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Water Availability and Use Science Program

Prepared in cooperation with the California Department of Water Resources and the State and Federal Contractors Water Agency

Pesticide Concentrations Associated with Augmented Flow Pulses in the Yolo Bypass and Cache Slough Complex, California

Open-File Report 2020–1076

U.S. Department of the Interior
U.S. Geological Survey

Cover Photo: Colusa Basin Drain at a point upstream of site RCS (Knights Landing Ridge Cut), July 1, 2020.

Inset: Sampling site LIS (Lisbon Weir) on the Toe Drain of the Yolo Bypass, September 5, 2017.

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DAVID BERNHARDT, Secretary

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Conversion Factors

International System of Units to U.S. customary units

Multiply	By	To obtain
	Length	
millimeter (mm)	0.3937	inch (in.)
micrometer (µm)	$3.937e^{-5}$	inch (in.)
meter (m)	3.281	foot (ft)
	Area	
hectare (ha)	2.471	acre
square kilometer (km^2)	0.3861	square mile (mi^2)
	Volume	
microliter (µL)	$3.3814e^{-5}$	ounce, fluid (fl. oz)
milliliter (mL)	0.033814	ounce, fluid (fl. oz)
liter (L)	33.814	ounce, fluid (fl. oz)
cubic meter (m^3)	35.31467	cubic foot (ft^3)
	Flow rate	
milliliter per minute (mL/min)	$3.53147e^{-5}$	ounce, fluid per minute (fl. oz/min)
	Mass	
kilogram (kg)	2.20462	pound avoirdupois (lb)
gram (g)	0.03527	ounce, avoirdupois (oz)
milligram (mg)	$3.527e^{-5}$	ounce, avoirdupois (oz)
nanogram (ng)	$3.527e^{-11}$	ounce, avoirdupois (oz)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$°F = (1.8 \times °C) + 32.$$

Datum

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Supplemental Information

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25 °C).

Concentrations of chemical constituents in water are given in either milligrams per liter (mg/L) or micrograms per liter (µg/L), or nanograms per liter (ng/L). One milligram per liter is equivalent to 1 part per million (ppm); one microgram per liter is equivalent to 1 part per billion (ppb); one nanogram per liter is equivalent to 1 part per trillion (ppt). Concentrations of pesticide compounds in suspended-sediments filtered from 1-liter water samples are provided in ng/L to facilitate the approximation of a whole-water pesticide concentration by summing the dissolved and suspended-sediment concentrations of pesticide compounds.

Abbreviations

3,4-DCA	3,4-Dichloroaniline
Bypass	Yolo Bypass
CDPR	California Department of Pesticide Regulation
CSC	Cache Slough Complex
DCM	dichloromethane
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
EtOAc	ethyl acetate
GC/MS	gas chromatography with mass spectrometry
LC/MS/MS	liquid chromatography with tandem mass spectrometry
MDL	method detection limit
OCRL	Organic Chemistry Research Laboratory
SPE	solid-phase extraction
USGS	U.S. Geological Survey

Pesticide Concentrations Associated with Augmented Flow Pulses in the Yolo Bypass and Cache Slough Complex, California

By James L. Orlando, Matt De Parsia, Corey Sanders, Michelle Hladik, and Jared Frantzich

Abstract

Surface-water and suspended-sediment samples were collected and analyzed by the U.S. Geological Survey for multiple current-use pesticides and pesticide degradates approximately every 2 weeks at up to five sites in the Yolo Bypass and Cache Slough Complex before, during, and after augmented flow pulses in summer and fall 2016 and 2018 as well as during ambient flow conditions in summer and fall 2017 (no flow pulse). In 2016, augmented flows occurred during the summer (July) and required the pumping of Sacramento River water by local Reclamation Districts into the Colusa Basin Drain and Yolo Bypass Toe Drain. In contrast, augmented flows in 2018 occurred in the fall (August–September) and used agricultural tailwater (primarily rice field discharge water) to create the flow pulse. Water samples were analyzed by the U.S. Geological Survey for a suite of 175 current-use pesticides and pesticide degradates using gas chromatography with mass spectrometry and liquid chromatography with tandem mass spectrometry laboratory methods. Suspended sediments filtered from the water samples were analyzed for 143 pesticides and degradates by gas chromatography with mass spectrometry.

During the study, 53 pesticides were detected, and all the samples contained mixtures of multiple pesticides at concentrations ranging from below method detection limits to 8,780 nanograms per liter. Pesticides used in growing rice were the dominant pesticides present at four of the five sites sampled and urban-use pesticides dominated at the remaining site. Overall, total pesticide concentrations tended to be higher at sites in the northern part of the Yolo Bypass and lower at southern sites, except for the farthest downstream site which received additional pesticide inputs from the Sacramento River. Flow-pulse water source influenced total pesticide concentrations in the Yolo Bypass and Cache Slough Complex, and the highest total pesticide concentrations at each site were detected either immediately before or during the flow pulse generated with agricultural tailwater in 2018. Data gathered during this study will aid the California Department of Water Resources and other agencies working in the region in adaptively managing pulse flows in the Yolo Bypass and Cache Slough Complex, as one of several California Natural Resources Agency's Delta Smelt Resiliency strategies.

Introduction

The Sacramento–San Joaquin Delta (hereinafter Delta) is an area of critical habitat for numerous species of concern, including state and federally listed species such as Chinook Salmon (*Oncorhynchus tshawytscha*) and Delta Smelt (*Hypomesus transpacificus*; U.S. Fish and Wildlife Service, 1993; National Marine Fisheries Service, 2014). Since the early 1800s, the Delta has undergone dramatic alteration, such that less than 3 percent of its historical freshwater emergent wetland remains today (Whipple and others, 2012). Historical habitat loss, along with a host of other factors, including nutrient loading, changes in sediment loads, anthropogenic loading from effluent (Dugdale and others, 2012; Parker and others, 2012), the presence of contaminants, and predation from invasive clams (Jassby and others, 2002; Winder and Jassby, 2011; Cloern and Jassby, 2012; Kimmerer and others, 2012), have led to decline in primary productivity in the Delta. More recently, the simultaneous decline in abundance of several fish species in the Delta, collectively known as the pelagic organism decline (Sommer and others, 2007), has highlighted the need for a better understanding of the factors affecting ecosystem function in the Delta as well as ways to mitigate these declines.

The Cache Slough Complex (CSC) lies in the northwest Delta and consists of Cache Slough, Lindsey Slough, Liberty Island, Sacramento Deep-Water Ship Channel (not shown on map) and the lower portion of the Yolo Bypass (fig. 1). Together, these areas represent the largest remaining area of freshwater tidal slough habitat and floodplain (Yolo Bypass) in the Delta (Frantzich and others, 2018). Recent work has found this area to be important habitat for the endangered Delta Smelt and numerous other pelagic species and that inundation of the Yolo Bypass floodplain provides enhanced rearing habitat for juvenile fish (Sommer and others, 2001; Nobriga and others, 2005). Additional research has shown that under certain conditions, the Yolo Bypass can be a major source of phytoplankton biomass, supporting the aquatic food web in downstream reaches of the Delta (Lehman and others, 2008; Frantzich and others, 2018).

In fall 2012, an unusually large-magnitude flow pulse occurred in the Yolo Bypass (Bypass) and CSC which likely contributed to a rare fall phytoplankton bloom in the lower Sacramento River and western Delta (Frantzich and others, 2018). Observations of this natural flow event led to the development of a research program by the California Department of Water Resources (DWR) and other regional organizations to create yearly flow pulses in the summer or fall in the Yolo Bypass and to explore the subsequent effects on phytoplankton production and associated water quality. This research program was subsequently incorporated into the California Natural Resources Agency's Delta Smelt Resiliency Strategy (California Natural Resources Agency, 2016).

Pesticides, including herbicides, insecticides, and fungicides associated with agricultural and urban runoff, have been detected in the Yolo Bypass and CSC throughout the year, and the types and concentrations of these pesticides vary based largely on flow and the amounts and timing of their use in the surrounding watersheds (Smalling and others, 2005, 2007; Weston and others, 2014; Orlando and Drexler, 2017). Previous studies have shown that environmental concentrations of herbicides can inhibit phytoplankton growth (Peterson and others, 1994; Ricart and others, 2009). The herbicide diuron, when combined with other herbicides, has been shown to have additive toxic effects (Magnusson and others, 2010), and in mixtures with its degradates, diuron has been shown to act synergistically to inhibit phytoplankton growth (Gatidou and Thomaidis, 2007). Additionally, the rice herbicide propanil has been shown to negatively affect phytoplankton and zooplankton in mesocosm studies of the effect of spray drift (Perschbacher and Edziyie, 2017).

To better understand water quality in the Yolo Bypass and CSC, in relation to summer and fall augmented flows, the U.S. Geological Survey Pesticide Fate Research Group cooperated with the DWR and the State and Federal Contractors Water Agency on a study to assess the occurrence of current-use pesticides in the Bypass and CSC before, during, and after summer and fall pulse flows in 2016, 2017, and 2018.

Purpose and Scope

This report describes the methods and procedures used in collecting water samples and measuring dissolved pesticide concentrations in filtered water samples and associated suspended sediments collected from five sites in the Yolo Bypass and CSC during summer and fall 2016, 2017, and 2018. Results are presented for a suite of 175 current-use pesticides and pesticide degradates in surface water.

Study Area

Surface-water samples were collected at five sites from Knights Landing Ridge Cut (RCS) in the north and extending south within the Yolo Bypass on the Tule Canal (RD22) and Toe Drain (LIS), to the Cache Slough Complex (BL5 and RYI, fig. 1; table 1). Knights Landing Ridge Cut is a 10-kilometer long, man-made, leveed channel that connects the Colusa Basin Drain to the Yolo Bypass. The Yolo Bypass is a 60-kilometer long, 24,000-hectare, partially leveed basin constructed in the 1930s to divert Sacramento River flood flows away from the city of Sacramento and other low-lying communities. The Yolo Bypass conveys rainfall runoff, agricultural tailwater, bypass flood flows, municipal stormwater, and treated wastewater from multiple sources. Sacramento River flood flows typically enter the Bypass only during the winter and spring and did not occur during the study periods.

During low-flow periods, as occurred during this study, water drains north to south along the eastern edge of the Bypass through the Tule Canal and Toe Drain (fig. 1). Agricultural irrigation water, which eventually drains through the Bypass, has a variety of sources including the Sacramento River, Putah Creek, and pumped groundwater (Putah Creek not shown on map). This water enters the Bypass as tailwater, primarily through the Colusa Basin Drain and Knights Landing Ridge Cut, with additional tailwater coming directly from agriculture within the Bypass. Urban wastewater from the city of Woodland enters the Bypass just upstream from study site RD22, and wastewater from the city of Davis enters the Bypass through the Willow Slough Bypass approximately 10 kilometers upstream from study site LIS. At the southern end of the Yolo Bypass, the Toe Drain terminates in Prospect Slough and site BL5 is approximately 2 kilometers below this junction. The farthest downstream site (RYI) is in Cache Slough at the lower end of the CSC. During low-flow periods, tidal transport results in net upstream flow in the CSC and lower reaches of the Toe Drain with source water mainly from the Sacramento River (Morgan-King and Schoellhamer, 2013).

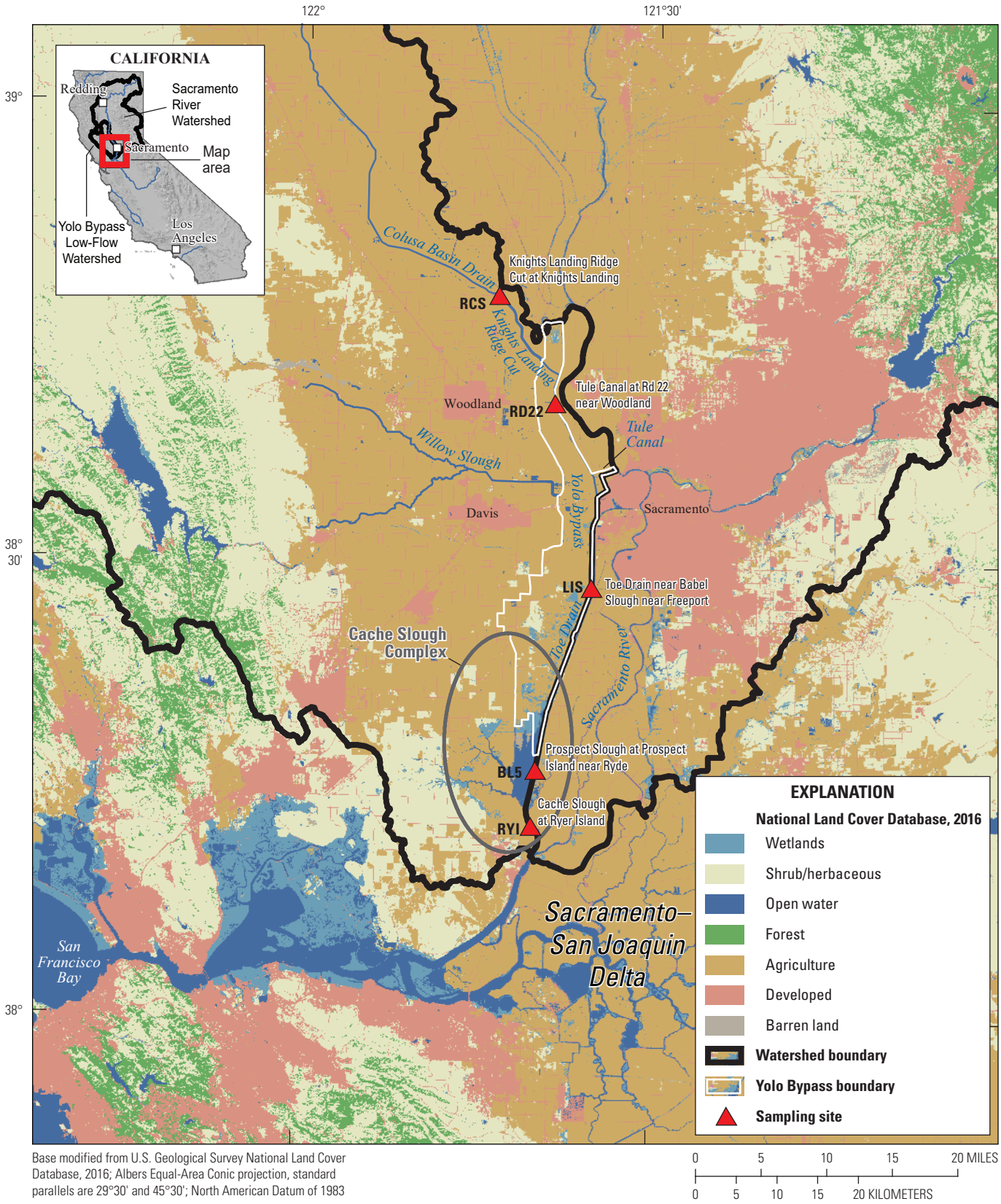

Figure 1. Locations of surface-water sampling sites in the Yolo Bypass and Cache Slough Complex, California.

