86.5

Table D-1, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
17-Apr-06	--	--	nd	nd	--	0.079	nd	--	--	nd	83.5
26-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
01-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.5
08-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	95.5
16-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.0
22-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	83.5
23-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	93.0
24-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.5
25-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.0
26-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.5
27-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.5
28-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	95.5
29-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5
30-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.0
31-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	92.5
06-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	78.0
13-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	101.0
20-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.0
26-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.0
05-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.0
10-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.5
17-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.0
24-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.0
31-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.0
07-Aug-06	--	--	nd	nd	--	nd	nd	--	--	nd	79.0
22-Aug-06	--	--	nd	nd	--	trace‡‡	nd	--	--	trace	93.5
28-Aug-06	--	--	nd	trace	--	trace	nd	--	--	trace	90.5
05-Sep-06	--	--	nd	nd	--	nd	nd	--	--	trace	77.5
11-Sep-06	--	--	nd	trace	--	nd	nd	--	--	trace	95.0
18-Sep-06	--	--	nd	nd	--	nd	nd	--	--	nd	69.5
25-Sep-06	--	--	nd	nd	--	nd	nd	--	--	nd	75.5
02-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	78.5
10-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	81.5
16-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
24-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5
30-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.0
06-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.0
13-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.0
20-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5

Table D-1, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
27-Nov-06	--	--	nd	nd	--	0.111	nd	--	--	nd	89.5
04-Dec-06	--	--	nd	nd	--	0.102	nd	--	--	nd	92.0
11-Dec-06	nd	nd	nd	nd	nd	0.268	nd	nd	nd	nd	87.5
18-Dec-06	nd	nd	nd	nd	nd	0.253	nd	nd	nd	nd	88.0
26-Dec-06	nd	nd	nd	nd	nd	0.310	nd	nd	nd	nd	83.0
01-Jan-07	nd	nd	nd	nd	nd	0.416	nd	nd	nd	nd	85.5
08-Jan-07	nd	nd	nd	nd	nd	0.341	nd	nd	nd	trace	90.0
16-Jan-07	--	--	nd	nd	--	0.227	nd	--	--	nd	87.0
22-Jan-07	--	--	nd	nd	--	0.111	nd	--	--	nd	88.5
29-Jan-07	nd	nd	nd	nd	nd	0.300	nd	nd	nd	nd	92.5
05-Feb-07	--	--	nd	nd	--	0.258	0.087	--	--	nd	94.5
12-Feb-07	--	--	trace	nd	--	1.168	0.282	--	--	trace	90.5
26-Feb-07	--	--	nd	trace	--	2.135	0.154	--	--	0.056	94.5
27-Feb-07	--	--	nd	trace	--	1.470	0.192	--	--	0.108	84.0
28-Feb-07++	--	--	nd	trace	--	1.430	0.152	--	--	0.172	87.0
28-Feb-07	--	--	nd	trace	--	1.540	0.171	--	--	0.182	87.0
01-Mar-07	--	--	trace	trace	--	1.445	0.114	--	--	0.708	97.0
02-Mar-07	--	--	nd	trace	--	1.629	0.126	--	--	0.465	96.0
03-Mar-07	--	--	nd	trace	--	1.315	0.117	--	--	0.217	97.5
04-Mar-07	--	--	nd	trace	--	0.860	0.069	--	--	0.158	87.5
05-Mar-07	--	--	nd	trace	--	0.883	0.089	--	--	0.116	96.0
06-Mar-07	--	--	nd	trace	--	0.757	0.088	--	--	0.092	91.0
07-Mar-07	--	--	nd	trace	--	0.845	0.079	--	--	0.075	90.0
12-Mar-07	--	--	nd	trace	--	0.649	0.071	--	--	trace	101.0
19-Mar-07	--	--	nd	nd	--	0.745	0.065	--	--	trace	80.0
26-Mar-07	--	--	nd	trace	--	0.636	0.055	--	--	trace	90.0
02-Apr-07	--	--	nd	nd	--	0.437	nd	--	--	trace	71.0
10-Apr-07	--	--	nd	nd	--	nd	nd	--	--	nd	74.5
10-Apr-07	--	--	nd	nd	--	nd	nd	--	--	nd	78.8
17-Apr-07	--	--	nd	nd	--	0.641	trace	--	--	trace	69.5
17-Apr-07	--	--	nd	trace	--	0.911	0.066	--	--	trace	99.3
24-Apr-07	--	--	nd	nd	--	0.340	nd	--	--	trace	88.0
01-May-07	--	--	nd	nd	--	0.317	nd	--	--	trace	95.5
09-May-07	--	--	nd	nd	--	0.216	nd	--	--	nd	92.5
14-May-07	--	--	nd	nd	--	0.157	nd	--	--	trace	104.0
22-May-07	nd	nd	nd	nd	nd	0.154	nd	nd	nd	nd	95.5
22-May-07	nd	nd	nd	nd	nd	0.169	nd	nd	nd	nd	94.0
30-May-07	--	--	nd	nd	--	nd	nd	--	--	nd	95.0
05-Jun-07	--	--	nd	nd	--	0.152	nd	--	--	nd	105.0

Table D-1, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
13-Jun-07	--	--	nd	nd	--	0.101	nd	--	--	nd	85.5
19-Jun-07	--	--	nd	nd	--	0.135	nd	--	--	nd	100.0
26-Jun-07	--	--	nd	nd	--	0.078	nd	--	--	nd	86.5
03-Jul-07	--	--	nd	trace	--	0.078	nd	--	--	nd	86.5
09-Jul-07	--	--	nd	trace	--	0.063	nd	--	--	nd	90.5
17-Jul-07	--	--	nd	trace	--	0.057	nd	--	--	nd	86.0
24-Jul-07	--	--	nd	trace	--	0.066	nd	--	--	nd	88.0
30-Jul-07	--	--	nd	trace	--	trace	nd	--	--	nd	99.0
06-Aug-07	--	--	nd	trace	--	trace	nd	--	--	nd	90.5
13-Aug-07	--	--	nd	nd	--	trace	nd	--	--	nd	89.0
20-Aug-07	--	--	nd	nd	--	trace	nd	--	--	nd	109.0
28-Aug-07	--	--	nd	trace	--	trace	nd	--	--	nd	98.0
04-Sep-07	--	--	nd	trace	--	nd	nd	--	--	nd	90.5
10-Sep-07	--	--	nd	trace	--	nd	nd	--	--	trace	94.5
10-Sep-07	--	--	nd	trace	--	nd	nd	--	--	trace	94.0
17-Sep-07	--	--	nd	trace	--	nd	nd	--	--	nd	82.5
25-Sep-07	--	--	nd	trace	--	nd	nd	--	--	nd	87.5
02-Oct-07	--	--	nd	trace	--	nd	nd	--	--	nd	84.5
09-Oct-07	--	--	nd	trace	--	nd	nd	--	--	nd	101.0
15-Oct-07	--	--	nd	trace	--	trace	nd	--	--	nd	100.0
22-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
29-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	94.5
06-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	95.5
13-Nov-07	--	--	nd	nd	--	0.053	nd	--	--	nd	92.0
20-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
26-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	91.0

† Analysis did not include this compound: analytical short screen performed during this sampling period

‡ nd (not detected): concentration below the method detection limit

†† Shaded dates indicate rain event sampling

‡‡ Trace detection (above the method detection limit, but below the reporting limit)

++ Field duplicate sample

Table D-2. Herbicides detected in the Sacramento River at Freeport: December 5, 2005 – December 27, 2007. Concentrations listed in µg/L.

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
05-Dec-05	--[†]	--	nd[‡]	nd	--	nd	nd	--	--	nd	94.0
12-Dec-05	--	--	nd	nd	--	nd	nd	--	--	nd	87.0
21-Dec-05	--	--	nd	nd	--	0.100	nd	--	--	nd	99.5
28-Dec-05	--	--	nd	nd	--	nd	nd	--	--	nd	95.0
03-Jan-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.0
09-Jan-06	--	--	nd	nd	--	nd	nd	--	--	nd	73.5
17-Jan-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.5
25-Jan-06	--	--	nd	nd	--	nd	nd	--	--	nd	90.5
01-Feb-06[††]	--	--	nd	nd	--	nd	nd	--	--	nd	87.0
02-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	80.5
03-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	79.5
04-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.5
05-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	90.5
06-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.0
07-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	79.5
08-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.5
09-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.0
10-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	78.5
14-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
20-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
21-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.5
22-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	93.5
23-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
24-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	97.0
25-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
26-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	81.0
27-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
28-Feb-06	--	--	nd	nd	--	0.176	nd	--	--	nd	91.0
01-Mar-06	--	--	nd	nd	--	0.133	nd	--	--	nd	87.5
02-Mar-06	--	--	nd	nd	--	0.177	nd	--	--	0.124	93.5
03-Mar-06	--	--	nd	nd	--	0.063	nd	--	--	0.056	83.0
04-Mar-06	--	--	nd	nd	--	0.055	nd	--	--	0.053	89.5
05-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.0
06-Mar-06	--	--	nd	nd	--	0.074	nd	--	--	nd	96.5
07-Mar-06	--	--	nd	nd	--	0.119	nd	--	--	0.053	94.0
08-Mar-06	--	--	nd	nd	--	0.090	nd	--	--	0.073	98.0
09-Mar-06	--	--	nd	nd	--	0.064	nd	--	--	0.072	103.0