Table 1. Surface-water sampling sites in the Yolo Bypass and Cache Slough Complex.

[DWR, California Department of Water Resources; USGS, U.S. Geological Survey; CA, California]

DWR site code	USGS station number	USGS station name	Latitude[1]	Longtitude[1]	Years sampled
RCS	384737121433201	Knights Landing Ridge Cut at Knights Landing CA	38.79353	–121.72544	2016, 2017, 2018
RD22	384035121383801	Tule Canal at Road 22 near Woodland CA	38.67636	–121.64397	2016, 2017, 2018
LIS	382829121351801	Toe Drain near Babel Slough near Freeport CA	38.47478	–121.58823	2016, 2017, 2018
BL5	381627121395101	Prospect Slough at Prospect Island near Ryde CA	38.27425	–121.66417	2016, 2017, 2018
RYI	11455350	Cache Slough at Ryer Island	38.21278	–121.66917	2017, 2018

[1]All locations reference the North American Datum 1983.

For the purposes of this report, watersheds that drain directly into the Yolo Bypass and CSC can collectively be described as the low-flow watershed (fig. 1). Water that is tidally pumped into the CSC under low-flow conditions can be a mixture of Sacramento River water and waters influenced by local within-Delta sources. Previous research by Frantzich and others (2018) suggests that during the low-flow periods, these waters likely influence the two southern-most sites (RYI and BL5) sampled during this study. As such, land and pesticide use practices in the entire Sacramento River watershed (fig. 1) can potentially influence pesticide occurrence in waters of the CSC and lower Yolo Bypass.

Land use within the Yolo Bypass low-flow watershed is predominantly agricultural in the lowlands within and adjacent to the Bypass and CSC, and a mixture of shrub and herbaceous grasslands and forest cover in upper reaches of the watershed (U.S. Geological Survey, 2018). Similarly, in the Sacramento River watershed, agricultural and urban land dominate in the lowlands whereas uplands are primarily forested (fig. 1). The primary crops grown in the Yolo Bypass low-flow and Sacramento River watersheds are rice, nuts (almonds, walnuts, pistachios), stone fruits (prunes, peaches, cherries), alfalfa and hay, sunflowers, grapes, olives, and tomatoes. (U.S. Department of Agriculture, 2019).

Pesticide Use

Agricultural and urban runoff enters the Yolo Bypass and CSC at various points (as well as from agricultural operations within the Bypass itself). These waters can contain mixtures of current-use pesticides and degradates in concentrations that vary depending (in large part) on spatial and temporal patterns of pesticide application and hydrologic conditions.

Since 1990, the California Department of Pesticide Regulation (CDPR) has required agricultural and professional urban pesticide applicators to provide detailed information on pesticide use. The CDPR system is the most comprehensive pesticide reporting system in the nation, and these data are extremely valuable in assessing the potential for environmental contamination. The CDPR reporting system, however, does not contain information on pesticide applications made by homeowners using products purchased at retail stores, which could contribute to total pesticide use in urban areas.

Applications of synthetic pesticides (excluding natural pesticides like sulfur, kaolin, mineral oil, and so on) in summer and fall 2016 totaled 862,846 kilograms (kg) in the Yolo Bypass low-flow watershed and 1,578,801 kg in the Sacramento River watershed (California Department of Pesticide Regulation, 2018). Tables 2 and 3 list the total pesticide applications of more than 1,000 kg by application site type and by pesticide for each watershed.

Pesticide applications to rice made up 54 and 42 percent of the total amount of pesticides applied in the Yolo Bypass low-flow and Sacramento River watersheds, respectively, in the 2016 tabulations. Other application site types with significant pesticide use (2 percent or greater of the total applications in the two watersheds) included several agricultural uses (walnuts, almonds, prunes, peaches, processing tomatoes, alfalfa, soil fumigation, uncultivated agriculture, outdoor transplants), urban uses (rights of way, landscape maintenance, public health), as well as timberland.

Applications of synthetic pesticides in summer and fall 2017 (the latest year for which data are available) totaled 815,035 kg in the Yolo Bypass low-flow watershed and 1,585,460 kg in the Sacramento River watershed (California Department of Pesticide Regulation, 2019). Tables 4 and 5 list the total pesticide applications of more than 1,000 kg by application site type and by pesticide for each watershed.

Pesticide applications to rice made up 50 and 30 percent of the total amount of pesticides applied in the Yolo Bypass low-flow and Sacramento River watersheds, respectively, in the 2017 tabulations. Pesticide applications to rice were lower in 2017 compared to 2016, and this decline was led by large reductions in the use of the herbicide propanil in both watersheds. The reduction in rice pesticide use was likely the result of a decline in planted rice acreage in California from 541,000 acres in 2016 to 445,000 acres in 2017 (U.S. Department of Agriculture, 2017, 2018).

Table 2. Synthetic pesticide applications in the Yolo Bypass low-flow watershed, of more than 1,000 kilograms, in summer and fall 2016.

[kg, kilogram; %, percent]

Application site	Application (kg)
Rice	466,804
Almond	144,608
Walnut	56,955
Uncultivated agriculture	35,152
Processing tomatoes	29,736
Rights of way	19,458
Alfalfa	18,830
Public health	9,432
Wine grapes	9,296
Pistachio	8,955
Cucumber	8,137
Landscape maintenance	7,106
Tomato	4,700
Structural pest control	3,626
Prune	3,525
Olive	3,076
Sunflower	2,467
Corn for forage	2,396
Cotton	2,334
Watermelon	2,286
Bean, dried	2,171
Wheat	1,915
Sudangrass	1,605
Forest, timberland	1,548
Water area	1,154
Corn for human consumption	1,120
Outdoor plants in containers	1,051
Uncultivated non-agriculture	1,014
Soil fumigation	1,002

Pesticide type		Primary application sites (in decreasing order, minimum 10% of total)
Propanil	406,989	Rice
Glyphosate, potassium salt	96,527	Almonds, walnuts, uncultivated agriculture
Glyphosate, isopropylamine salt	61,834	Almonds, uncultivated agriculture, rights of way, walnuts
Thiobencarb	33,809	Rice
Chlorothalonil	21,522	Processing tomatoes
Pendimethalin	19,391	Almonds, walnuts, alfalfa
Paraquat dichloride	18,905	Almonds, walnuts
Methyl bromide	16,685	Uncultivated agriculture, walnuts
Oxyfluorfen	14,683	Almonds, walnuts
Glufosinate-ammonium	14,430	Almonds, walnuts

Table 2. Synthetic pesticide applications in the Yolo Bypass low-flow watershed, of more than 1,000 kilograms, in summer and fall 2016.—Continued

[kg, kilogram; %, percent]

Pesticide type	Application (kg)	Primary application sites (in decreasing order, minimum 10% of total)
Triclopyr, triethylamine salt	14,372	Rice
1,3-Dichloropropene	11,840	Almonds, tomatoes
Azoxystrobin	9,834	Rice, processing tomatoes
Chlorpyrifos	7,862	Walnuts, almonds, alfalfa
Bifenazate	7,773	Almonds, walnuts
Endothall, dipotassium salt	6,980	Rights of way, landscape maintenance, water area
Bifenthrin	5,968	Almonds, processing tomatoes, walnuts
Naled	5,772	Public health
Methoxyfenozide	5,273	Almonds, rice
Ethephon	5,062	Walnuts, cotton
Oryzalin	5,043	Almonds
Mancozeb	4,445	Cucumbers, processing tomatoes
2,4-D, dimethylamine salt	3,548	Sudangrass, almonds, landscape maintenance
Pyraclostrobin	3,170	Processing tomatoes, almonds
Piperonyl butoxide	2,790	Public health
Glyphosate, dimethylamine salt	2,597	Timberland, rights of way
Methomyl	2,214	Corn for human consumption, watermelons, cucumbers, squash
Chlorantraniliprole	1,970	Almonds, sunflower, walnuts
Fluxapyroxad	1,665	Almonds, processing tomatoes
Cyhalofop butyl	1,634	Rice
Carbaryl	1,576	Olives, melons
Imidacloprid	1,575	Processing tomatoes, wine grapes, walnuts, structural pest control
Diuron	1,441	Alfalfa, rights of way, landscape maintenance, walnuts
Trifluralin	1,372	Wine grapes
Malathion	1,346	Walnuts, cucumbers, rice
Propiconazole	1,331	Almonds, walnuts
Flubendiamide	1,180	Alfalfa, processing tomatoes, sunflower, walnuts
Propargite	1,136	Almonds, corn for forage, wheat
Clethodim	1,040	Alfalfa, almonds
Hexythiazox	1,021	Almonds, walnuts
Indoxacarb	1,005	Alfalfa, processing tomatoes

Table 3. Synthetic pesticide applications in the Sacramento River watershed, of more than 1,000 kilograms, in summer and fall 2016.

[kg, kilogram; %, percent]

Application site	Application (kg)
Rice	659,001
Walnut	303,516
Almond	110,895
Prune	81,098
Timberland	68,419
Rights of way	50,974
Soil fumigation	48,464
Outdoor transplants	37,642
Landscape maintenance	34,352
Peach	32,434
Public health	25,610
Processing tomatoes	17,092
Wine grapes	13,943
Structural pest control	13,876
Commodity fumigation	9,224
Uncultivated agriculture	7,693
Outdoor plants in containers	7,306
Alfalfa	5,050
Dried beans	4,366
Pear	4,144
Olive	3,857
Corn for forage	3,249
Strawberry	3,183
Cotton	2,939
Water area	2,179
Sunflower	2,168
Uncultivated non-agriculture	2,006
Regulatory pest control	1,992
Pecan	1,875
Pistachio	1,860
Unspecified beans	1,419
Cucumber	1,403
Greenhouse flower	1,322
Corn, grain	1,306
Cherry	1,231
Wheat	1,160

Pesticide type		Primary application sites (in decreasing order, minimum 10% of total)
Propanil	585,328	Rice
1,3-Dichloropropene	242,572	Walnuts, prunes, peaches
Glyphosate, isopropylamine salt	135,870	Walnuts, almonds, rights of way

Table 3. Synthetic pesticide applications in the Sacramento River watershed, of more than 1,000 kilograms, in summer and fall 2016.—Continued

[kg, kilogram; %, percent]

Pesticide type	Application (kg)	Primary application sites (in decreasing order, minimum 10% of total)
Glyphosate, potassium salt	95,459	Walnuts, almonds
Methyl bromide	77,611	Outdoor transplants, soil fumigation, commodity fumigation
Paraquat dichloride	31,754	Almonds, walnuts
Thiobencarb	30,470	Rice
Chlorpyrifos	29,756	Walnuts
Glyphosate, dimethylamine salt	25,056	Timberland, rights of way
Triclopyr, triethylamine salt	24,115	Rice
Ethephon	19,793	Walnuts
Naled	17,871	Public health
Glufosinate-ammonium	17,374	Walnuts, almonds, wine grapes
Pendimethalin	17,120	Walnuts, almonds
Oxyfluorfen	13,893	Walnuts, almonds
Azoxystrobin	13,791	Rice
Chlorothalonil	13,564	Processing tomatoes, landscape maintenance
Oryzalin	13,282	Landscape maintenance, almonds, walnuts
Hexazinone	9,894	Timberland
Bifenthrin	7,392	Walnuts, structural pest control, almonds
Bifenazate	7,117	Walnuts, almonds
2,4-D, dimethylamine salt	6,818	Walnuts, almonds, rights of way
Permethrin	6,620	Structural pest control, walnuts
Metam-sodium	6,204	Rights of way
Imazapyr, isopropylamine salt	6,047	Timberland
Piperonyl butoxide	6,037	Public health, structural pest control
Imidacloprid	5,680	Wine grapes, regultory pest control, walnuts, structural pest control
Endothall, dipotassium salt	5,483	Rights of way
Methoxyfenozide	4,584	Almonds, rice, walnuts
Propiconazole	3,728	Walnuts, rice, purnes
Cyhalofop butyl	3,439	Rice
Carbaryl	3,063	Rice, pears, olives
Acetamiprid	2,943	Walnuts
Diuron	2,922	Rights of way, walnuts
Triclopyr, butoxyethyl ester	2,886	Rights of way, timberland, landscape maintenance
Chlorantraniliprole	2,871	Walnuts, almonds
Mancozeb	2,723	Processing tomatoes, cucumbers
Aminopyralid, triisopropanolamine salt	2,649	Timberland, rights of way
Glyphosate, monoammonium salt	2,359	Landscape maintenance
Propargite	2,286	Walnuts, corn for forage, almonds
Hexythiazox	2,193	Walnuts, corn for forage
Dimethoate	2,003	Dried beans, cotton, sorghum/milo
(S)-metolachlor	1,944	Unspecified beans, dried beans, processing tomatoes

Table 3. Synthetic pesticide applications in the Sacramento River watershed, of more than 1,000 kilograms, in summer and fall 2016.—Continued

[kg, kilogram; %, percent]

Pesticide type	Application (kg)	Primary application sites (in decreasing order, minimum 10% of total)
Pyraclostrobin	1,943	Walnuts, almonds
Malathion	1,904	Walnuts, wild rice, public health, cotton
Diazinon	1,884	Pears
Acephate	1,813	Dried beans, outdoor plants in containers
Diquat dibromide	1,743	Landscape maintenance, water area
Deltamethrin	1,725	Structural pest control
Boscalid	1,699	Walnuts
Dazomet	1,626	Soil fumigation/preplant
Trifluralin	1,575	Processing tomatoes
Lambda cyhalothrin	1,452	Structural pest control, rice
Tebuconazole	1,386	Walnuts, wine grapes, peaches
Etoxazole	1,322	Walnuts, almonds
Spirodiclofen	1,307	Walnuts
Sethoxydim	1,298	Almonds, walnuts
Bispyribac-sodium	1,293	Rice
Ethalfluralin	1,154	Unspecified beans, dried beans
Simazine	1,136	Walnuts, wine grapes
2,4-D, 2-ethylhexyl ester	1,054	Timberland, landscape maintenance, rights of way
Fipronil	1,047	Structural pest control
Avermectin	1,040	Walnuts, almonds

Pesticides, which were largely used on rice in either 2016 or 2017 and which were analyzed in this study, included azoxystrobin, carbaryl, clomazone, cyhalofop-butyl, methoxyfenozide, penoxsulam, propanil and its degradate 3,4-dichloroaniline (3,4-DCA), and thiobencarb (tables 2–5). The rice herbicide propanil was the most heavily applied pesticide in both watersheds in summer and fall 2016 and in the Yolo Bypass low-flow watershed in summer and fall 2017.

Pesticides largely used in urban settings and which were analyzed for in this study included carbendazim (a degradate of thiophanate-methyl and used in paints and coatings on building materials), deltamethrin, dichlorvos (a degradate of naled), diuron and its degradates N-3,4-dichlorophenyl-N-methyl-urea (DCPMU) and 3,4-dichlorophenylurea (DCPU), fipronil and its degradates desulfinylfipronil, desulfinylfipronil amide, fipronil sulfide, and fipronil sulfone, as well as lambda cyhalothrin, malathion, oryzalin, permethrin, and piperonyl butoxide.

Table 4. Synthetic pesticide applications in the Yolo Bypass low-flow watershed, of more than 1,000 kilograms, in summer and fall 2017.

[kg, kilogram; %, percent]

Application site	Application (kg)
Rice	405,823
Almond	150,149
Walnut	70,954
Uncultivated agriculture	38,328
Processing tomatoes	24,858
Rights of way	17,756
Alfalfa	16,462
Grape, wine	9,471
Public Health	8,950
Sunflower	7,203
Pistachio	5,830
Landscape maintenance	5,813
Tomato	5,610
Soil fumigation	5,603
Cucumber	4,739
Cotton	4,147
Water area	3,813
Olive	3,591
Prune	2,884
Corn for forage	2,706
Dried beans	2,426
Sudangrass	2,339
Corn, grain	1,826
Watermelon	1,514
Structural pest control	1,367
Uncultivated non-agriculture	1,167

Pesticide type		Primary application sites (in decreasing order, minimum 10% of total)
Propanil	335,032	Rice
Glyphosate, potassium salt	96,663	Almonds, walnuts, alfalfa
Glyphosate, isopropylamine salt	61,756	Almonds, walnuts, uncultivated agriculture, rights of way
Thiobencarb	45,562	Rice
Paraquat dichloride	23,689	Almonds, sunflowers, walnuts
Methyl bromide	21,632	Uncultivated agriculture, walnuts
Pendimethalin	19,972	Almonds, walnuts
Glufosinate-ammonium	19,095	Almonds, walnuts
Chlorothalonil	17,953	Processing tomatoes, tomatoes
Oxyfluorfen	14,192	Almonds, walnuts
Triclopyr, triethylamine salt	12,281	Rice
Azoxystrobin	10,053	Rice, processing tomatoes

Table 4. Synthetic pesticide applications in the Yolo Bypass low-flow watershed, of more than 1,000 kilograms, in summer and fall 2017.—Continued

[kg, kilogram; %, percent]

Pesticide type	Application (kg)	Primary application sites (in decreasing order, minimum 10% of total)
Ethephon	8,656	Walnuts, cotton, processing tomatoes
Chlorpyrifos	8,388	Walnuts, almonds
Bifenazate	7,855	Almonds, walnuts
1,3-Dichloropropene	7,800	Soil fumigation/preplant, uncultivated agriculture, walnuts
Endothall, dipotassium salt	7,360	Rights of way, water areas
Oryzalin	6,809	Almonds
Bifenthrin	6,712	Almonds, processing tomatoes, walnuts
Naled	5,674	Public health
Methoxyfenozide	4,604	Almonds, rice
Mancozeb	4,430	Cucumbers, walnuts
2,4-d, dimethylamine salt	4,311	Sudangrass, almonds, uncultivated agriculture
Pyraclostrobin	2,940	Processing tomatoes, almonds
Chlorantraniliprole	2,902	Almonds, walnuts, sunflowers
(S)-metolachlor	2,663	Processing tomatoes, dried beans, sunflowers, tomatoes
Spirodiclofen	2,212	Almonds, walnuts
Hexythiazox	2,174	Almonds, walnuts
Carbaryl	1,919	Olives
Fluxapyroxad	1,876	Almonds, processing tomatoes, walnuts
Malathion	1,732	Public health, rice
Ethalfluralin	1,675	Sunflowers, dried beans
Imidacloprid	1,498	Wine grapes, processing tomatoes, walnuts
Cyhalofop butyl	1,491	Rice
Lambda cyhalothrin	1,479	Almonds, rice, processing tomatoes, walnuts
Trifluralin	1,440	Sunflowers, processing tomatoes, tomatoes
Endothall, mono [n,n-dimethyl alkylamine] salt	1,331	Rights of way
Piperonyl butoxide	1,230	Public health
Clethodim	1,220	Alfalfa, almonds, processing tomatoes
Propiconazole	1,149	Walnuts, almonds, prunes
Propargite	1,126	Corn for forage, almonds, walnuts, uncultivated agriculture

Table 5. Synthetic pesticide applications in the Sacramento River watershed, of more than 1,000 kilograms, in summer and fall 2017.

[kg, kilogram; %, percent]

Application site	Application (kg)
Rice	474,136
Walnut	436,477
Soil Fumigation	163,293
Almond	112,600
Prune	71,985
Forest, timberland	52,358
Rights of way	47,674
Outdoor transplants	37,549
Landscape maintenance	28,923
Peach	25,163
Public health	22,526
Uncultivated agriculture	13,828
Processing tomatoes	10,890
Wine grapes	10,532
Structural pest control	9,631
Commodity fumigation	9,182
Corn for forage	5,373
Dried beans	4,411
Olive	4,336
Alfalfa	3,966
Sunflower	3,553
Pear	3,510
Pecan	3,086
Cotton	2,445
Pistachio	2,286
Water area	1,929
Uncultivated non-agriculture	1,769
Corn, grain	1,684
Outdoor plants in containers	1,584
Garbanzo bean	1,559
Cucumber	1,503
Turf/sod	1,109
Greenhouse flower	1,054
Cherry	1,045
Forage hay/silage	1,019

Pesticide type		Primary application sites (in decreasing order, minimum 10% of total)
1,3-Dichloropropene	437,864	Walnuts, soil fumigation, prunes
Propanil	398,916	Rice
Glyphosate, isopropylamine salt	122,753	Walnuts, almonds, rights of way, landscape maintenance
Glyphosate, potassium salt	102,613	Walnuts, almonds

Table 5. Synthetic pesticide applications in the Sacramento River watershed, of more than 1,000 kilograms, in summer and fall 2017.—Continued

[kg, kilogram; %, percent]

Pesticide type	Application (kg)	Primary application sites (in decreasing order, minimum 10% of total)
Methyl bromide	74,529	Soil fumigation, outdoor transplants, commodity fumigation
Thiobencarb	39,578	Rice
Paraquat dichloride	34,123	Almonds, walnuts
Glyphosate, dimethylamine salt	26,957	Timberland, rights of way
Ethephon	25,900	Walnuts
Chlorpyrifos	24,701	Walnuts
Pendimethalin	21,829	Walnuts, almonds, prunes
Glufosinate-ammonium	20,322	Walnuts, almonds, wine grapes
Naled	18,207	Public health
Triclopyr, triethylamine salt	18,036	Rice, rights of way
Oxyfluorfen	16,994	Walnuts, almonds
Bifenazate	16,473	Walnuts, almonds
Azoxystrobin	12,147	Rice, walnuts
Hexazinone	9,278	Timberland
Chlorothalonil	9,248	Processing tomatoes, landscape maintenance
Mancozeb	8,227	Walnuts
Bifenthrin	7,728	Walnuts, almonds, structural pest control
Endothall, dipotassium salt	7,708	Rights of way, landscape maintenance
2,4-D, dimethylamine salt	7,234	Walnuts, almonds, rights of way, prunes
Methoxyfenozide	6,874	Rice, walnuts, almonds
Chlorantraniliprole	5,170	Walnuts, almonds
Propiconazole	4,856	Walnuts, purnes
Imazapyr, isopropylamine salt	4,554	Timberland, rights of way
Permethrin	4,427	Walnuts, structural pest control
Hexythiazox	3,544	Walnuts, almonds
Cyhalofop butyl	3,495	Rice
Acetamiprid	3,050	Walnuts
Fipronil	2,961	Structural pest control
Carbaryl	2,865	Turf sod, timothy hay, forage hay, olives
Spirodiclofen	2,844	Walnuts, almonds
Oryzalin	2,671	Walnuts, rights of way, almonds, landscape maintenance
Imidacloprid	2,639	Walnuts, structural pest control
Triclopyr, butoxyethyl ester	2,563	Rights of way, landscape maintenance
Propargite	2,554	Corn for forage, walnuts
Trifluralin	2,208	Processing tomatoes, dried beans
(S)-metolachlor	2,128	Dried beans, processing tomatoes, unspecified beans, sunflowers
Pyraclostrobin	2,105	Walnuts, almonds
Piperonyl butoxide	2,075	Public health
Tebuconazole	1,983	Walnuts, wine grapes
Diazinon	1,917	Pears

Table 5. Synthetic pesticide applications in the Sacramento River watershed, of more than 1,000 kilograms, in summer and fall 2017.—Continued

[kg, kilogram; %, percent]

Pesticide type	Application (kg)	Primary application sites (in decreasing order, minimum 10% of total)
Lambda cyhalothrin	1,771	Walnuts, rice
Deltamethrin	1,768	Structural pest control
Ethalfluralin	1,672	Sunflowers, dried beans
Acephate	1,569	Dried beans
Diquat dibromide	1,517	Rights of way, landscape maintenance, water area, water (industrial)
Boscalid	1,293	Walnuts, wine grapes
Fluxapyroxad	1,284	Walnuts, almonds
Sethoxydim	1,257	Almonds, walnuts
Malathion	1,218	Public health, walnuts
Penoxsulam	1,213	Rice
Penthiopyrad	1,196	Walnuts, almonds, processing tomatoes
Fosetyl-al	1,188	Outdoor transplants, landscape maintenance
Dimethoate	1,125	Dried beans, sorghum/milo, cotton
Diuron	1,116	Rights of way, pears, walnuts, landscape maintenance
Fluopyram	1,045	Walnuts, wine grapes, almonds
Acrolein	1,032	Rights of way
Aminopyralid, triisopropanolamine salt	1,010	Rights of way, timberland

Hydrologic Conditions

As mentioned previously, this study sought to understand the occurrence of current-use pesticides in Yolo Bypass surface water associated with managed flow pulses. Flow pulses occurred during the last 2 weeks of July in 2016 and during a 4-week period beginning in late August in 2018 (late August through late September; fig. 2). Flows in the Toe Drain of the Yolo Bypass near Woodland (not shown on map) peaked at approximately 600 cubic feet per second during both events (U.S. Geological Survey, 2019). In 2016, augmented flows in the Toe Drain were the result of water transferred from the Sacramento River to the Bypass by local reclamation districts, whereas the flow pulse in 2018 was created using agricultural tailwater from the Colusa Basin Drain that was released into the Bypass (J. Frantzich, written commun., 2019). There was no managed flow pulse in the Bypass in 2017.