Table D-2, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
10-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	92.5
14-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
21-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.5
28-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5
04-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	80.5
10-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.0
17-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.0
26-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.0
01-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
08-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.5
16-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
22-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5
23-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	95.0
24-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	92.0
25-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.0
26-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.0
27-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.5
28-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	93.0
29-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	92.5
30-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.0
31-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
06-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5
13-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.5
20-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.5
26-Jun-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.0
05-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.0
10-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
17-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.5
24-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	81.5
31-Jul-06	--	--	nd	nd	--	nd	nd	--	--	nd	83.5
07-Aug-06	--	--	nd	nd	--	nd	nd	--	--	nd	79.0
22-Aug-06	--	--	nd	nd	--	nd	nd	--	--	nd	93.0
28-Aug-06	--	--	nd	nd	--	nd	nd	--	--	nd	105.0
05-Sep-06	--	--	nd	nd	--	nd	trace‡‡	--	--	nd	72.0
11-Sep-06	--	--	nd	nd	--	nd	trace	--	--	nd	86.0
18-Sep-06	--	--	nd	nd	--	nd	nd	--	--	nd	83.0
25-Sep-06	--	--	nd	nd	--	nd	nd	--	--	nd	73.0
02-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.5
10-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	75.0

Table D-2, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
16-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
24-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	76.0
30-Oct-06	--	--	nd	nd	--	nd	nd	--	--	nd	90.5
06-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
13-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.0
20-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	86.0
27-Nov-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.0
04-Dec-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.0
10-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	82.5
11-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	89.0
12-Dec-06	nd	nd	nd	nd	nd	0.067	nd	nd	nd	nd	85.5
13-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	79.5
14-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	79.0
15-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	88.0
16-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	82.5
17-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	88.0
18-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	89.0
19-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	85.0
22-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	77.0
23-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	75.0
24-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	80.0
25-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	82.0
26-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	81.0
27-Dec-06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	81.0
28-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	82.0
29-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	86.5
30-Dec-06	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	88.0
31-Dec-06	--	--	nd	nd	--	trace	nd	--	--	trace	87.0
01-Jan-07[++]	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	97.0
01-Jan-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	88.5
02-Jan-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	88.5
03-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	81.0
04-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	87.0
05-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	88.5
08-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	91.0
16-Jan-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
22-Jan-07	--	--	nd	nd	--	nd	nd	--	--	nd	100.0
29-Jan-07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	90.5
05-Feb-07	--	--	nd	nd	--	nd	nd	--	--	nd	91.5

Table D-2, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
09-Feb-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
10-Feb-07	--	--	0.113	nd	--	0.090	nd	--	--	nd	86.5
11-Feb-07	--	--	0.463	nd	--	0.462	nd	--	--	nd	92.5
12-Feb-07	--	--	trace	nd	--	1.117	0.291	--	--	trace	94.5
13-Feb-07	--	--	0.053	nd	--	0.173	nd	--	--	trace	90.5
14-Feb-07	--	--	nd	nd	--	0.098	nd	--	--	trace	92.0
15-Feb-07	--	--	nd	nd	--	0.099	nd	--	--	trace	89.5
16-Feb-07	--	--	nd	nd	--	0.086	nd	--	--	trace	89.0
17-Feb-07	--	--	nd	nd	--	0.064	nd	--	--	trace	89.5
18-Feb-07	--	--	nd	nd	--	0.056	nd	--	--	trace	85.0
23-Feb-07	--	--	nd	nd	--	trace	nd	--	--	nd	91.0
24-Feb-07	--	--	nd	nd	--	0.053	nd	--	--	nd	94.5
25-Feb-07	--	--	nd	nd	--	trace	nd	--	--	nd	87.5
26-Feb-07	--	--	0.052	nd	--	0.104	nd	--	--	nd	83.0
27-Feb-07	--	--	nd	nd	--	0.100	nd	--	--	trace	99.5
28-Feb-07	--	--	nd	nd	--	0.098	nd	--	--	nd	90.5
01-Mar-07	--	--	trace	nd	--	0.075	nd	--	--	trace	93.5
02-Mar-07	--	--	nd	nd	--	0.055	nd	--	--	nd	88.5
03-Mar-07	--	--	nd	nd	--	trace	nd	--	--	nd	89.0
04-Mar-07	--	--	nd	nd	--	trace	nd	--	--	nd	91.5
05-Mar-07	--	--	nd	nd	--	trace	nd	--	--	nd	90.5
12-Mar-07	--	--	nd	nd	--	nd	nd	--	--	nd	98.5
19-Mar-07	--	--	nd	nd	--	nd	nd	--	--	nd	83.5
26-Mar-07	--	--	nd	nd	--	nd	nd	--	--	nd	81.0
02-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	72.0
10-Apr-07	--	--	nd	nd	--	0.184	nd	--	--	trace	79.3
17-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	83.5
23-Apr-07	--	--	nd	nd	--	0.054	nd	--	--	nd	91.0
24-Apr-07	--	--	0.052	nd	--	0.059	nd	--	--	nd	98.5
25-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	96.5
25-Apr-07	--	--	nd	nd	--	nd	nd	--	--	nd	96.0
26-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	94.0
27-Apr-07	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
28-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	82.0
29-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	92.5
30-Apr-07	--	--	nd	nd	--	trace	nd	--	--	nd	93.0
01-May-07	--	--	nd	nd	--	trace	nd	--	--	nd	95.5
02-May-07	--	--	nd	nd	--	trace	nd	--	--	nd	95.0
09-May-07	--	--	nd	nd	--	nd	nd	--	--	nd	94.5

Table D-2, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
14-May-07	--	--	nd	nd	--	nd	nd	--	--	nd	97.5
14-May-07	--	--	nd	nd	--	nd	nd	--	--	nd	87.5
22-May-07	--	--	nd	nd	--	nd	nd	--	--	nd	97.5
30-May-07	--	--	nd	nd	--	0.127	nd	--	--	nd	89.0
05-Jun-07	--	--	nd	nd	--	nd	nd	--	--	nd	106.0
13-Jun-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
13-Jun-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
19-Jun-07	--	--	nd	nd	--	nd	nd	--	--	nd	95.0
26-Jun-07	--	--	nd	nd	--	nd	nd	--	--	nd	84.0
03-Jul-07	--	--	nd	nd	--	nd	nd	--	--	nd	84.5
09-Jul-07	--	--	nd	nd	--	nd	nd	--	--	nd	92.5
17-Jul-07	--	--	nd	nd	--	nd	nd	--	--	nd	92.5
24-Jul-07	--	--	nd	nd	--	nd	nd	--	--	nd	95.5
30-Jul-07	--	--	nd	nd	--	nd	nd	--	--	nd	97.5
06-Aug-07	--	--	nd	nd	--	nd	nd	--	--	nd	92.5
13-Aug-07	--	--	nd	nd	--	nd	nd	--	--	nd	92.0
20-Aug-07	--	--	nd	nd	--	nd	nd	--	--	nd	75.0
28-Aug-07	--	--	nd	nd	--	nd	nd	--	--	nd	94.5
04-Sep-07	--	--	nd	nd	--	nd	nd	--	--	nd	93.5
10-Sep-07	--	--	nd	nd	--	nd	nd	--	--	nd	83.0
17-Sep-07	--	--	nd	nd	--	nd	nd	--	--	nd	89.0
25-Sep-07	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
02-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
09-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	89.0
15-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	86.5
22-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.0
29-Oct-07	--	--	nd	nd	--	nd	nd	--	--	nd	98.0
06-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	92.0
06-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	99.5
13-Nov-07	--	--	trace	nd	--	nd	nd	--	--	nd	87.5
20-Nov-07	--	--	nd	nd	--	trace	nd	--	--	nd	91.0
26-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	90.5
26-Nov-07	--	--	nd	nd	--	nd	nd	--	--	nd	86.0
18-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	85.0
18-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	89.5
19-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	91.0
19-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	103.0
20-Dec-07	nd	nd	0.057	nd	nd	0.056	nd	nd	nd	nd	95.5
20-Dec-07	nd	nd	0.052	nd	nd	0.053	nd	nd	nd	nd	92.5

Table D-2, Continued

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
21-Dec-07	nd	nd	0.059	nd	nd	trace	nd	nd	nd	trace	92.5
21-Dec-07	nd	nd	0.064	nd	nd	trace	nd	nd	nd	nd	95.5
22-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	83.0
22-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	90.0
23-Dec-07	nd	nd	nd	nd	nd	0.082	nd	nd	nd	nd	88.5
23-Dec-07	nd	nd	nd	nd	nd	0.079	nd	nd	nd	nd	81.0
24-Dec-07	nd	nd	nd	nd	nd	0.090	nd	nd	nd	trace	88.5
25-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	85.0
26-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	86.0
27-Dec-07	nd	nd	nd	nd	nd	trace	nd	nd	nd	nd	88.5

† Analysis did not include this compound: analytical short screen performed during this sampling period

‡ nd (not detected): concentration below the method detection limit

†† Shaded dates indicate rain event sampling

‡‡ Trace detection (above the method detection limit, but below the reporting limit)

++ Field duplicate sample

Table D-3. Herbicides detected at the KLRC: February 2, 2006 – March 2, 2007. Concentrations listed in µg/L.