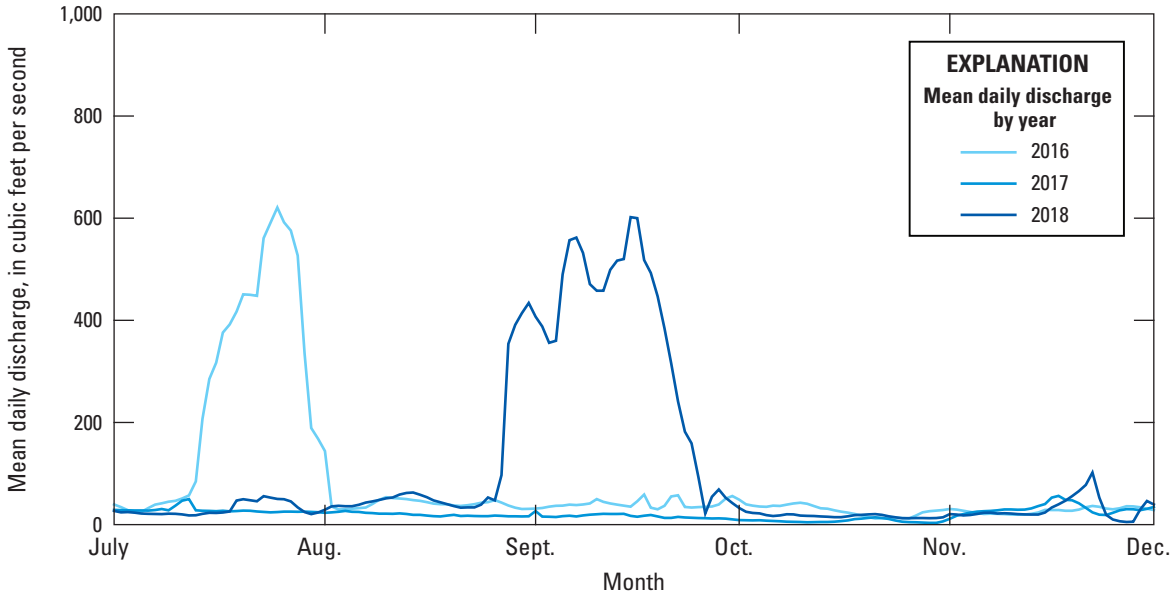

Figure 2. Mean daily discharge at U.S. Geological Survey site 11453000 Yolo Bypass near Woodland for summer and fall 2016, 2017, and 2018.

Procedures and Methods

Basic water-quality parameters (water temperature, specific conductance, pH, dissolved oxygen concentration, and turbidity) were measured at the time of sample collection (table 6). Water samples were transported to the U.S. Geological Survey (USGS) Organic Chemistry Research Laboratory (OCRL) in Sacramento, California, and were analyzed for a suite of 175 current-use pesticides using two methods: (1) gas chromatography with mass spectrometry (GC/MS) and (2) liquid chromatography with tandem mass spectrometry (LC/MS/MS; table 7). Suspended sediments filtered from the water samples were analyzed for 143 pesticides by GC/MS (table 7). Extensive quality-control sampling also was performed for each method, including field blanks, field replicates, and laboratory matrix-spike and matrix-spike-replicate samples.

Sample Collection

Surface-water samples were collected by DWR or USGS personnel at four sites in the Yolo Bypass and CSC during summer 2016 and at five sites in summer and fall 2017 and 2018 (table 1). At sites RCS, RD22 and LIS, samples were collected from the streambank by hand dipping or using a pole sampler to submerge 1-liter (L) amber glass bottles 0.5 m below the surface. At sites BL5 and RYI, samples were collected (by boat) from the center of the channel by hand dipping 1-L amber glass bottles 0.5 m below the surface. Samples were collected following guidance contained in a Quality Assurance Project Plan (QAPP) developed for the project (U.S. Geological Survey, written commun., 2016). After collection, samples were placed on ice and transported to the USGS OCRL for extraction and analysis.

Pesticide Extraction and Analysis

Extraction and analysis were performed in the laboratory within 24 hours of sample collection. Water samples were filtered through pre-weighed, baked 0.7-micrometer (µm) glass-fiber filters (Grade GF/F, Whatman, Piscataway, New Jersey) to remove suspended material. The filter papers containing the suspended sediments were dried at room temperature overnight (in the dark) and then stored in a freezer at –20 degrees Celsius (°C) until extraction.

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	06/23/2016	09:42	DWR	Pre-pulse	25.5	576	7.6	3.8	28.9
RD22	384035121383801	TULE CANAL A RD 22 NR WOOD-LAND CA	06/23/2016	11:05	DWR	Pre-pulse	24.8	812	8.1	4.1	71.0
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	06/23/2016	13:15	DWR	Pre-pulse	24.0	492	7.9	5.9	62.5
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	06/23/2016	12:30	DWR	Pre-pulse	21.6	165	8.4	8.7	60.3
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	07/19/2016	08:10	DWR	Pulse	24.4	557	7.7	4.2	31.8
RD22	384035121383801	TULE CANAL A RD 22 NR WOOD-LAND CA	07/19/2016	08:45	DWR	Pulse	23.8	579	7.9	4.4	68.9
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	07/19/2016	09:47	DWR	Pulse	23.1	637	8.1	6.0	36.6
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	07/19/2016	11:42	DWR	Pulse	20.9	195	8.1	9.0	54.9
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	07/28/2016	08:10	DWR	Pulse	26.6	540	7.6	3.5	26.7
RD22	384035121383801	TULE CANAL A RD 22 NR WOOD-LAND CA	07/28/2016	09:35	DWR	Pulse	26.3	542	7.8	3.6	39.1
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	07/28/2016	11:16	DWR	Pulse	26.3	488	7.8	4.4	35.3
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	07/28/2016	11:15	DWR	Pulse	25.4	343	8.2	8.7	32.1
RD22	384035121383801	TULE CANAL A RD 22 NR WOOD-LAND CA	08/02/2016	07:54	DWR	Post-pulse	24.3	701	7.5	5.0	52.3
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/02/2016	09:15	DWR	Post-pulse	22.9	438	7.7	5.6	39.4

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/02/2016	10:45	DWR	Post-pulse	21.6	235	8.7	8.3	34.0
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	08/09/2016	08:54	DWR	Post-pulse	23.2	826	7.6	4.3	47.0
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/09/2016	11:09	DWR	Post-pulse	23.6	552	8.3	7.7	33.2
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/09/2016	10:15	DWR	Post-pulse	21.1	158	7.6	8.5	12.7
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	06/29/2017	09:20	DWR	Ambient	24.6	798	7.8	4.1	37.4
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	06/28/2017	09:25	DWR	Ambient	23.0	647	7.8	5.2	61.8
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	06/28/2017	12:14	DWR	Ambient	21.1	195	8.1	8.2	19.0
RYI	11455350	CACHE SLOUGH A RYER ISLAND	06/28/2017	13:30	DWR	Ambient	21.8	148	7.8	8.1	8.6
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	07/13/2017	08:19	DWR	Ambient	26.9	655	7.8	3.5	43.8
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	07/13/2017	09:33	DWR	Ambient	25.3	827	7.4	5.7	52.4
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	07/13/2017	11:35	DWR	Ambient	24.3	644	8.1	5.2	62.9
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	07/13/2017	12:00	DWR	Ambient	22.8	184	7.9	8.1	4.7
RYI	11455350	CACHE SLOUGH A RYER ISLAND	07/13/2017	10:59	DWR	Ambient	23.3	139	7.5	7.8	5.2
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	07/27/2017	08:46	DWR	Ambient	26.4	623	7.8	4.1	49.7
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	07/27/2017	10:16	DWR	Ambient	25.0	700	7.9	6.3	55.2

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	07/27/2017	12:45	DWR	Ambient	25.4	407	7.9	5.4	63.7
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	07/27/2017	11:44	DWR	Ambient	22.6	158	8.1	8.3	4.7
RYI	11455350	CACHE SLOUGH A RYER ISLAND	07/27/2017	11:00	DWR	Ambient	22.9	128	7.8	8.0	10.4
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	08/10/2017	08:20	DWR	Ambient	25.2	558	7.8	4.8	36.5
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	08/10/2017	09:40	DWR	Ambient	24.0	642	8.0	6.9	40.8
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/10/2017	11:49	DWR	Ambient	23.9	303	8.1	6.9	57.7
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/10/2017	11:20	DWR	Ambient	21.3	159	8.1	8.4	15.9
RYI	11455350	CACHE SLOUGH A RYER ISLAND	08/10/2017	10:34	DWR	Ambient	21.7	131	7.6	8.3	4.8
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	08/31/2017	08:20	DWR	Ambient	24.2	507	7.7	4.8	28.5
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	08/31/2017	09:54	DWR	Ambient	24.0	646	7.7	4.7	29.0
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/30/2017	10:21	DWR	Ambient	24.7	329	8.1	6.7	54.2
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/30/2017	12:41	DWR	Ambient	23.1	153	8.4	7.8	4.0
RYI	11455350	CACHE SLOUGH A RYER ISLAND	08/30/2017	13:47	DWR	Ambient	23.1	153	8.4	7.8	4.0
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	09/13/2017	08:34	DWR	Ambient	24.0	531	7.6	5.3	25.4
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	09/13/2017	10:13	DWR	Ambient	24.3	708	8.0	4.7	28.8

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	09/13/2017	13:15	DWR	Ambient	25.1	688	8.3	6.1	30.2
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	09/13/2017	12:10	DWR	Ambient	22.4	159	7.9	8.0	4.0
RYI	11455350	CACHE SLOUGH A RYER ISLAND	09/13/2017	13:15	DWR	Ambient	21.5	145	7.6	8.2	0.2
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	09/20/2017	12:00	USGS	Ambient	21.9	556	7.9	6.9	—
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	09/20/2017	12:50	USGS	Ambient	21.5	647	7.5	5.0	—
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	09/20/2017	14:30	USGS	Ambient	21.7	648	8.1	6.9	—
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	09/20/2017	13:12	USGS	Ambient	19.8	157	7.9	8.6	—
RYI	11455350	CACHE SLOUGH A RYER ISLAND	09/20/2017	12:40	USGS	Ambient	19.6	135	7.3	—	—
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	10/04/2017	13:10	USGS	Ambient	20.1	586	7.6	5.8	—
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	10/04/2017	13:50	USGS	Ambient	17.6	686	7.6	5.8	—
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	10/04/2017	15:20	USGS	Ambient	19.0	196	7.8	7.6	—
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	10/04/2017	13:25	USGS	Ambient	17.3	129	7.7	8.5	4.0
RYI	11455350	CACHE SLOUGH A RYER ISLAND	10/04/2017	13:00	USGS	Ambient	17.3	124	7.4	8.4	2.6
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	10/18/2017	12:45	USGS	Ambient	18.3	640	7.7	6.9	—
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	10/18/2017	13:20	USGS	Ambient	18.8	876	7.7	8.2	—

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	10/18/2017	14:55	USGS	Ambient	16.4	187	7.8	7.5	—
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	10/18/2017	11:00	USGS	Ambient	15.9	131	7.8	8.9	—
RYI	11455350	CACHE SLOUGH A RYER ISLAND	10/18/2017	10:30	USGS	Ambient	15.8	132	6.7	8.6	—
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	11/01/2017	10:10	USGS	Ambient	16.5	556	7.6	6.3	—
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	11/01/2017	10:45	USGS	Ambient	16.7	760	7.6	5.6	—
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	11/01/2017	12:40	USGS	Ambient	17.6	211	7.9	8.2	—
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	11/01/2017	10:40	USGS	Ambient	16.0	135	7.3	9.3	153.8
RYI	11455350	CACHE SLOUGH A RYER ISLAND	11/01/2017	10:10	USGS	Ambient	16.6	123	6.5	8.7	152.8
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	07/10/2018	09:45	DWR	Pre-pulse	25.9	990	7.8	2.8	37.2
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	07/10/2018	11:02	DWR	Pre-pulse	25.0	904	7.9	5.0	37.7
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	07/11/2018	11:11	DWR	Pre-pulse	25.1	242	7.8	6.8	32.2
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	07/11/2018	12:09	DWR	Pre-pulse	21.9	170	8.8	8.0	8.3
RYI	11455350	CACHE SLOUGH A RYER ISLAND	07/11/2018	13:12	DWR	Pre-pulse	22.4	139	7.7	7.9	4.5
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	07/26/2018	09:13	DWR	Pre-pulse	27.9	633	7.5	3.2	26.4
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	07/26/2018	11:09	DWR	Pre-pulse	25.8	701	7.8	6.8	16.6
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	07/26/2018	13:11	DWR	Pre-pulse	26.6	224	8.1	7.5	33.7