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
02-Feb-06[††]	--[†]	--	nd[‡]	nd	--	0.064	nd	--	--	nd	85.0
03-Feb-06	--	--	nd	nd	--	0.089	nd	--	--	nd	78.5
04-Feb-06	--	--	nd	nd	--	0.064	nd	--	--	nd	79.5
05-Feb-06	--	--	nd	nd	--	0.059	nd	--	--	nd	91.5
06-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.5
01-Mar-06	--	--	0.280	nd	--	1.660	0.546	--	--	0.743	94.5
08-May-06	--	--	nd	nd	--	0.130	nd	--	--	nd	85.0
16-May-06	--	--	nd	nd	--	0.147	nd	--	--	nd	92.5
22-May-06	--	--	nd	nd	--	0.056	nd	--	--	nd	90.0
23-May-06	--	--	nd	nd	--	0.084	nd	--	--	0.107	81.0
24-May-06	--	--	nd	nd	--	0.063	nd	--	--	nd	85.0
25-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.5
26-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	82.5
27-May-06	--	--	nd	nd	--	0.059	nd	--	--	nd	88.0
28-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	88.0
29-Dec-06	nd	nd	nd	nd	nd	0.154	nd	nd	nd	0.103	84.0
30-Dec-06	nd	nd	nd	nd	trace[‡‡]	0.203	nd	nd	nd	0.130	75.5
11-Feb-07	--	--	nd	nd	--	0.223	nd	--	--	0.120	84.0
12-Feb-07[++]	--	--	0.098	nd	--	0.319	nd	--	--	0.129	92.5
12-Feb-07	--	--	0.079	nd	--	0.646	0.435	--	--	0.525	91.0
13-Feb-07	--	--	nd	nd	--	0.799	0.702	--	--	1.021	83.0
15-Feb-07	--	--	nd	nd	--	0.398	0.075	--	--	0.242	80.0
16-Feb-07	--	--	nd	nd	--	0.221	0.052	--	--	0.136	81.0
17-Feb-07	--	--	nd	nd	--	0.192	0.066	--	--	0.087	95.5
27-Feb-07	--	--	nd	nd	--	trace	nd	--	--	trace	80.5
28-Feb-07	--	--	nd	nd	--	trace	nd	--	--	trace	89.5
01-Mar-07	--	--	nd	nd	--	trace	nd	--	--	trace	93.0
02-Mar-07	--	--	nd	nd	--	trace	nd	--	--	trace	98.5

[†] Analysis did not include this compound: analytical short screen performed during this sampling period

[‡] nd (not detected): concentration below the method detection limit

[††] Shaded dates indicate rain event sampling

[‡‡] Trace detection (above the method detection limit, but below the reporting limit)

[++] Field duplicate sample

Table D-4. Herbicides detected at the Yolo Bypass: January 3, 2006 – May 3, 2006. Concentrations listed in µg/L.

Date Sampled	ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	% Recovery Propazine
03-Jan-06	--[†]	--	nd[‡]	nd	--	nd	nd	--	--	nd	85.5
09-Jan-06	--	--	nd	nd	--	nd	nd	--	--	nd	85.0
17-Jan-06	--	--	nd	nd	--	nd	nd	--	--	nd	80.0
23-Jan-06	--	--	nd	nd	--	0.062	0.050	--	--	nd	89.5
07-Feb-06[††]	--	--	nd	nd	--	nd	nd	--	--	nd	81.5
08-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	89.5
09-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	73.5
10-Feb-06	--	--	nd	nd	--	nd	nd	--	--	nd	76.5
02-Mar-06	--	--	0.093	nd	--	1.120	0.536	--	--	0.252	106.0
03-Mar-06	--	--	nd	nd	--	0.219	nd	--	--	0.088	93.5
04-Mar-06	--	--	nd	nd	--	0.180	nd	--	--	0.124	108.0
05-Mar-06	--	--	nd	nd	--	0.108	nd	--	--	0.071	86.0
06-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	79.5
07-Mar-06	--	--	nd	nd	--	0.077	nd	--	--	nd	89.5
08-Mar-06	--	--	nd	nd	--	0.170	0.064	--	--	0.064	84.5
09-Mar-06	--	--	nd	nd	--	0.253	0.065	--	--	0.119	105.0
10-Mar-06	--	--	nd	nd	--	0.083	nd	--	--	0.061	86.0
21-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	96.0
28-Mar-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
04-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	91.0
10-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	83.0
17-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	87.5
26-Apr-06	--	--	nd	nd	--	nd	nd	--	--	nd	84.5
03-May-06	--	--	nd	nd	--	nd	nd	--	--	nd	92.5

[†] Analysis did not include this compound: analytical short screen performed during this sampling period
[‡] nd (not detected): concentration below the method detection limit
[††] Shaded dates indicate rain event sampling

Appendix E:
Quality Control

Quality Control (QC)
For the purposes of this study, laboratory matrix spikes, matrix blanks and blind spikes were prepared using an American River water matrix. One matrix spike[1] was analyzed per each field sample set received by the laboratory, for a total of 125 matrix spikes analyzed (62 for OPs; 63 for herbicides). A single matrix blank was analyzed in conjunction with each matrix spike. Matrix spikes and blanks were extracted on the date the companion field sample set was extracted; analysis of the matrix spike/blank and companion set occurred either on the day of extraction, or at a later date.

In addition, 22 blind spikes were prepared and analyzed over the course of the study. Duplicate field samples were also collected and analyzed: 16 duplicate sets were collected for OPs; 17 sets for herbicides.

Spike Concentrations
Matrix spikes were spiked at a concentration of 0.1 µg/L for OPs, with the exception of the OPs chlorpyrifos and diazinon, which were spiked at 0.025 µg/L. Herbicides (including the triazine surrogate propazine) were spiked at 0.2 µg/L. Blind spikes were spiked at variable concentrations (Table E-4).

OP Pesticides
Spiked Matrix Samples
Spiked matrix QC samples were analyzed for the 15 OPs investigated during this study (Table E-2). Of the 62 matrix spikes prepared and analyzed for OPs, 59 were analyzed for 15 OPs; three were analyzed for five OPs.

Blind Spikes
Blind spikes were analyzed for ten of the 15 OPs studied (Table E-4). A total of 12 blind spike samples were analyzed for one to two of the ten OPs.

QC Warning/Control Limits Exceeded
Analyses of OP spiked laboratory QC samples (matrix and blind spikes) exceeded QC warning/control limits in 4.1 percent of the total analyses performed. A summary of the exceeded limits is presented in Table E-1.

Spiked Matrix Analyses
Chlorpyrifos analyses exceeded QC warning/control limits in 17.7 percent of the matrix spike analyses, with 12.9 percent of the analyses exceeding upper warning/control limits. While lower warning/control limit exceedances were relatively less frequent (4.8 percent of the total), two of the three lower warning/control limit exceedances disclosed a potentially serious analytical problem: analysis of QC matrix spike 2007-1539 resulted

[1] For OPs in this study, "one matrix spike" is actually a set of two spiked matrices: a single matrix was spiked with ethoprop, diazinon, disulfoton, chlorpyrifos, malathion, methidathion, fenamiphos and azinphos methyl; a second matrix was spiked with dichlorvos, thimet, fonofos, dimethoate, methyl parathion, tribufos and profenofos. (This matrix spike format began with the sample set extracted on February 7, 2006—see Table E-2.)

in a zero percent recovery; matrix spike 2007-1589 yielded a 56 percent recovery. While the cause of the low recoveries could not be determined by the CDFA laboratory, it should be noted analysis of matrix spike 2007-1539 was analyzed 61 days post collection (53 days post extraction). Analysis of matrix spike 2007-1589 was performed 15 days post sampling, ten days post extraction.

During the course of the study chlorpyrifos was detected in four field samples; detections ranged from 0.0103 to 0.0346 µg/L. No matrix spikes were analyzed in association with chlorpyrifos-positive field samples.