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	07/26/2018	12:45	DWR	Pre-pulse	22.8	166	8.5	8.3	9.8
RYI	11455350	CACHE SLOUGH A RYER ISLAND	07/26/2018	11:30	DWR	Pre-pulse	22.5	141	7.5	8.1	5.0
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	08/07/2018	09:15	DWR	Pre-pulse	22.9	532	7.6	4.6	38.9
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	08/07/2018	10:50	DWR	Pre-pulse	23.6	852	7.8	5.7	16.5
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/08/2018	12:11	DWR	Pre-pulse	23.4	244	8.0	7.1	31.3
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/08/2018	13:08	DWR	Pre-pulse	21.0	163	8.0	7.5	8.5
RYI	11455350	CACHE SLOUGH A RYER ISLAND	08/08/2018	11:43	DWR	Pre-pulse	21.1	152	7.7	8.2	3.0
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	08/21/2018	09:43	DWR	Pre-pulse	22.9	563	7.6	5.6	18.0
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	08/21/2018	12:19	DWR	Pre-pulse	23.0	873	7.8	7.1	17.2
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/21/2018	09:08	DWR	Pre-pulse	21.5	275	8.0	7.3	30.4
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/22/2018	12:50	DWR	Pre-pulse	19.8	177	8.0	7.9	8.9
RYI	11455350	CACHE SLOUGH A RYER ISLAND	08/22/2018	11:20	DWR	Pre-pulse	21.0	161	7.8	8.3	3.5
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	08/30/2018	10:01	DWR	Pulse	20.9	507	7.6	5.8	19.8
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	08/30/2018	11:35	DWR	Pulse	21.0	528	7.5	4.5	18.6
LIS	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	08/30/2018	14:05	DWR	Pulse	22.0	572	7.5	4.1	12.7

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
BL5	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	08/30/2018	12:28	DWR	Pulse	19.8	182	8.1	8.4	9.5
RYI	11455350	CACHE SLOUGH A RYER ISLAND	08/30/2018	10:55	DWR	Pulse	20.1	173	7.8	8.6	2.4
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	09/04/2018	13:10	DWR	Pulse	22.2	522	7.7	5.5	16.9
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	09/04/2018	14:54	DWR	Pulse	22.6	531	7.6	5.3	17.9
LIS	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	09/04/2018	09:26	DWR	Pulse	21.8	546	7.5	4.4	16.0
BL5	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	09/05/2018	12:20	DWR	Pulse	20.4	221	8.5	8.3	7.9
RYI	11455350	CACHE SLOUGH A RYER ISLAND	09/05/2018	13:15	DWR	Pulse	21.2	177	7.8	8.2	3.1
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	09/18/2018	09:25	DWR	Pulse	19.9	584	7.7	6.1	17.7
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	09/18/2018	10:51	DWR	Pulse	19.4	583	7.7	5.7	16.1
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	09/19/2018	10:00	DWR	Pulse	20.0	594	7.5	5.4	18.3
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	09/19/2018	12:49	DWR	Pulse	19.2	296	8.7	—	9.2
RYI	11455350	CACHE SLOUGH A RYER ISLAND	09/19/2018	10:19	DWR	Pulse	19.3	197	8.1	—	6.9
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	10/09/2018	09:34	DWR	Post-pulse	19.3	632	7.7	4.4	21.3
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	10/09/2018	11:30	DWR	Post-pulse	19.0	919	7.8	6.4	20.1
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	10/10/2018	08:45	DWR	Post-pulse	18.4	294	8.1	7.4	32.3

Table 6. Water-quality parameters measured in water samples collected at surface-water sites in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, miligrams/liter; NTU, nephelometric turbidity units; —, not recorded]

DWR site code	USGS station number	USGS station name	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sampling agency	Hydrologic condition	Water temperature (°C) [00010]	Specific conductance (µS/cm) [00095]	pH [00400]	Dissolved oxygen (mg/L) [00300]	Turbidity (NTU) [63675]
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	10/10/2018	12:28	DWR	Post-pulse	18.1	192	8.4	8.7	5.6
RYI	11455350	CACHE SLOUGH A RYER ISLAND	10/10/2018	13:38	DWR	Post-pulse	18.3	162	7.7	8.2	3.1
RCS	384737121433201	KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA	10/25/2018	08:07	DWR	Post-pulse	15.7	641	7.9	6.0	24.2
RD22	384035121383801	TULE CANAL A RD 22 NR WOODLAND CA	10/25/2018	09:43	DWR	Post-pulse	16.0	820	7.6	5.7	23.0
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	10/25/2018	13:28	DWR	Post-pulse	18.1	277	7.7	5.4	46.7
BL5	381627121395101	PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA	10/25/2018	11:21	DWR	Post-pulse	16.4	182	8.7	9.5	4.5
RYI	11455350	CACHE SLOUGH A RYER ISLAND	10/25/2018	12:26	DWR	Post-pulse	16.7	162	7.9	8.9	3.7
LIS	382829121351801	TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA	11/08/2018	12:27	DWR	Post-pulse	14.2	333	8.0	8.2	41.2

Table 7. Analytical methods and method detection limits for pesticides dissolved in surface water and on suspended sediments measured at the U.S. Geological Survey Organic Chemistry Research Laboratory.

[NWIS, National Water Information System; ng/L, nanograms per liter; LC/MS/MS, liquid chromatography with tandem mass spectrometry; GC/MS, gas chromatograph with mass spectrometry]

Compound	NWIS parameter code	Chemical class	Pesticide type	Method detection limit (ng/L)	Analytical method
Acetamiprid	68302	Neonicotinoid	Insecticide	3.3	LC/MS/MS
Acetochlor	68520	Chloroacetanilide	Herbicide	1.5	GC/MS
Acibenzolar-S-methyl	51849	Benzothiadiazole	Fungicide	3.0	GC/MS
Alachlor	65064	Chloroacetanilide	Herbicide	1.7	GC/MS
Allethrin	66586	Pyrethroid	Insecticide	1.0	GC/MS
Atrazine	65065	Triazine	Herbicide	2.3	GC/MS
Azinphos-methyl	65066	Organophosphorus	Insecticide	9.4	GC/MS
Azinphos-methyl oxon	68211	Organophosphorus	Breakdown product	9.4	GC/MS
Azoxystrobin	66589	Strobin	Fungicide	3.1	GC/MS
Benefin (benfluralin)	51643	2,6-Dinitroaniline	Herbicide	2.0	GC/MS
Benzovindiflupyr	52652	Amide	Fungicide	3.4	GC/MS
Bifenthrin	65067	Pyrethroid	Insecticide	0.7	GC/MS
Boscalid	67550	Anilide	Fungicide	2.8	GC/MS
Bromuconazole	68315	Azole	Fungicide	3.2	GC/MS
Butralin	68545	2,6-Dinitroaniline	Herbicide	2.6	GC/MS
Butylate	65068	Thiocarbamate	Herbicide	1.8	GC/MS
Captan	68322	Thiophthalimide	Fungicide	10.2	GC/MS
Carbaryl	65069	N-methyl carbamate	Insecticide	6.5	GC/MS
Carbendazim	68548	Benzimidazole	Fungicide	4.2	LC/MS/MS
Carbofuran	65070	N-methyl carbamate	Insecticide	3.1	GC/MS
Carboxin	52765	Anilide	Fungicide	4.5	LC/MS/MS
Chlorantraniliprole	51856	Anthranilic diamide	Insecticide	4.0	LC/MS/MS
Chlorfenapyr	53567	Pyrrole	Insecticide	3.3	GC/MS
Chlorothalonil	65071	Substituted benzene	Fungicide	4.1	GC/MS
Chlorpyrifos	65072	Organophosphorus	Insecticide	2.1	GC/MS
Chlorpyrifos oxon	68216	Organophosphorus	Insecticide	5.0	GC/MS
Clomazone	67562	Oxazolidinone	Herbicide	2.5	GC/MS
Clothianidin	68221	Neonicotinoid	Insecticide	3.9	LC/MS/MS
Coumaphos	51836	Organophosphorus	Insecticide	3.1	GC/MS
Cyantraniliprole	51862	Anthranilic diamide	Insecticide	4.2	LC/MS/MS
Cyazofamid	51853	Azole	Fungicide	4.1	LC/MS/MS
Cycloate	65073	Thiocarbamate	Herbicide	1.1	GC/MS
Cyfluthrin	65074	Pyrethroid	Insecticide	1.0	GC/MS
Cyhalofop-butyl	68360	Aryloxyphenoxy propionic acid	Herbicide	1.9	GC/MS
Cyhalothrin (all isomers)	68354	Pyrethroid	Insecticide	0.5	GC/MS
Cymoxanil	51861	Urea	Fungicide	3.9	LC/MS/MS
Cypermethrin	65075	Pyrethroid	Insecticide	1.0	GC/MS
Cyproconazole	66593	Azole	Fungicide	4.7	GC/MS
Cyprodinil	67574	Pyrimidine	Fungicide	7.4	GC/MS
DCPA	65076	Alkyl phthalate	Herbicide	2.0	GC/MS

Table 7. Analytical methods and method detection limits for pesticides dissolved in surface water and on suspended sediments measured at the U.S. Geological Survey Organic Chemistry Research Laboratory.—Continued

[NWIS, National Water Information System; ng/L, nanograms per liter; LC/MS/MS, liquid chromatography with tandem mass spectrometry; GC/MS, gas chromatograph with mass spectrometry]

Compound	NWIS parameter code	Chemical class	Pesticide type	Method detection limit (ng/L)	Analytical method
DCPMU	68231	Urea	Herbicide degradate	3.5	LC/MS/MS
DCPU	68226	Urea	Herbicide degradate	3.4	LC/MS/MS
Deltamethrin	65077	Pyrethroid	Insecticide	0.6	GC/MS
Desthio-prothioconazole	51865	Azole	Fungicide degradate	3.0	LC/MS/MS
Desulfinylfipronil	66607	Pyrazole	Insecticide degradate	1.6	GC/MS
Desulfinylfipronil amide	68570	Pyrazole	Insecticide degradate	3.2	GC/MS
Diazinon	65078	Organophosphorus	Insecticide	0.9	GC/MS
Diazoxon	68236	Organophosphorus	Insecticide degradate	5.0	GC/MS
3,4-Dichloroaniline	66584	Amine	Herbicide degradate	3.2	LC/MS/MS
3,5-Dichloroaniline	67536	Amine	Herbicide degradate	7.6	GC/MS
Dichlorvos	68572	Organophosphorus	Insecticide	5.1	GC/MS
Difenoconazole	67582	Azole	Fungicide	10.5	GC/MS
Dimethomorph	68373	Morpholine	Fungicide	6.0	GC/MS
Dinotefuran	68379	Neonicotinoid	Insecticide	4.5	LC/MS/MS
Dithiopyr	51837	Pyridinecarboxylic acid	Herbicide	1.6	GC/MS
Diuron	66598	Urea	Herbicide	3.2	LC/MS/MS
EPTC	65080	Thiocarbamate	Herbicide	1.5	GC/MS
Esfenvalerate	65081	Pyrethroid	Insecticide	0.5	GC/MS
Ethaboxam	51855	Aromatic amide	Fungicide	3.8	LC/MS/MS
Ethalfluralin	65082	2,6-Dinitroaniline	Herbicide	3.0	GC/MS
Etofenprox	67604	Pyrethroid ether	Insecticide	2.2	GC/MS
Etoxazole	68598	Diphenyl oxazoline	Insecticide	4.2	GC/MS
Famoxadone	67609	Oxazolidinedione	Fungicide	2.5	GC/MS
Fenamidone	51848	Imidazole	Fungicide	5.1	GC/MS
Fenarimol	67613	Pyrimidine	Fungicide	6.5	GC/MS
Fenbuconazole	67618	Azole	Fungicide	5.2	GC/MS
Fenhexamid	67622	Anilide	Fungicide	7.6	GC/MS
Fenpropathrin	65083	Pyrethroid	Insecticide	0.6	GC/MS
Fenpyroximate	51838	Pyrazole	Insecticide	5.2	GC/MS
Fenthion	51839	Organophosphorus	Insecticide	5.5	GC/MS
Fipronil	66604	Pyrazole	Insecticide	2.9	GC/MS
Fipronil sulfide	66610	Pyrazole	Insecticide degradate	1.8	GC/MS
Fipronil sulfone	66613	Pyrazole	Insecticide degradate	3.5	GC/MS
Flonicamid	51858	Pyridinecarboxamide	Insecticide	3.4	LC/MS/MS
Fluazinam	67636	2,6-Dinitroaniline	Fungicide	4.4	GC/MS
Flubendiamide	68606	Organofluorine	Insecticide	6.2	GC/MS
Fludioxonil	67640	Benzodioxole	Fungicide	7.3	GC/MS
Flufenacet	51840	Anilide	Herbicide	4.7	GC/MS
Flumetralin	51841	2,6-Dinitroaniline	Plant growth regulator	5.8	GC/MS
Fluopicolide	51852	Benzamide pyridine	Fungicide	3.9	GC/MS

Table 7. Analytical methods and method detection limits for pesticides dissolved in surface water and on suspended sediments measured at the U.S. Geological Survey Organic Chemistry Research Laboratory.—Continued

[NWIS, National Water Information System; ng/L, nanograms per liter; LC/MS/MS, liquid chromatography with tandem mass spectrometry; GC/MS, gas chromatograph with mass spectrometry]