Blind Spike Analyses
Quality control warning/control limits were exceeded for four OP blind spike analyses: two diazinon analyses exceeded QC warning/control limits: one exceeded the lower warning limit and the second exceeded the lower control limit. A single fenamiphos analysis exceeded the lower warning limit; one dichlorvos analysis exceeded the upper warning limit.

Herbicides
Spiked Matrix Samples
Spiked matrix QC samples were analyzed for the seven herbicides and three herbicide breakdown products investigated during the study (Table E-3). Of the 63 matrix spikes prepared and analyzed for herbicides, 54 were analyzed for five herbicides, nine were analyzed for ten herbicides.

Blind Spikes
Blind spikes were analyzed for a total of five herbicides and the herbicide breakdown product DACT (Table E-4). A total of ten blind spike samples were analyzed for one to two herbicides.

QC Warning/Control Limits Exceeded
Analyses of herbicide spiked laboratory QC samples (matrix and blind spikes) exceeded QC warning/control limits in 12.1 percent of the total analyses performed. A summary of the exceeded limits is presented in Table E-1.

Spiked Matrix Analyses
Spiked matrix analyses of the following herbicides/herbicide breakdown products exceeded QC warning/control limits by over ten percent: bromacil (12.7 percent of 63 analyses); DACT (28.6 percent of 63 analyses); hexazinone (14.3 percent of 63 analyses); ACET (11.1 percent of nine analyses); norflurazon (11.1 percent of nine analyses); prometon (11.1 percent of nine analyses).

Of the 12.7 percent bromacil analyses exceeding QC warning/control limits, 6.35 percent exceeded lower warning/control limits (half of the 6.35 percent exceeded lower control limits); 6.35 percent exceeded the upper warning limit. Bromacil was detected in 18 field collected samples; detections ranged from trace (five detections) to 0.463 µg/L. A single matrix spike (extraction/analysis date February 15, 2007) was analyzed in association

with six detections of bromacil in field collected samples: percent recovery for this matrix spike met lower warning limit criteria, which suggests a downward bias for associated field sample analyses. Detections in the matrix spike associated field collected samples ranged from trace to 0.463 µg/L.

DACT QC analyses exceeded warning/control limits in 28.6 percent of the analyses, of which 25.4 percent exceeded upper warning/control limits. These results may indicate an upward bias in DACT analyses. All 31 detections of DACT in field collected samples were trace detections. Of those analyses, nine detections are associated with four QC matrix spikes: three of the matrix spikes met upper warning limit criteria; one met upper control limit criteria.

Hexazinone QC analyses exceeded warning/control limits in 14.3 percent of the analyses; 11.1 percent exceeded upper QC warning/control limits, suggesting a possible upward bias in the majority of the hexazinone analyses. Hexazinone was detected in 37 field collected samples; detections ranged from trace (three detections) to 0.702 µg/L. Of the three matrix spikes associated with field samples, two matrix spikes met upper warning limit criteria and were analyzed in conjunction with six detections ranging from trace to 0.192 µg/L; one matrix spike met lower warning limit criteria and was analyzed in conjunction with field samples that yielded two detections ranging from 0.083 to 0.098 µg/L (suggesting a downward bias for these specific sample analyses).

While ACET, norflurazon and prometon matrix spike analyses each exceeded QC warning/control limits in 11.1 percent of the analyses, none of these herbicides were detected in field collected samples. Thus, speculation regarding potential analysis bias is rendered moot.

Blind Spike Analyses
Quality control warning/control limits were exceeded for two herbicide blind spike analyses: hexazinone and simazine analyses exceeded the QC upper warning limit on one occasion each.

Matrix Blank Analyses
Matrix blank analyses yielded no OP or herbicide detections.

Duplicate Samples
Of the 16 OP duplicate sample sets collected and analyzed, 14 were non-detect for all OPs; one duplicate set had two matching trace detections, and one set had a detection each of diazinon with values of 0.0619 and 0.0714 µg/L. (See Appendix C, tables C-1 through C-3.)

Of the 17 herbicide duplicate sample sets collected and analyzed, most had multiple detections, of which only one set displayed notable variability: recovery of the propazine spike ranged from 69.5 (QC lower warning limit) to 99.3 percent. This was one of only four propazine analyses (out of 469) that exceeded QC warning limits.

Propazine Analyses

During the course of this study, 469 samples were spiked with the surrogate propazine and analyzed to evaluate triazine herbicide recovery. This sample number includes field collected samples (396), matrix spikes (63), and blind spikes (10) (see Appendix D, tables D-1 through D-4 and tables E-3 and E-4). Of the 469 samples analyzed for propazine, analyses of four field collected samples exceeded QC warning limits (0.9 percent of the total propazine analyses).

Sample Hold Times

Table E-5 lists all samples analyzed 14 days or more after the date of collection.[2] In summary, sample extraction was performed up to 51 days after sample collection; sample analysis was performed up to 66 days after sample collection. It is not known what effect hold times had on sample integrity.

[2] The 14-day timeframe is an arbitrary selection. The contract with CDFA specified sample extraction dates only: four business days for OPs; seven business days for herbicides.

Table E-1. Summary of quality control warning and control limits exceeded for OP and herbicide spiked matrix and blind spike samples.

Pesticide	Total Number of Spiked Matrix Samples Analyzed	Total Number of Blind Spike Samples Analyzed	Number of Spike Analyses ≤ LCL†		Number of Spike Analyses ≤ LWL††		Number of Spike Analyses ≥ UWL‡		Number of Spike Analyses ≥ UCL‡‡		Total Number of Analyses Equaling or Exceeding Warning or Control Limits	Percent of Analyses Equaling or Exceeding Warning or Control Limits
			Matrix	Blind	Matrix	Blind	Matrix	Blind	Matrix	Blind		
OP Pesticides												
Azinphos Methyl	59	2			1						1	1.7
Chlorpyrifos	62	2	2		1		7		1		11	17.7
Diazinon	62	4		1	1	1					3	4.8
Dichlorvos (DDVP)	59	1			2		2	1			5	8.5
Dimethoate	62	3			1						1	1.6
Fenamiphos	59	1	1		3	1					5	8.5
Fonofos	59	----			3						3	5.1
Malathion	62	----			2						2	3.2
Methidathion	62	----			1						1	1.6
Methyl Parathion	59	----			1						1	1.7
Thimet (Phorate)	59	2			5						5	8.5
Herbicides												
ACET	9	----			1						1	11.1
Bromacil	63	1	2		2		4				8	12.7
DACT	63	3	1		1		15		1		18	28.6
Diuron	63	4					3				3	4.8
Hexazinone	63	1			2		6	1			9	14.3
Norflurazon	9	----							1		1	11.1
Prometon	9	----					1				1	11.1
Simazine	63	2					2	1	1		4	6.3
Propazine	469*	----			3		1				4	0.9

† Lower control limit
†† Lower warning limit
‡ Upper warning limit
‡‡ Upper control limit
* Sample number represents propazine spikes of field collected surface water samples and matrix and blind spikes; only field sample analyses exceeded warning limits (due to table category constraints, these field samples are listed under the "matrix" spike category)

Table E-2. Quality control matrix spike percent recovery data for organophosphates (OP).

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
13-Dec-05	2001, 2004, 2007, 2010		80.0	83.2		106.0					97.9	100.0				
10-Jan-06	2025, 2028, 2031, 2034, 2037, 2040,		112.0	106.0		86.0					100.0	90.7				
26-Jan-06	2049, 2046, 2043, 2052, 2055, 2058		94.0	81.2		85.9					88.8	90.0				
07-Feb-06	1013, 1016, 1019, 1022, 1025, 1028, 1001, 1004, 1007, 1010, 2067, 2070	112.0	103.0	96.8	82.2	89.6	107.0	103.0	106.0	89.2	110.0	117.0	91.6	96.9	87.1	93.1
15-Feb-06	1043, 1046, ‡(1049), (1052), 2073, 1031, 1034, 1037, 1040, 2076	118.0	104.0	92.4	70.6	75.4	98.9	100.0	102.0	81.4	103.0	104.0	72.7	76.8	74.0	80.1
22-Feb-06	2079, 2082, 1055, 2085, 2088	85.8	94.4	86.8	75.9	87.4	92.2	92.7	93.2	83.9	94.5	91.3	89.2	90.9	79.1	92.7
01-Mar-06	1058, 1061, 1064, 1067	94.4	86.4	85.2	71.6	77.3	85.3	88.9	95.1	75.9	93.0	98.8	78.7	83.2	74.5	83.4
06-Mar-06	1070, 1073, 1076, 1079, 1082, 1086, 1088, 1091, 1094, 2097, 2100	87.9	110.0	94.4	84.9	91.5	75.8	79.2	87.2	86.7	86.4	89.0	92.8	97.3	83.0	95.9