Compound	NWIS parameter code	Chemical class	Pesticide type	Method detection limit (ng/L)	Analytical method
Fluopyram	52761	Amide	Fungicide	3.8	GC/MS
Fluoxastrobin	67645	Strobin	Fungicide	9.5	GC/MS
Flupyradifurone	52764	Butenolides	Insecticide	3.0	LC/MS/MS
Fluridone	51864	Phenylpyridine	Herbicide	3.7	LC/MS/MS
Flusilazole	67649	Azole	Fungicide	4.5	GC/MS
Flutolanil	51842	Anilide	Fungicide	4.4	GC/MS
Flutriafol	67653	Azole	Fungicide	4.2	GC/MS
Fluxapyroxad	51851	Anilide, pyrazole	Fungicide	4.8	GC/MS
Hexazinone	65085	Triazinone	Herbicide	8.4	GC/MS
Imazalil	67662	Azole	Fungicide	10.5	GC/MS
Imidacloprid	68426	Neonicotinoid	Insecticide	3.8	LC/MS/MS
Imidacloprid urea	51859	Neonicotinoid	Insecticide degradate	4.0	LC/MS/MS
Indaziflam	53960	Alkylazine	Herbicide	2.1	GC/MS
Indoxacarb	68627	Oxadiazine	Insecticide	4.9	GC/MS
Ipconazole	52762	Triazole	Fungicide	7.8	GC/MS
Iprodione	66617	Dicarboximide	Fungicide	4.4	GC/MS
Isofetamid	53569	Amide	Fungicide	2.0	GC/MS
Kresoxim-methyl	67670	Strobin	Fungicide	4.0	GC/MS
Malaoxon	68240	Organophosphorus	Insecticide degradate	5.0	GC/MS
Malathion	65087	Organophosphorus	Insecticide	3.7	GC/MS
Mandipropamid	51854	Amide	Fungicide	3.3	LC/MS/MS
Metalaxyl	68437	Xylylalanine	Fungicide	5.1	GC/MS
Metconazole	66620	Azole	Fungicide	5.2	GC/MS
Methidathion	65088	Organophosphorus	Insecticide	7.2	GC/MS
Methoprene	66623	Juvenile hormone mimic	Insect growth regulator	6.4	GC/MS
Methoxyfenozide	68647	Diacylhydrazine	Insecticide	2.7	LC/MS/MS
Methyl parathion	65089	Organophosphorus	Insecticide	3.4	GC/MS
Metolachlor	65090	Chloroacetanilide	Herbicide	1.5	GC/MS
Molinate	65091	Thiocarbamate	Herbicide	3.2	GC/MS
Myclobutanil	66632	Azole	Fungicide	6.0	GC/MS
Napropamide	65092	Amide	Herbicide	8.2	GC/MS
Novaluron	68655	Benzoylurea	Herbicide	2.9	GC/MS
Oryzalin	68663	2,6-Dinitroaniline	Herbicide	5.0	LC/MS/MS
Oxadiazon	51843	Unclassified	Herbicide	2.1	GC/MS
Oxathiapiprolin	52766	Pyrazole	Fungicide	3.2	LC/MS/MS
Oxyfluorfen	65093	Diphenyl ether	Herbicide	3.1	GC/MS
p,p'-DDD	65094	Organochlorine	Insecticide degradate	4.1	GC/MS
p,p'-DDE	65095	Organochlorine	Insecticide degradate	3.6	GC/MS
p,p'-DDT	65096	Organochlorine	Insecticide	4.0	GC/MS
Paclobutrazol	51846	Azole	Plant growth regulator	6.2	GC/MS

Table 7. Analytical methods and method detection limits for pesticides dissolved in surface water and on suspended sediments measured at the U.S. Geological Survey Organic Chemistry Research Laboratory.—Continued

[NWIS, National Water Information System; ng/L, nanograms per liter; LC/MS/MS, liquid chromatography with tandem mass spectrometry; GC/MS, gas chromatograph with mass spectrometry]

Compound	NWIS parameter code	Chemical class	Pesticide type	Method detection limit (ng/L)	Analytical method
Pebulate	65097	Thiocarbamate	Herbicide	2.3	GC/MS
Pendimethalin	65098	2,6-Dinitroaniline	Herbicide	2.3	GC/MS
Penoxsulam	51863	Triazolopyrimidine	Herbicide	3.5	LC/MS/MS
Pentachloroanisole	66637	Organochlorine	Insecticide degradate	4.7	GC/MS
Pentachloronitrobenzene	66639	Substituted benzene	Fungicide	3.1	GC/MS
Penthiopyrad	52769	Pyrazole	Fungicide	3.2	LC/MS/MS
Permethrin	65099	Pyrethroid	Insecticide	0.6	GC/MS
Phenothrin	65100	Pyrethroid	Insecticide	1.0	GC/MS
Phosmet	65101	Organophosphorus	Insecticide	4.4	GC/MS
Picoxystrobin	51850	Strobin	Fungicide	4.2	GC/MS
Piperonyl butoxide	65102	Unclassified	Synergist	2.3	GC/MS
Prodiamine	51844	2,6-Dinitroaniline	Herbicide	5.2	GC/MS
Prometon	67702	Triazine	Herbicide	2.5	GC/MS
Prometryn	65103	Triazine	Herbicide	1.8	GC/MS
Propanil	66641	Anilide	Herbicide	10.1	GC/MS
Propargite	68677	Unclassified	Insecticide	6.1	GC/MS
Propiconazole	66643	Azole	Fungicide	5.0	GC/MS
Propyzamide	67706	Amide	Herbicide	5.0	GC/MS
Pyraclostrobin	66646	Strobin	Fungicide	2.9	GC/MS
Pyridaben	68682	Pyridazinone	Insecticide	5.4	GC/MS
Pyrimethanil	67717	Pyrimidine	Fungicide	4.1	GC/MS
Pyriproxyfen	68683	Hormone mimic	Insecticide	5.2	GC/MS
Quinoxyfen	51847	Quinoline	Fungicide	3.3	GC/MS
Resmethrin	65104	Pyrethroid	Insecticide	1.0	GC/MS
Sedaxane	52648	Anilide, pyrazole	Fungicide	5.2	GC/MS
Simazine	65105	Triazine	Herbicide	5.0	GC/MS
Sulfoxaflor	52767	Sulfoximine	Insecticide	4.4	LC/MS/MS
tau-Fluvalinate	65106	Pyrethroid	Insecticide	0.7	GC/MS
Tebuconazole	66649	Azole	Fungicide	3.7	GC/MS
Tebufenozide	68692	Moulting hormone agonist	Insecticide	3.0	LC/MS/MS
Tebupirimfos	68693	Organophosphorus	Insecticide	1.9	GC/MS
Tebupirimfos oxon	68694	Organophosphorus	Insecticide degradate	2.8	GC/MS
Tefluthrin	67731	Pyrethroid	Insecticide	0.6	GC/MS
Tetraconazole	66654	Azole	Fungicide	5.6	GC/MS
Tetradifon	51651	Unclassified	Insecticide	3.8	GC/MS
Tetramethrin	66657	Pyrethroid	Insecticide	0.5	GC/MS
Thiabendazole	67161	Benzimidazole	Fungicide	3.6	LC/MS/MS
Thiacloprid	68485	Neonicotinoid	Insecticide	3.2	LC/MS/MS
Thiamethoxam	68245	Neonicotinoid	Insecticide	3.4	LC/MS/MS
Thiamethoxam degradate (NOA-355190)	53568	Neonicotinoid	Insecticide degradate	3.5	LC/MS/MS

Table 7. Analytical methods and method detection limits for pesticides dissolved in surface water and on suspended sediments measured at the U.S. Geological Survey Organic Chemistry Research Laboratory.—Continued

[NWIS, National Water Information System; ng/L, nanograms per liter; LC/MS/MS, liquid chromatography with tandem mass spectrometry; GC/MS, gas chromatograph with mass spectrometry]

Compound	NWIS parameter code	Chemical class	Pesticide type	Method detection limit (ng/L)	Analytical method
Thiamethoxam degradate (NOA-407475)	53576	Neonicotinoid	Insecticide degradate	3.4	LC/MS/MS
Thiazopyr	51845	Pyridinecarboxylic acid	Herbicide	4.1	GC/MS
Thiobencarb	65107	Thiocarbamate	Herbicide	1.9	GC/MS
Tolfenpyrad	51866	Pyrazole	Insecticide	2.9	LC/MS/MS
Triadimefon	67741	Azole	Fungicide	8.9	GC/MS
Triadimenol	67746	Azole	Fungicide	8.0	GC/MS
Triallate	68710	Thiocarbamate	Herbicide	2.4	GC/MS
Tribufos	68711	Organophosphorus	Defoliant	3.1	GC/MS
Tricyclazole	52768	Azole	Fungicide	4.1	LC/MS/MS
Trifloxystrobin	66660	Strobin	Fungicide	4.7	GC/MS
Triflumizole	67753	Azole	Fungicide	6.1	GC/MS
Trifluralin	65108	2,6-Dinitroaniline	Herbicide	2.1	GC/MS
Triticonazole	67758	Azole	Fungicide	6.9	GC/MS
Zoxamide	67768	Amide	Fungicide	3.5	GC/MS

Sample Extraction

The full extraction procedure and instrumental analysis by LC/MS/MS is described in Hladik and Calhoun (2012). Filtered water samples were spiked with the recovery surrogate standards monuron (Chem Service, West Chester, Pennsylvania) and imidacloprid-d_4 (Cambridge Isotope Laboratories, Andover, Massachusetts). Each sample was then passed through an Oasis Hydrophilic Lipophilic Balance (HLB) solid-phase extraction (SPE; 6 milliliters [mL], 500 milligrams [mg]; Waters, Milford, Massachusetts) cartridge that had been cleaned with one column volume of dichloromethane (DCM), followed by one column volume of acetone and two column volumes of deionized water. During this process, the water samples were pumped through the SPE cartridge at a flow rate of 10 milliliters per minute (mL/min); the cartridge was then dried under nitrogen gas until the SPE sorbent was dry. The analytes were eluted with 10 mL of 50:50 DCM:acetone, and the eluent was then evaporated to less than 0.5 mL using a gentle stream of dry nitrogen gas, solvent-exchanged into acetonitrile, and further evaporated to 0.2 mL. The internal standard (20 microliters [µL] of a 5-nanogram per microliter [ng/µL] solution of $^{13}C_3$-caffeine; Cambridge Isotope Laboratories) was then added to the sample. Lastly, the sample extracts were stored in a freezer at –20 °C until analysis (up to 30 days).

The full extraction procedure and instrumental analysis by GC/MS is described in Hladik and others (2008, 2009) and Hladik and McWayne (2012). Filtered water samples were spiked with the recovery surrogate standard $^{13}C_3$-atrazine, d-trifluralin, and ^{13}C-fipronil (Cambridge Isotope Laboratories). Each sample was passed through an Oasis HLB SPE (6 mL, 500 mg; Waters, Milford, Massachusetts) cartridge that had been cleaned with two column volumes of ethyl acetate (EtOAc), followed by two column volumes of methanol and two column volumes of deionized water. During this process, the water samples were pumped through the SPE cartridge at a flow rate of 10 mL/min. After extraction, sodium sulfate was added to the sample bottle to remove any residual water, then the bottle was rinsed three times with approximately 2 mL of DCM into a collection tube. The bottle rinse was concentrated to 1 mL under a gentle stream of nitrogen gas. The SPE cartridge was dried under nitrogen gas until the SPE sorbent was dry, then the analytes were eluted with 12 mL of EtOAc into the concentrator tube containing its bottle rinse. The combined bottle rinse and eluent mixture was evaporated to less than 0.2 mL using a gentle stream of dry nitrogen gas. The internal standard (20 µL of a 10-nanogram per microliter [ng/µL] solution of the deuterated polycyclic aromatic hydrocarbon compounds acenaphthene-d_{10} and pyrene-d_{10}) was then added to the sample. The sample extracts were stored in a freezer at –20 °C until analysis (up to 30 days).

For the analysis of suspended sediments by GC/MS, filter papers were cut up and placed in an Erlenmeyer flask, spiked with the recovery surrogate standards d_{14}-trifluralin, $^{13}C_{12}$-*p,p'*-DDE, and $^{13}C_6$-permethrin (Cambridge Isotopes) and extracted twice with 50 mL of DCM in a sonicator (Branson 5200, Danbury, Connecticut) for 15 minutes. The extract was filtered through sodium sulfate, reduced using a Zymark Turbovap II evaporator (Hopkinton, Maryland) to 0.5 mL, solvent exchanged into EtOAc, and further evaporated to less than 0.2 mL using a gentle stream of dry nitrogen gas. The internal standard (20 µL of a 10-ng/µL solution of the deuterated polycyclic aromatic hydrocarbon compounds acenaphthene-d_{10} and pyrene-d_{10}) was then added to the sample. The sample extracts were stored in a freezer at –20 °C until analysis (up to 30 days).

Analytical Methods

Water extracts were analyzed by LC/MS/MS on an Agilent (Palo Alto, California) 1100 HPLC system coupled to a 6430 tandem MS system with a Zorbax Eclipse XDB-C18 column (2.1 by 150 by 3.5 millimeters [mm]). The column flow rate was 0.6 mL/min, and the column temperature was 30 °C. Data were collected in the multiple-reaction-monitoring mode. Additional details about the instrument method can be found in Hladik and Calhoun (2012).