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
07-Mar-06	1097 ,1100, 1103, 1106, 1109, 1112, (1115), 1118, 1121	112.0	118.0	105.0	84.9	91.5	87.8	94.3	101.0	90.1	98.4	101.0	95.4	97.3	87.9	97.0
09-Mar-06	1139, 1136, 1133, 1124, 1127, 1130, 1142, 1145, 1148	95.9	102.0	92.8	79.7	85.8	88.4	91.6	95.5	87.2	94.0	97.4	84.3	91.2	82.7	89.1
13-Mar-06	1159, 1162, 1165, 1168, 1171, (1174)	106.0	101.0	97.2	83.3	95.1	99.4	101.0	103.0	90.4	105.0	103.0	97.3	104.0	83.7	110.0
22-Mar-06	2103, 2106, 2109, 2112, 2115	98.6	109.0	99.6	94.4	89.0	92.5	98.9	84.5	96.0	97.7	95.7	99.8	94.5	89.8	89.7
05-Apr-06	2120, 2123, 2126, 1219	93.1	96.8	92.8	88.9	83.5	83.3	82.6	91.4	89.2	85.2	91.7	88.5	89.2	88.3	89.4
07-Apr-06	1175, (1178), 1220, 1223, 1226, 1229, 1232, 2133, 2130, 2127	96.4	87.2	85.6	93.6	95.9	92.9	91.7	100.0	96.9	97.1	105.0	101.0	107.0	97.2	107.0
18-Apr-06	2136, 2139, 2145, 2148, 2151, 2154	91.3	88.4	86.8	83.3	82.7	90.4	94.0	95.6	81.6	96.6	102.0	83.9	83.0	78.7	80.3
02-May-06	(1151), (1156), 2157, 2160, 2163, 2166, 2169	102.0	108.0	102.0	84.3	87.1	87.1	94.1	98.6	81.9	101.0	99.7	90.4	88.4	78.0	90.8
09-May-06	2181, 2184, 2187, 2172	106.0	102.0	82.8	95.1	94.2	87.9	96.9	91.5	93.5	103.0	104.0	104.0	97.0	88.0	94.9

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
26-May-06	2190, 2193, 2196, 2215, 1181 ,1184, 2175, 2178, 2199	106.0	101.0	90.0	90.0	94.9	85.4	89.0	97.9	87.5	96.0	101.0	97.2	96.6	87.0	97.9
31-May-06	1235, 1238, 1241, 1187, 1190, 1193, 1196, 1199, 1202	106.0	113.0	99.6	89.7	90.7	69.0	98.5	85.5	86.6	101.0	94.6	90.0	90.9	84.4	94.5
01-Jun-06	1205, 1208, 1211, 1244, 1247, 1250, 1253, 1256, 1260	76.7	117.0	92.0	80.3	75.7	90.7	89.5	87.9	76.6	92.8	98.6	84.2	82.6	80.7	88.8
16-Jun-06	2217, 2220, 2224, 2223	107.0	96.0	88.8	77.2	68.0	73.2	98.6	109.0	76.6	98.0	112.0	78.8	75.9	77.5	90.2
27-Jun-06	2229, 2232, 2235, 2238	110.0	108.0	90.0	100.0	97.5	88.8	94.6	110.0	102.0	97.9	101.0	98.3	88.7	98.4	95.1
11-Jul-06	2241, 2244, 2247, 2250	104.0	96.8	89.6	87.2	88.0	97.5	98.7	105.0	88.5	103.0	99.7	89.0	86.7	89.4	107.0
25-Jul-06	2253, 2256, 2259, 2262	71.2	107.0	96.0	78.5	78.6	76.3	80.0	69.6	88.1	72.6	76.2	81.3	82.6	81.0	92.8
09-Aug-06	2265, 2268, 2271, 2274	103.0	116.0	104.0	86.6	95.3	94.3	93.9	112.0	95.0	109.0	112.0	93.6	100.0	91.7	111.0
29-Aug-06	2277, 2280, 2283, 2286	87.9	84.8	80.0	75.2	83.1	76.2	81.3	82.3	86.9	91.1	88.7	84.7	78.4	81.8	106.0

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
13-Sep-06	2289, 2292, 2295, 2298	88.4	83.2	81.2	64.7	83.7	75.6	78.0	94.2	73.8	88.4	86.3	88.3	94.7	70.6	103.0
26-Sep-06	2301, 2304, 2307, 2310	91.5	108.0	96.4	67.8	88.3	75.3	86.8	76.4	87.2	85.2	76.9	93.5	107.0	83.5	104.0
11-Oct-06	2313, 2316, 2319, 2322	72.6	98.0	84.8	83.4	86.6	85.5	93.1	86.9	85.0	88.2	85.1	83.2	85.2	84.3	107.0
08-Nov-06	2337, 2340, 2343, 2346	83.5	92.8	83.2	80.8	77.8	84.9	92.2	85.6	83.5	92.1	89.6	86.0	83.1	82.9	98.4
21-Nov-06	2349, 2352, (2361), 2355, 2358, (2364)	85.6	92.0	83.6	88.8	93.5	80.7	80.6	87.4	95.3	91.5	85.6	99.2	101.0	88.4	103.0
06-Dec-06	1001, 1004, 2367, 2368	102.0	100.0	96.4	75.1	88.5	93.1	110.0	94.6	81.5	110.0	107.0	86.8	85.1	72.8	89.0
20-Dec-06	5010, 5013, 5014, 5018, 5001, 1007, 5004, 5007, 5022, 1010, 5025, 5028	79.0	100.0	88.8	80.1	92.0	91.5	93.4	94.6	91.7	97.5	95.2	96.5	94.5	88.5	93.5
28-Dec-06	5031, 5034, 5037, 5040, 1013, 5043, 5046	78.4	115.0	87.6	79.8	92.1	91.3	95.3	92.8	89.3	99.9	97.7	90.6	100.0	83.8	97.0
03-Jan-07	5049, 5052, 5055, 5058, 5061, 5064, 5067, 1016, 1018	93.5	95.2	84.4	86.0	91.0	87.0	89.9	93.9	92.7	92.1	90.8	94.4	94.1	88.9	92.4

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
10-Jan-07	5070, 5073, 5076, 5079, 1019, 1022	90.8	89.2	82.4	73.6	80.6	74.6	83.5	85.1	78.2	89.0	87.2	82.8	83.6	72.3	83.7
23-Jan-07	1025, 1028, 1031, 1034	111.0	108.0	96.8	66.6	79.8	102.0	103.0	110.0	74.3	105.0	107.0	86.2	79.7	72.3	78.2
06-Feb-07	1037, (1052), 1040, (1049), 1043, 1046	96.2	114.0	87.2	71.4	81.4	81.8	85.6	93.7	76.9	89.0	91.8	84.8	89.1	73.2	85.1
14-Feb-07	1055, 1058, 5103, 5105, 5106, 5109, 5112, 5082, 5091, 5093, 5094, 5097, 5100	100.0	106.0	90.4	70.0	83.8	83.4	87.5	92.6	79.8	93.3	92.8	84.3	87.0	75.5	89.0
21-Feb-07	5115, 5136, 5130, 5133, 5127, 5124, 5118, 5121	105.0	106.0	86.4	74.1	79.4	78.6	82.0	85.8	80.6	88.6	86.9	85.5	83.0	76.9	85.9
01-Mar-07	5148, 5151, 5154, 5157, 5139, 5142, 5145, 5169, 5171, 5163, 5166, 5160	80.4	108.0	91.6	77.7	82.4	87.9	90.1	93.1	85.1	95.3	91.2	88.0	79.0	80.3	90.1
06-Mar-07	5172, 5175, 5178, 5181, 5184, 5187, 5190, 5193, 5196, 5198, 5200, 5208	88.4	119.0	97.2	79.9	85.6	84.8	85.2	86.6	85.7	86.9	90.5	88.0	92.4	83.3	92.4
13-Mar-07	5202, 5205, 5211, 5215, 1061, 1064	112.0	107.0	102.0	76.4	85.9	104.0	102.0	112.0	87.1	109.0	113.0	92.3	98.7	83.2	96.7
27-Mar-07	1067, 1070, 1073, 1076, (1115)	103.0	109.0	100.0	80.2	91.3	89.3	97.8	98.5	87.6	104.0	103.0	93.9	97.3	78.9	99.9

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
20-Apr-07	1079, 1082, 1084, 1091, 1095, 1098	108.0	96.0	90.4	74.2	81.4	89.8	90.8	100.7	83.5	99.0	106.0	89.6	90.0	77.7	90.1
01-May-07	5226, 1099, 1102, 5217, 5220, 5223	93.0	97.2	90.4	84.5	83.9	91.1	97.0	96.3	92.2	95.1	97.7	89.3	87.6	83.4	91.5
04-May-07	5229, 5232, 5235, 5238, 5241, 5244, 5247	101.0	99.4	106.0	82.8	97.2	81.9	102.0	96.3	96.2	108.0	104.0	96.1	96.9	91.5	99.7
14-May-07	5250, 5253	64.5	95.4	95.8	83.9	86.4	80.5	88.0	82.2	86.0	89.9	87.1	90.7	87.2	85.5	88.6
01-Jun-07	5271	97.2	100.0	101.0	83.2	99.1	77.9	85.8	87.3	103.0	97.1	92.4	98.5	103.0	89.4	104.0
12-Jun-07	5278, 5281, 5272, 5275	70.8	100.0	100.0	85.4	92.6	73.1	88.0	82.4	101.0	84.6	87.6	91.6	92.0	92.3	96.3
10-Jul-07	1143, 1146, 1137, 1140	99.3	99.2	100.0	99.5	104.0	81.8	90.1	91.3	93.9	94.6	102.0	102.0	104.0	90.8	106.0
08-Aug-07	1153, 1156, 1159, 1162, 1165, 1168, 1171, 1174	105.0	99.2	98.4	91.0	81.9	85.8	88.7	86.6	91.4	90.5	100.0	87.9	93.5	92.8	84.8
22-Aug-07	1177, 1180, 1183, 1186	86.8	89.6	88.4	88.2	98.7	71.0	74.7	87.7	95.3	81.2	92.9	104.0	111.0	87.1	109.0

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
05-Sep-07	1189, 1192, 1195, 1198	110.0	100.0	100.0	74.4	82.5	93.2	91.6	99.2	84.1	96.7	96.6	90.9	92.2	80.1	93.9
19-Sep-07	1201, 1204, 1206, 1207, 1210	54.7	96.0	95.6	83.1	83.6	72.2	77.9	66.0	88.3	74.2	68.4	94.3	88.2	84.2	90.0
03-Oct-07	1225, 1128, 1231, 1134	67.3	96.4	98.4	80.9	82.3	76.0	78.1	79.3	81.9	81.5	81.7	84.4	82.3	80.0	82.5
17-Oct-07	1213, 1216, 1299, 1219, 1222, 1297	92.9	98.4	99.2	84.4	93.6	79.9	83.8	91.6	86.2	90.5	93.4	97.2	95.4	83.8	93.0
30-Oct-07	1237, 1240, 1243, 1246	77.0	74.8	76.4	75.5	80.2	71.8	76.3	75.1	81.2	79.6	77.6	80.9	79.5	78.7	82.3
14-Nov-07	1249, 1251, 1252, 1255, 1258	110.0	0.0	108.0	88.7	90.5	89.9	90.5	97.3	86.0	93.3	98.0	90.6	88.8	89.8	89.7
27-Nov-07	1261, 1264, 1267, 1269, 1270	103.0	92.8	93.2	83.7	91.6	84.5	85.4	88.8	88.3	87.0	90.1	90.8	92.4	87.4	93.3
21-Dec-07	1273, 1274, 1277, 1278, 1281, 1282, 1285, 1286	111.0	90.0	88.4	77.8	82.3	89.5	92.2	91.8	81.6	93.8	95.1	81.5	81.8	79.0	84.9
27-Dec-07	1289, 1290, 1293, 1294, 5283, 5286, 5289, 5292	83.1	56.0	88.0	74.2	82.2	79.2	91.1	81.1	74.1	89.6	88.4	78.3	77.8	74.1	79.0

Table E-2, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery														
		Azinphos Methyl	Chlorpyrifos	Diazinon	Dichlorvos (DDVP)	Dimethoate	Disulfoton	Ethoprop	Fenamiphos	Fonofos	Malathion	Methidathion	Methyl Parathion	Profenofos	Thimet (Phorate)	Tribufos (DEF)
SUMMARY DATA																
Average Recovery		94.4	97.8	92.6	81.5	87.3	85.4	90.5	92.3	86.8	94.3	95.2	90.0	90.8	83.2	93.6
Standard Deviation		13.9	16.8	7.4	7.7	7.2	8.6	7.7	9.8	6.9	8.2	9.3	6.8	8.3	6.4	8.3
Coefficient of Variation		14.7	17.1	8.0	9.4	8.2	10.1	8.5	10.6	7.9	8.7	9.8	7.5	9.1	7.7	8.9
Upper Control Limit		136.9	119.0	117.0	106.0	116.6	118.6	123.0	124.5	112.5	125.7	127.8	119.0	124.5	109.5	126.0
Upper Warning Limit		122.3	111.0	109.0	98.2	107.9	108.5	112.6	115.1	105.1	115.7	117.2	110.8	114.5	102.3	115.8
Lower Warning Limit		64.0	77.2	77.2	67.0	73.2	68.1	70.7	77.3	75.5	75.7	74.6	76.6	74.2	73.5	74.9
Lower Control Limit		49.4	68.8	69.2	59.2	64.5	58.0	60.2	67.9	68.1	65.7	63.9	68.0	64.1	66.3	64.7

‡ Sample numbers in brackes are blind spikes

Percent recovery ≥ upper control limit

Percent recovery ≥ upper warning limit

Percent recovery ≤ lower warning limit

Percent recovery ≤ lower control limit

Table E-3. Quality control matrix spike percent recovery data for herbicides.

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
15-Dec-05	2002, 2005, 2008, 2010			101.0	95.0		99.0	107.0			93.0	88.5
30-Dec-05	2014, 2017, 2023, 2020			112.0	87.0		98.5	88.0			91.5	89.5
11-Jan-06	2026, 2029, 2032, 2035, 2038, 2041			89.5	90.0		91.5	101.0			90.0	82.0
30-Jan-06	2050, 2047, 2044, 2053, ‡(2062), (2065), 2056, 2059			101.0	93.0		98.0	101.0			98.5	88.0
08-Feb-06	1002, 1005, 1008, 1011, 1014, 1017, 1020, 1023, 1026, 1029, 2068, 2071			92.0	85.0		93.0	82.5			89.0	82.5
15-Feb-06	1044, 1047, 1050, 1053, 2074, 1032, 1035, 1038, 1041, 2077			92.5	82.0		86.5	81.0			84.5	79.5
23-Feb-06	2080, 2083, 1056, 2086, 2089			94.0	91.0		96.0	92.0			91.0	87.0
02-Mar-06	1059, 1062, 1068, 1071, 1074, 1077, 2098, 2101			91.0	83.0		97.0	74.5			92.0	88.5
07-Mar-06	1098, 1101, 1104, 1107, 1110, 1113, 1116, 1119, 1122			88.0	84.5		94.5	88.5			85.0	79.5

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
13-Mar-06	1143, 1146, 1149, 1158, 1161, 1164, 1167, 1170, 1173			94.5	93.5		93.5	95.5			89.0	87.5
14-Mar-06	1081, 1084, 1085, 1090, 1093, 1096, 1126, 1129, 1132, 1141, 1138, 1135			94.0	88.5		96.5	93.0			94.0	87.0
23-Mar-06	2104, 2107, 2110, 2113, 2116			97.5	96.0		101.0	108.0			97.0	90.5
04-Apr-06	2119, 2133, 2125, (2143), 1218			93.0	91.0		96.0	113.0			93.0	85.5
11-Apr-06	1221, 1224, 1227, 1230, 1233, 2134, 2131, 2128, 1176, 1179			105.0	93.0		98.5	94.0			109.0	86.5
20-Apr-06	2137, 2140, 2146, 2149, 2152, 2155			105.0	98.5		105.0	106.0			91.0	90.5
02-May-06	2158, 2161, 2164, 2167, 1270			95.0	87.5		92.5	99.5			87.0	82.0
10-May-06	2182, 2185, 2188, 2173			95.5	90.5		92.5	118.0			90.0	88.0
31-May-06	2214, 1182, 1185, 2176, 2179, 2200, (1152), 2206, 2209, 2212, 2191, 2194			100.0	99.0		107.0	116.0			95.5	92.0

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
01-Jun-06	2197, 1236, 1239, 1242, 1188, 1191, 1194, 1197, 1200, 1203			98.5	91.0		105.0	112.0			95.0	88.0
02-Jun-06	1206, 1209, 1212, 1245, 1248, 1251, 1254, 1257, 1259, 1261			90.5	89.0		92.5	107.0			87.5	87.5
26-Jun-06	2218, 2221, 2225, 2227	97.0	83.5	97.5	63.5	85.0	87.0	90.5	92.0	91.0	88.5	81.0
11-Jul-06	2230, 2233, 2236, 2239, 2242, 2245, 2248, 2251			93.5	92.5		88.0	110.0			91.5	83.0
28-Jul-06	2254, 2257, 2260, 2263			94.0	83.0		97.5	116.0			88.5	84.0
10-Aug-06	2266, 2269, 2272, 2275			90.0	85.5		91.0	94.5			83.5	77.5
05-Sep-06	2278, 2281, 2284, 2288			75.0	92.0		90.5	82.5			81.0	101.0
15-Sep-06	2290, 2293, 2296, 2299			115.0	81.5		104.0	113.0			76.5	81.5
02-Oct-06	2302, 2306, 2308, 2311			76.5	80.0		76.0	72.5			77.0	75.5