Water and filter extracts were analyzed by GC/MS on an Agilent 7890A gas chromatograph with an Agilent 5975C Inert XL electron ionization (EI) mass-selective detector system using a DB-5MS analytical column (30 meters [m] by 0.25 mm by 0.25 µm) for separation with helium as the carrier gas. Data were collected in the selected ion-monitoring mode. Additional details of the GC/MS method can be found in Hladik and others (2008, 2009).

Method Detection Limits

Method detection limits (MDLs) for pesticide concentrations in surface water were validated in previous work (Hladik and others, 2008; Hladik and Calhoun, 2012) by using the procedure described in 40 CFR 136, Appendix B (U.S. Environmental Protection Agency, 1992). Method detection limits for pesticides in suspended sediments filtered from surface water were validated in previous studies by Hladik and others (2009) and Hladik and McWayne (2012). Method detection limits for pesticide concentrations measured in surface water are listed in table 7. Analytes can sometimes be identified at concentrations less than the MDLs with lower confidence in the numerical value; therefore, concentrations of compounds detected below the MDLs are reported as estimates.

Quality-Control Methods and Results

Pesticide concentrations in water samples were validated using a suite of performance-based quality-control samples, including trip blanks, field replicates, laboratory matrix spikes, and matrix-spike replicates, and surrogate recoveries in accordance with the laboratory's QAPP (U.S. Geological Survey, written commun., 2016). for California pesticide studies. Quality-control samples were analyzed using the GC/MS and LC/MS/MS methods described earlier.

Eight trip blanks consisting of 1-L amber glass bottles of organic-free OCRL blank water were provided to the field sampling crews. Each trip blank was opened to the atmosphere during the time that environmental samples were collected at one site. Following sample collection, trip blanks were transported to, processed, and analyzed at the OCRL in the same manner as all environmental samples. The herbicide fluridone was detected in the trip blank collected on September 19, 2018, at 1.4 ng/L above the method detection limit for this compound. This was possibly caused by incomplete cleaning of the sample filtering apparatus between the trip blank and the previous sample and resulted in two results for fluridone (sites LIS and RYI collected on September 19, 2018, being coded with the "V" (analyte detected in laboratory blank) value qualifier code in National Water Information System. No pesticides were detected in any other trip blanks. Filter papers used in the processing of the four trip blanks analyzed by GC/MS also were analyzed for pesticides and no pesticides were detected.

Ten sequential field-replicate sample pairs were collected to test the reproducibility of results. Replicate pairs were collected at one site in each sampling period and analyzed by GC/MS (6) and LC/MS/MS (4). There were 62 detections of pesticides in the sample pairs analyzed by GC/MS, and the relative standard deviation between the replicate and its complementary environmental sample concentration was less than the control limit of 25 percent in all cases (table 8). The correlation of pesticide detections between the paired environmental and replicate samples was 100 percent. There were 33 detections of pesticides in the sample pairs analyzed by LC/MS/MS, and the relative standard deviation between the replicate and its complementary environmental sample concentration was less than the control limit of 25 percent in all cases (table 9). The correlation of pesticide detections between the environmental and replicate samples was 100 percent.

Suspended sediments trapped on filter papers that were used in the processing of the six replicate samples analyzed by GC/MS were also analyzed. The insecticide fenpropathrin was detected in the environmental and replicate samples collected at RD22 on July 26, 2018, and the relative standard deviation between the replicate and environmental sample result was less than the control limit of 25 percent. There were no pesticides detected in any other replicate suspended-sediment samples or in their corresponding environmental samples.

Four laboratory water matrix spikes, each paired with a matrix-spike-replicate, were analyzed to assess pesticide recovery, degradation, sorption, and interferences caused by the sampling matrix. Water matrix-spike and matrix-spike-replicate pairs were analyzed by GC/MS (2) and LC/MS/MS (2). All samples met the data-quality objective of 70–130 percent matrix-spike recovery. The relative standard deviation between the matrix-spike samples and their complementary replicates was less than the 25-percent control limit in all cases (table 10).

Two laboratory suspended-sediment matrix spikes, each paired with a matrix-spike-replicate, were analyzed by GC/MS to assess pesticide recovery, degradation, sorption, and interferences caused by the sampling matrix. All samples met the data-quality objective of 70–130 percent matrix-spike recovery. The relative standard deviation between the matrix-spike samples and their complementary replicates was less than the 25-percent control limit in all cases (table 11).

Surrogate compounds were added to each environmental and quality-control sample, as described earlier, to assess the efficiency of sample extraction for GC/MS and LC/MC/MS analytical methods. Recoveries of all surrogate compounds met the data-quality objective of 70–130 percent in every sample.

Table 8. Pesticide concentrations with measured detections by gas chromatography mass spectrometry in environmental and field replicate water samples collected in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; RSD, relative standard deviation; %, percent]

DWR site code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sample type	Azoxy-strobin [66589]	Boscalid [67550]	Carbaryl [65069]	Chlorpyrifos [65072]	Clomazone [67562]	Desulfinyl-fipronil [66607]	Diazinon [65078]	3,4-Dichloro-aniline [66584]	Dichlorvos [68572]	Fipronil [66604]	Fipronil sulfide [66610]
KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA														
RCS	07/19/2016	08:10	Environmental	169	16.8	(4.0)	8.2	54.2	—	—	750	NA	—	—
RCS	07/19/2016	08:10	Field replicate	170	15.4	(4.4)	7.6	50.3	—	—	688	NA	—	—
			RSD	0%	6%	7%	5%	5%			6%			
TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA														
LIS	08/09/2016	11:09	Environmental	537	10.4	—	—	23.3	—	—	178	NA	—	—
LIS	08/09/2016	11:09	Field replicate	562	10.9	—	—	27.7	—	—	186	NA	—	—
			RSD	3%	4%			12%			3%			
TULE CANAL A RD 22 NR WOODLAND CA														
RD22	08/10/2017	09:40	Environmental	138	29.6	—	—	14.6	8.1	—	187	39.1	8.4	—
RD22	08/10/2017	09:40	Field replicate	139	30.3	—	—	14.6	7.8	—	179	37.8	9.2	—
			RSD	1%	2%			0%	2%		3%	2%	6%	
PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA														
BL5	11/01/2017	10:40	Environmental	39.4	4.2	—	—	—	—	3.9	12.0	—	—	—
BL5	11/01/2017	10:40	Field replicate	42.6	4.2	—	—	—	—	4.6	11.2	—	—	—
			RSD	6%	0%					11%	5%			
TULE CANAL A RD 22 NR WOODLAND CA														
RD22	07/26/2018	11:09	Environmental	266	31.0	—	—	18.4	4.9	—	661	—	5.8	2.0
RD22	07/26/2018	11:09	Field replicate	289	34.6	—	—	20.2	5.1	—	709	—	6.1	2.3
			RSD	6%	8%			7%	3%		5%		4%	10%
KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA														
RCS	10/09/2018	09:34	Environmental	421	18.5	—	—	—	—	—	190	—	—	—
RCS	10/09/2018	09:34	Field replicate	446	20.0	—	—	—	—	—	193	—	—	—
			RSD	4%	6%						1%			

Table 8. Pesticide concentrations with measured detections by gas chromatography mass spectrometry in environmental and field replicate water samples collected in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; RSD, relative standard deviation; %, percent]

DWR site code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sample type	Fipronil sulfone [66613]	Fluopyram [52761]	Fluxapyroxad [51851]	Hexazinone [65085]	Indaziflam [pending]	Metolachlor [65090]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Thiobencarb [65107]
KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA															
RCS	07/19/2016	08:10	Environmental	—	12.9	11.2	21.7	NA	17.6	72.8	47.3	12.0	—	—	75.7
RCS	07/19/2016	08:10	Field replicate	—	12.9	11.0	21.7	NA	16.5	72.8	43.7	12.4	—	—	74.3
			RSD		0%	1%	0%		5%	0%	6%	3%			1%
TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA															
LIS	08/09/2016	11:09	Environmental	—	—	9.0	14.7	NA	33.0	—	—	—	—	—	—
LIS	08/09/2016	11:09	Field replicate	—	—	9.2	21.1	NA	38.8	—	—	—	—	—	—
			RSD			1%	25%		11%						
TULE CANAL A RD 22 NR WOODLAND CA															
RD22	08/10/2017	09:40	Environmental	3.7	—	21.5	29.2	NA	370	—	—	—	—	7.0	17.5
RD22	08/10/2017	09:40	Field replicate	3.9	—	22.5	29.4	NA	370	—	—	—	—	7.1	18.3
			RSD	4%		3%	1%		0%					1%	3%
PROSPECT SLOUGH A PROSPECT ISLAND NR RYDE CA															
BL5	11/01/2017	10:40	Environmental	—	—	—	14.8	NA	3.5	—	—	—	—	—	—
BL5	11/01/2017	10:40	Field replicate	—	—	—	14.4	NA	3.2	—	—	—	—	—	—
			RSD				2%		5%						
TULE CANAL A RD 22 NR WOODLAND CA															
RD22	07/26/2018	11:09	Environmental	—	13.0	12.6	17.3	23.7	57.7	22.3	39.6	—	—	—	35.1
RD22	07/26/2018	11:09	Field replicate	—	13.3	13.2	18.1	26.7	63.1	25.2	42.1	—	—	—	39.9
			RSD		2%	3%	3%	8%	6%	9%	4%				9%
KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA															
RCS	10/09/2018	09:34	Environmental	—	12.0	14.2	17.4	—	—	—	—	—	78.5	—	—
RCS	10/09/2018	09:34	Field replicate	—	10.8	14.4	19.7	—	—	—	—	—	78.8	—	—
			RSD		8%	1%	9%						0%		

Table 9. Pesticide concentrations with measured detections by liquid chromatography tandem mass spectrometry in environmental and field replicate water samples collected in the Yolo Bypass and Cache Slough Complex, 2016, 2017, and 2018.

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; RSD, relative standard deviation; %, percent.]

DWR site code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Sample type	Carbendazim [68548]	Chloraniliprole [51856]	DCPMU [68231]	DCPU [68226]	3,4-Dichloroaniline [66584]	Diuron [66598]	Fluridone [51864]	Imidacloprid [68426]	Methoxyfenozide [68647]	Penoxsulam [51863]	Thiabendazole [67161]
TOE DRAIN NR BABEL SLOUGH NR FREEPORT CA														
LIS	08/09/2016	11:09	Environmental	—	6.6	4.6	7.6	188	3.7	—	5.1	40.5	15.7	—
LIS	08/09/2016	11:09	Field replicate	—	6.7	5.0	8.2	201	3.7	—	5.6	42.7	17.2	—
			RSD		1%	6%	6%	5%	0%		6%	4%	7%	
TULE CANAL A RD 22 NR WOODLAND CA														
RD22	08/10/2017	09:40	Environmental	1,550	106	4.1	10.4	233	5.5	3.9	8.0	318	21.0	7.6
RD22	08/10/2017	09:40	Field replicate	1,650	118	4.6	11.5	252	6.2	4.3	8.7	334	22.2	8.2
			RSD	4%	8%	8%	7%	6%	8%	8%	6%	4%	4%	6%
KNIGHTS LANDING RIDGE CUT A KNIGHTS LANDING CA														
RCS	09/13/2017	08:34	Environmental	—	38.4	(2.9)	6.0	562	—	—	3.8	206	8.2	—
RCS	09/13/2017	08:34	Field replicate	—	35.6	(2.9)	6.1	521	—	—	4.0	184	8.0	—
			RSD		5%	0.0%	2%	5%			3%	8%	2%	
TULE CANAL A RD 22 NR WOODLAND CA														
RD22	10/25/2018	09:43	Environmental	658	13.2	(2.6)	—	87.4	13.0	—	—	62.3	—	7.5
RD22	10/25/2018	09:43	Field replicate	682	13.0	(2.2)	—	81.6	12.6	—	—	63.8	—	7.3
			RSD	3%	1%	11.0%		5%	2%			2%		1%

Table 10. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked water samples with standard deviation.