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
13-Oct-06	2314, 2317, 2320, 2323			97.0	86.0		88.5	88.0			85.5	78.5
02-Nov-06	2332, 2335, 2326, 2329			99.0	101.0		101.0	96.0			103.0	94.5
09-Nov-06	2338, 2341, 2344, 2347			101.0	97.5		100.0	105.0			95.0	91.0
27-Nov-06	2356, 2359, (2365), 2350, 2353, (2362)			99.0	94.0		94.0	102.0			93.5	89.5
08-Dec-06	1002, 1005, 2369, 2370			98.0	91.0		110.0	109.0			94.0	89.5
21-Dec-06	5011, 5017, 5015, 5019, 5002, 1008, 5005, 5008, 5023, 1011, 5026, 5029	77.5	80.5	84.0	81.5	83.5	89.5	90.5	91.5	80.0	88.0	76.5
04-Jan-07	5032, 5035, 5038, 5041, 5047, 1014, 5050, 5053, 5056, 5059, 5062, 5044	84.5	80.0	86.5	89.0	91.5	80.0	100.5	91.5	85.0	89.0	82.0
11-Jan-07	5065, 1017, 5068, 5069, 5071, 5074, 5077, 5080, 1020, 1023	92.0	88.0	86.5	93.0	91.0	93.0	94.5	95.5	88.5	90.5	85.5
25-Jan-07	1026, 1029, 1032, 1035			85.5	94.5		89.0	93.5			86.5	81.0

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
06-Feb-07	1041, (1050), 1038, (1053), 1044, 1047	88.5	91.5	94.5	96.0	94.0	86.0	102.0	101.0	92.5	89.5	92.0
15-Feb-07	1056, 1057, 1059, 5104, 5107, 5110, 5113, 5095, 5098, 5101	83.5	80.5	82.0	88.0	84.5	99.0	103.0	91.0	82.0	84.5	81.0
21-Feb-07	5116, 5137, 5131, 5134, 5125, 5128, 5119, 5122			89.0	99.0		92.5	106.0			93.0	92.0
01-Mar-07	5149, 5152, 5155, 5158, 5140, 5143, 5146, 5167, 5170, 5164, 5165, 5161			95.5	96.0		102.0	115.0			100.0	98.5
07-Mar-07	5173, 5176,l 5179, 5182, 5185, 5188, 5191, 5194, 5209, 5210, 5197, 5199			89.5	92.5		88.5	82.5			91.0	88.5
13-Mar-07	5203, 5206, 5212, 5214, 1062, 1065			93.0	95.5		93.5	96.0			95.0	97.5
23-Apr-07	1086, 1089, 1080, 1081, 1083, 1092, 1094, 1096			86.0	82.0		79.5	81.0			80.5	74.5
30-Apr-07	5227, 1100, 1103, 5218, 5221, 5222, 5224			108.0	97.0		109.0	93.5			95.0	95.0
03-May-07	5230, 5233, 5236, 5239, 5242, 5245, 5248			113.0	99.5		115.0	105.0			98.0	96.0

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
22-May-07	5251, 5254			92.5	69.5		96.0	83.5			96.0	94.0
31-May-07	5258, 5260, 5262, 5265, 5267, 5269	93.5	93.5	111.0	100.0	104.0	103.0	112.0	115.0	101.0	97.5	97.0
11-Jun-07	5279, 5282			99.0	91.5		112.0	104.0			93.5	88.5
13-Jun-07	5273, 5277			108.0	96.0		104.0	106.0			98.0	90.0
22-Jun-07	1118, 1122, 1124, 1126, 1129			97.0	93.5		100.0	96.0			87.5	86.5
02-Jul-07	1132, 1135			87.5	82.5		87.5	85.0			81.0	80.5
11-Jul-07	1144, 1147, 1138, 1141			89.0	82.0		85.0	95.0			78.5	82.0
09-Aug-07	1154, 1157, 1160, 1163, 1166, 1169, 1172, 1175			99.5	94.5		94.5	102.0			98.0	93.0
22-Aug-07	1178, 1181, 1184, 1187			106.0	94.5		106.0	99.0			92.0	87.0

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
06-Sep-07	1190, 1193, 1196, 1199			95.0	98.5		96.5	91.5			93.5	86.0
24-Sep-07	1202, 1203, 1205, 1208, 1211			85.0	94.0		92.0	85.5			87.5	86.5
09-Oct-07	1226, 1229, 1232, 1235			95.0	99.5		97.5	94.0			90.0	86.5
17-Oct-07	1214, 1217, 1300, 1220, 1223, 1298			100.0	103.0		101.0	87.5			95.5	93.0
30-Oct-07	1238, 1241, 1244, 1247			98.0	95.5		104.0	92.5			94.0	89.0
20-Nov-07	1250, 1253, 1254, 1256, 1259			96.5	92.0		93.0	93.0			90.5	89.0
28-Nov-07	1262, 1265, 1268, 1271, 1272			104.0	98.0		93.0	102.0			95.5	90.0
26-Dec-07	1275, 1276 1279, 1280, 1283, 1284, 1287, 1288	97.5	92.0	102.0	98.0	85.0	101.0	96.5	99.5	92.5	101.0	87.5
31-Dec-07	1291, 1292, 1295, 1296, 5284, 5287, 5290, 5293	83.0	87.0	89.0	86.0	88.5	85.0	89.0	88.0	88.0	82.5	82.5

Table E-3, Continued

Extraction Date	DPR Samples Analyzed with Matrix Spike Series	Percent Recovery										
		ACET	Atrazine	Bromacil	DACT	DEA	Diuron	Hexazinone	Norflurazon	Prometon	Simazine	Propazine (Surrogate)
SUMMARY DATA												
Average Recovery		88.6	86.3	95.4	90.9	89.7	95.7	97.4	96.1	88.9	91.0	87.1
Standard Deviation		6.9	5.4	8.2	7.3	6.5	7.8	10.7	8.2	6.3	6.2	5.8
Coefficient of Variation		7.8	6.2	8.6	8.0	7.3	8.2	10.9	8.6	7.1	6.8	6.6
Upper Control Limit		139.8	105.0	117.4	101.2	115.9	118.4	121.3	112.8	105.6	107.7	115.4
Upper Warning Limit		127.5	98.2	110.9	95.7	108.5	109.4	112.5	107.2	99.2	100.8	106.8
Lower Warning Limit		78.3	72.2	84.9	73.7	79.1	73.4	76.9	84.8	73.8	73.2	72.4
Lower Control Limit		66.0	65.8	78.4	68.2	71.7	64.4	68.1	79.2	67.4	66.3	63.8

‡ Sample numbers in brackes are blind spikes

Percent recovery ≥ upper control limit

Percent recovery ≥ upper warning limit

Percent recovery ≤ lower warning limit

Percent recovery ≤ lower control limit

Table E-4. Quality control blind spike data for organophosphates (OP) and herbicides.

Extraction Date	Screen	DPR Sample Number	Pesticide	Spike Concentration (µg/L)	Recovery (µg/L)	Percent Recovery	‡Warning Limits (UWL / LWL)	‡‡Control Limits (UCL / LCL)	Propazine % Recovery
30-Jan-06	Triazine	2062	Bromacil	0.25	0.243	97.2	110.9 / 84.9	117.4 / 78.4	92.5
		2065	Diuron	0.35	0.330	94.3	109.4 / 73.4	118.4 / 64.4	83.0
			Simazine	0.20	0.172	86.0	100.8 / 73.2	107.7 / 66.3	
30-Mar-06	OP	2142	Profenofos	0.25	Sample Set Failure		114.5 / 74.2	124.5 / 64.1	
		2144	Thimet	0.20	Sample Set Failure		102.3 / 73.5	109.5 / 66.3	
			Disulfoton	0.15	Sample Set Failure		108.5 / 68.1	118.6 / 58.0	
04-Apr-06	Triazine	2143	Hexazinone	0.25	0.291	116.4	112.5 / 76.9	121.3 / 68.1	89.5
01-May-06	OP	1151	Diazinon	0.20	0.206	103.0	109.0 / 77.2	117.0 / 69.2	
			Chlorpyrifos	0.35	0.380	108.6	111.0 / 77.2	119.0 / 68.8	
		1156	Dimethoate	0.25	0.232	92.8	107.9 / 73.2	116.6 / 64.5	
26-May-06		1306	Ethoprop	0.20	0.166	83.0	113.0 / 70.7	123.0 / 60.2	
			Fenamiphos	0.30	0.220	73.3	115.1 / 77.3	124.5 / 67.9	
31-May-06	Triazine	1152	DACT	0.25	0.231	92.4	95.7 / 73.7	101.2 / 68.2	86.5
21-Nov-06	OP	2361	Azinphos-Methyl	0.20	0.154	77.0	122.3 / 64.0	136.9 / 49.4	
			Diazinon	0.10	0.075	75.4	109.0 / 77.2	117.0 / 69.2	
		2364	Dichlorvos (DDVP)	0.30	0.300	100.0	98.2 / 67.0	106.0 / 59.2	
			Thimet	0.30	0.305	101.7	102.3 / 73.5	109.5 / 66.3	
27-Nov-06	Triazine	2362	DACT	0.15	0.126	84.0	95.7 / 73.7	101.2 / 68.2	93.0
		2365	Diuron	0.15	0.163	108.7	109.4 / 73.4	118.4 / 64.4	101.0
			Simazine	0.20	0.203	101.5	100.8 / 73.2	107.7 / 66.3	

Table E-4, Continued

Extraction Date	Screen	DPR Sample Number	Pesticide	Spike Concentration (µg/L)	Recovery (µg/L)	Percent Recovery	‡Warning Limits (UWL / LWL)	‡‡Control Limits (UCL / LCL)	Propazine % Recovery
06-Feb-07	OP	1049	Azinphos-Methyl	0.30	0.316	105.3	122.3 / 64.0	136.9 / 49.4	
			Chlorpyrifos	0.10	0.100	100.0	111.0 / 77.2	119.0 / 68.8	
	Triazine	1050	Diuron	0.15	0.149	99.3	109.4 / 73.4	118.4 / 64.4	95.5
	OP	1052	Diazinon	0.25	0.228	91.2	109.0 / 77.2	117.0 / 69.2	
	Triazine	1053	Atrazine	0.20	0.195	97.5	98.2 / 72.2	105.0 / 65.8	96.5
27-Mar-07	OP	1115	Dimethoate	0.40	0.347	86.8	107.9 / 73.2	116.6 / 64.5	
28-Mar-07	Triazine	1116	Diuron	0.20	0.192	96.0	109.4 / 73.4	118.4 / 64.4	85.5
17-Oct-07	OP	1297	Diazinon	0.30	0.206	68.7	109.0 / 77.2	117.0 / 69.2	
		1299	Dimethoate	0.25	0.220	88.0	107.9 / 73.2	116.6 / 64.5	
	Triazine	1300	DACT	0.15	0.127	84.7	95.7 / 73.7	101.2 / 68.2	79.0

‡ Quality control upper warning limit (UWL) / lower warning limit (LWL)

‡‡ Quality control upper control limit (UCL) / lower control limit (LCL)

Percent recovery ≥ upper warning limit

Percent recovery ≤ lower warning limit

Percent recovery ≤ lower control limit

Table E-5. Sample hold periods ≥14 days from sample collection to analysis for OPs and herbicides.

CDFA Matrix Spike Sample Numbers		DPR Samples Analyzed During Spike Series	Sample Collection Date	Date Laboratory Received Samples	Date Extracted	Date Analyzed*	Days From Sampling to Extraction	Days from Sampling to Analysis
OP Pesticides	2006-2160 2006-2161	1067, 1070	19-Mar-07	26-Mar-07	27-Mar-07	03-Apr-07	8	14
	2006-2257 2006-2258	5226	23-Apr-07	27-Apr-07	01-May-07	14-Jun-07	8	51
		1099, 1102	24-Apr-07	27-Apr-07	01-May-07	14-Jun-07	7	50
		5217, 5220	25-Apr-07	27-Apr-07	01-May-07	14-Jun-07	6	49
		5223	26-Apr-07	27-Apr-07	01-May-07	14-Jun-07	5	48
	2006-2608 2006-2609	5229	27-Apr-07	02-May-07	04-May-07	16-May-07	7	19
		5232	28-Apr-07	02-May-07	04-May-07	16-May-07	6	18
		5235	29-Apr-07	02-May-07	04-May-07	16-May-07	5	17
		5238	30-Apr-07	02-May-07	04-May-07	16-May-07	4	16
		5241, 5244	01-May-07	02-May-07	04-May-07	16-May-07	3	15
		5247	02-May-07	02-May-07	04-May-07	16-May-07	2	14
	2006-2976 2006-2977	5271	22-May-07	23-May-07	29-May-07	26-Jun-07	7	34
	2006-3110 2006-3111	5272, 5275	30-May-07	06-Jun-07	12-Jun-07	12-Jul-07	12	42
		5278, 5281	05-Jun-07	06-Jun-07	12-Jun-07	12-Jul-07	7	37

Table E-5, Continued

CDFA Matrix Spike Sample Numbers		DPR Samples Analyzed During Spike Series	Sample Collection Date	Date Laboratory Received Samples	Date Extracted	Date Analyzed*	Days From Sampling to Extraction	Days from Sampling to Analysis
OP Pesticides	2007-0046 2007-0047	1137, 1140	03-Jul-07	09-Jul-07	10-Jul-07	16-Aug-07	7	43
		1143, 1146	09-Jul-07	09-Jul-07	10-Jul-07	16-Aug-07	1	37
	2007-0395 2007-0396	1177, 1180	13-Aug-07	17-Aug-07	22-Aug-07	08-Sep-07	9	25
		1183, 1186	20-Aug-07	21-Aug-07	22-Aug-07	08-Sep-07	2	18
	2007-0772 2007-0773	1189, 1192	28-Aug-07	05-Sep-07	05-Sep-07	26-Oct-07	7	58
		1195, 1198	04-Sep-07	05-Sep-07	05-Sep-07	26-Oct-07	1	52
	2007-0965 2007-0966	1201, 1204, 1206	10-Sep-07	18-Sep-07	19-Sep-07	16-Nov-07	9	66
		1207, 1210	17-Sep-07	18-Sep-07	19-Sep-07	16-Nov-07	2	59
	2007-1129 2007-1130	1225, 1128	25-Sep-07	02-Oct-07	03-Oct-07	30-Oct-07	8	35
		1231, 1134	02-Oct-07	02-Oct-07	03-Oct-07	30-Oct-07	1	28
	2007-1231 2007-1232	1213, 1216, 1299	09-Oct-07	16-Oct-07	17-Oct-07	06-Dec-07	8	57
		1219, 1222, 1297	15-Oct-07	16-Oct-07	17-Oct-07	06-Dec-07	2	51
	2007-1539 2007-1540	1249, 1251, 1252	06-Nov-07	13-Nov-07	14-Nov-07	07-Jan-08	8	61
		1255, 1258	13-Nov-07	13-Nov-07	14-Nov-07	07-Jan-08	1	54
	2007-1578 2007-1579	1261, 1264	20-Nov-07	26-Nov-07	27-Nov-07	07-Jan-08	7	47
		1267, 1269, 1270	26-Nov-07	26-Nov-07	27-Nov-07	07-Jan-08	1	41

Table E-5, Continued

CDFA Matrix Spike Sample Numbers		DPR Samples Analyzed During Spike Series	Sample Collection Date	Date Laboratory Received Samples	Date Extracted	Date Analyzed*	Days From Sampling to Extraction	Days from Sampling to Analysis
OP Pesticides	2007-1757 2007-1758	1273, 1274	18-Dec-07	21-Dec-07	21-Dec-07	07-Jan-08	3	19
		1277, 1278	19-Dec-07	21-Dec-07	21-Dec-07	07-Jan-08	2	18
		1281, 1282	20-Dec-07	21-Dec-07	21-Dec-07	07-Jan-08	1	17
		1285, 1286	21-Dec-07	21-Dec-07	21-Dec-07	07-Jan-08	0	16
	2007-1589 2007-1860	1289, 1290	22-Dec-07	27-Dec-07	27-Dec-07	07-Jan-08	5	15
		1293, 1294	23-Dec-07	27-Dec-07	27-Dec-07	07-Jan-08	4	14
Herbicides	2006-65	2230, 2233	20-Jun-06	26-Jun-06	11-Jul-06	11-Jul-06	21	21
		2236, 2239	26-Jun-06	26-Jun-06	11-Jul-06	11-Jul-06	15	15
	2006-1022	2314, 2317	02-Oct-06	10-Oct-06	13-Oct-06	25-Oct-06	11	23
		2320, 2323	10-Oct-06	10-Oct-06	13-Oct-06	25-Oct-06	3	15
	2006-2483	1086, 1089	02-Mar-07	18-Apr-07	23-Apr-07	23-Apr-07	51	51

* Analysis date listed on Chain of Custody record

Chain of Custody record identifies extraction date as 29-May-07; laboratory QC data sheet identifies 01-June-07 as extraction date

Re-analysis 05-Dec-07. Re-analysis increased period from sample collection to analysis from 35 to 70 days for samples 1225, 1128; 28 to 63 days for samples 1231, 1134

Analysis date listed as 10-Oct-06 through 25-Oct-06 on Chain of Custody record and laboratory QC data sheet; final analysis date used in this table