[Two spiked samples and two spiked replicate samples were analyzed by either gas chromatography/mass spectrometry or liquid chromatography/tandem mass spectrometry. Compounds noted with * were analyzed in one spiked sample and one spiked replicate sample.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Acetamiprid	76	92	82	7
Acetochlor	94	106	103	6
Acibenzolar-S-methyl	100	110	103	4
Alachlor	92	100	94	4
Allethrin	86	110	94	11
Atrazine	83	107	100	11
Azinphos-methyl	90	100	95	4
Azinphos-methyl oxon	75	84	82	4
Azoxystrobin	81	106	91	11
Benefin (benfluralin)	80	93	86	6
Benzovindiflupyr	85	109	92	11
Bifenthrin	77	95	91	8
Boscalid	97	110	100	6
Bromuconazole	86	101	96	7
Butralin	86	117	103	14
Butylate	71	83	76	5
Captan	85	98	96	6
Carbaryl	81	104	91	11
Carbendazim	83	96	90	5
Carbofuran	90	104	96	6
Carboxin	74	107	90	16
Chlorantraniliprole	102	110	106	3
Chlorfenapyr	89	101	97	5
Chlorothalonil	71	90	81	9
Chlorpyrifos	83	105	99	10
Chlorpyrifos oxon	84	114	100	12
Clomazone	92	101	95	4
Clothianidin	91	98	97	3
Coumaphos	99	117	103	8
Cyantraniliprole	91	102	98	5
Cyazofamid	76	99	87	12
Cycloate	78	97	89	8
Cyfluthrin	98	110	105	6
Cyhalofop-butyl	96	110	101	7
Cyhalothrin (all isomers)	82	89	88	3
Cymoxanil	76	103	88	14
Cypermethrin	86	108	94	9
Cyproconazole	88	98	95	4
Cyprodinil	92	102	101	4
DCPA	79	108	96	14
DCPMU	86	104	93	9

Table 10. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked water samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by either gas chromatography/mass spectrometry or liquid chromatography/tandem mass spectrometry. Compounds noted with * were analyzed in one spiked sample and one spiked replicate sample.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
DCPU	82	102	90	10
Deltamethrin	97	106	104	4
Desthio-prothioconazole	95	100	97	2
Desulfinylfipronil	91	109	104	8
Desulfinylfipronil amide	83	117	95	17
Diazinon	82	105	98	11
Diazoxon	78	105	87	13
3,4-Dichloroaniline	94	102	98	4
3,5-Dichloroaniline	72	80	75	4
Dichlorvos	79	101	92	10
Difenoconazole	88	105	93	8
Dimethomorph	80	98	88	8
Dinotefuran	88	108	98	9
Dithiopyr	85	106	101	9
Diuron	89	99	92	4
EPTC	74	86	79	5
Esfenvalerate	89	100	98	5
Ethaboxam	76	94	83	8
Ethalfluralin	84	113	99	14
Etofenprox	90	100	93	4
Etoxazole	87	112	96	11
Famoxadone	84	110	94	12
Fenamidone	100	106	101	3
Fenarimol	88	111	96	11
Fenbuconazole	95	109	99	6
Fenhexamid	75	90	83	7
Fenpropathrin	91	97	92	2
Fenpyroximate	78	85	82	3
Fenthion	87	93	91	2
Fipronil	101	111	105	5
Fipronil sulfide	106	120	109	6
Fipronil sulfone	79	100	92	11
Flonicamid	76	96	84	10
Fluazinam	70	83	76	6
Flubendiamide	74	81	77	3
Fludioxonil	92	111	100	9
Flufenacet	89	124	102	17
Flumetralin	79	104	94	12
Fluopicolide	86	96	94	5
Fluopyram	87	107	95	9
Fluoxastrobin	90	104	97	6

Table 10. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked water samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by either gas chromatography/mass spectrometry or liquid chromatography/tandem mass spectrometry. Compounds noted with * were analyzed in one spiked sample and one spiked replicate sample.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Flupyradifurone	72	109	89	19
Fluridone	94	105	102	5
Flusilazole	82	98	93	7
Flutolanil	87	108	96	9
Flutriafol	91	112	99	10
Fluxapyroxad	98	106	101	3
Hexazinone	84	92	90	4
Imazalil	84	107	90	11
Imidacloprid	81	107	93	13
Imidacloprid urea	95	102	96	3
Indaziflam*	97	105	101	5
Indoxacarb	92	104	99	5
Ipconazole	89	102	98	6
Iprodione	86	112	98	14
Isofetamid	92	116	100	12
Kresoxim-methyl	96	105	100	4
Malaoxon	81	105	93	12
Malathion	98	122	108	12
Mandipropamid	98	108	105	5
Metalaxyl	86	107	96	9
Metconazole	86	105	88	9
Methidathion	90	107	98	7
Methoprene	87	96	89	4
Methoxyfenozide	95	117	106	10
Methyl parathion	93	107	97	6
Metolachlor	97	113	102	7
Molinate	71	84	79	5
Myclobutanil	94	110	98	7
Napropamide	100	114	101	6
Novaluron	72	79	75	3
Oryzalin	79	92	84	6
Oxadiazon	88	100	98	5
Oxathiapiprolin	93	102	98	4
Oxyfluorfen	81	100	94	8
p,p'-DDD	82	108	98	13
p,p'-DDE	89	103	100	7
p,p'-DDT	93	105	103	6
Paclobutrazol	90	104	96	6
Pebulate	80	95	85	6
Pendimethalin	92	103	99	5
Penoxsulam	93	115	105	11

Table 10. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked water samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by either gas chromatography/mass spectrometry or liquid chromatography/tandem mass spectrometry. Compounds noted with * were analyzed in one spiked sample and one spiked replicate sample.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Pentachloroanisole	81	90	89	4
Pentachloronitrobenzene	79	92	87	5
Penthiopyrad	88	101	94	5
Permethrin	94	104	94	5
Phenothrin	82	95	88	6
Phosmet	77	95	82	8
Picoxystrobin	88	99	93	5
Piperonyl butoxide	90	100	95	4
Prodiamine	96	106	101	4
Prometon	80	110	98	15
Prometryn	75	86	78	5
Propanil	86	100	96	6
Propargite	91	101	93	5
Propiconazole	92	111	99	8
Propyzamide	97	104	102	3
Pyraclostrobin	94	109	97	7
Pyridaben	95	115	107	9
Pyrimethanil	83	106	92	11
Pyriproxyfen	99	112	103	6
Quinoxyfen	92	106	98	6
Resmethrin	81	94	83	6
Sedaxane	89	111	97	11
Simazine	86	99	94	5
Sulfoxaflor	74	105	87	16
tau-Fluvalinate	88	93	91	2
Tebuconazole	92	103	93	5
Tebufenozide	99	105	103	3
Tebupirimfos	83	109	99	13
Tebupirimfos oxon	97	109	99	5
Tefluthrin	75	89	86	6
Tetraconazole	98	118	104	9
Tetradifon	78	99	92	10
Tetramethrin	81	87	86	3
Thiabendazole	85	98	91	6
Thiacloprid	75	96	83	10
Thiamethoxam	89	95	94	3
Thiamethoxam degradate (NOA-355190)	88	95	93	3
Thiamethoxam degradate (NOA-407475)	76	106	90	16
Thiazopyr	81	103	96	11
Thiobencarb	87	112	104	12
Tolfenpyrad	99	108	102	4

Table 10. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked water samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by either gas chromatography/mass spectrometry or liquid chromatography/tandem mass spectrometry. Compounds noted with * were analyzed in one spiked sample and one spiked replicate sample.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Triadimefon	91	103	95	5
Triadimenol	84	116	96	16
Triallate	86	107	100	10
Tribufos	92	110	98	8
Tricyclazole	88	101	92	6
Trifloxystrobin	90	121	102	15
Triflumizole	97	110	99	6
Trifluralin	83	96	89	5
Triticonazole	85	107	94	11
Zoxamide	83	108	91	11

Table 11. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked suspended-sediment samples with standard deviation.

[Two spiked samples and two spiked replicate samples were analyzed by gas chromatography/mass spectrometry.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Acetochlor	92	100	93	4
Acibenzolar-S-methyl	85	96	92	5
Alachlor	83	100	89	8
Allethrin	94	108	99	6
Atrazine	82	96	84	6
Azinphos-methyl	79	99	93	9
Azinphos-methyl oxon	72	82	79	4
Azoxystrobin	74	99	88	12
Benefin (benfluralin)	79	101	88	9
Benzovindiflupyr	89	101	97	5
Bifenthrin	84	93	91	4
Boscalid	90	105	95	7
Bromuconazole	77	88	83	4
Butralin	89	107	93	8
Butylate	75	98	83	10
Captan	90	103	92	6
Carbaryl	96	114	107	7
Carbofuran	100	106	103	3
Chlorfenapyr	93	102	98	4
Chlorothalonil	79	99	90	10
Chlorpyrifos	87	109	93	10
Chlorpyrifos oxon	84	100	98	7
Clomazone	91	101	92	5

Table 11. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked suspended-sediment samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by gas chromatography/mass spectrometry.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Coumaphos	84	100	98	7
Cycloate	93	112	98	8
Cyfluthrin	93	104	97	5
Cyhalofop-butyl	92	105	96	6
Cyhalothrin (all isomers)	77	93	88	7
Cypermethrin	95	102	97	3
Cyproconazole	81	87	84	3
Cyprodinil	86	105	92	8
DCPA	82	100	88	8
Deltamethrin	91	105	99	6
Desulfinylfipronil	90	101	90	6
Desulfinylfipronil amide	76	96	90	9
Diazinon	81	96	86	6
Diazoxon	74	90	83	7
3,4-Dichloroaniline	72	92	82	9
3,5-Dichloroaniline	72	86	82	7
Dichlorvos	74	104	88	15
Difenoconazole	74	84	80	5
Dimethomorph	83	94	90	4
Dithiopyr	93	108	95	7
EPTC	77	102	86	11
Esfenvalerate	97	116	113	9
Ethalfluralin	90	102	92	5
Etofenprox	93	101	97	3
Etoxazole	83	96	84	6
Famoxadone	88	102	95	7
Fenamidone	77	89	84	5
Fenarimol	79	92	81	6
Fenbuconazole	88	96	93	3
Fenhexamid	73	106	88	16
Fenpropathrin	84	106	92	11
Fenpyroximate	90	105	95	6
Fenthion	92	109	99	7
Fipronil	86	101	97	6
Fipronil sulfide	90	111	95	9
Fipronil sulfone	85	97	87	6
Fluazinam	89	101	94	5
Flubendiamide	76	79	77	2
Fludioxonil	85	103	97	7
Flufenacet	97	110	99	6
Flumetralin	87	101	92	6

Table 11. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked suspended-sediment samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by gas chromatography/mass spectrometry.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Fluopicolide	89	102	91	6
Fluopyram	83	105	89	10
Fluoxastrobin	83	97	96	7
Flusilazole	78	100	89	11
Flutolanil	86	98	91	5
Flutriafol	78	107	90	14
Fluxapyroxad	90	101	95	5
Hexazinone	75	80	77	2
Imazalil	80	101	94	10
Indaziflam*	93	98	96	4
Indoxacarb	95	116	101	9
Ipconazole	72	82	77	4
Iprodione	98	110	100	5
Isofetamid	89	104	94	6
Kresoxim-methyl	80	94	87	6
Malaoxon	74	77	75	2
Malathion	89	114	100	11
Metalaxyl	75	93	82	8
Metconazole	80	85	83	2
Methidathion	78	97	91	9
Methoprene	89	102	100	6
Methyl parathion	89	100	90	6
Metolachlor	97	106	98	4
Molinate	81	105	88	11
Myclobutanil	75	91	84	7
Napropamide	78	91	81	6
Novaluron	77	94	87	8
Oxadiazon	83	100	89	8
Oxyfluorfen	86	106	91	9
p,p'-DDD	89	106	93	8
p,p'-DDE	81	108	90	14
p,p'-DDT	85	99	89	6
Paclobutrazol	75	96	83	9
Pebulate	81	101	90	9
Pendimethalin	81	111	93	13
Pentachloroanisole	77	91	80	7
Pentachloronitrobenzene	84	97	95	6
Permethrin	91	107	101	6
Phenothrin	91	102	99	5
Phosmet	76	108	91	17
Picoxystrobin	79	91	86	5

Table 11. Minimum, maximum, and median recovery of compounds in pesticide matrix-spiked suspended-sediment samples with standard deviation.—Continued

[Two spiked samples and two spiked replicate samples were analyzed by gas chromatography/mass spectrometry.]

Compound	Minimum recovery (percent)	Maximum recovery (percent)	Median recovery (percent)	Standard deviation (percent)
Piperonyl butoxide	80	93	91	6
Prodiamine	88	109	94	9
Prometon	80	92	81	6
Prometryn	74	83	82	4
Propanil	95	113	102	8
Propargite	72	103	89	17
Propiconazole	79	87	83	4
Propyzamide	93	102	96	4
Pyraclostrobin	71	93	73	11
Pyridaben	96	106	98	5
Pyrimethanil	83	90	83	4
Pyriproxyfen	93	102	96	4
Quinoxyfen	94	117	103	11
Resmethrin	84	105	97	9
Sedaxane	81	101	96	9
Simazine	78	109	87	14
tau-Fluvalinate	93	104	102	5
Tebuconazole	81	85	83	2
Tebupirimfos	90	104	94	6
Tebupirimfos oxon	85	96	86	5
Tefluthrin	94	105	96	5
Tetraconazole	83	97	88	6
Tetradifon	85	101	90	7
Tetramethrin	84	109	92	11
Thiazopyr	89	109	94	9
Thiobencarb	89	109	95	9
Triadimefon	80	91	82	5
Triadimenol	92	106	100	6
Triallate	90	100	93	4
Tribufos	84	96	89	5
Trifloxystrobin	83	99	95	7
Triflumizole	75	86	78	5
Trifluralin	81	99	91	8
Triticonazole	85	92	89	3
Zoxamide	87	103	99	7

Pesticide Concentrations in the Yolo Bypass and Cache Slough Complex

A total of 50 different dissolved pesticides and pesticide degradates (15 fungicides, 16 herbicides, 18 insecticides, and 1 synergist) were detected in 113 water samples during this 3-year study (table 12). During this same period, six different pesticides (two fungicides, two herbicides, and two insecticides) were detected in suspended sediments filtered from the water samples. The pyrethroid insecticides bifenthrin and fenpropathrin and the fungicide fluoxastrobin only were detected in suspended sediments (table 13). Concentrations of pesticides in suspended sediments are provided in ng/L to facilitate the approximation of a whole-water pesticide concentration by summing the dissolved and suspended-sediment concentrations of pesticides.

All samples contained mixtures from 7 to 27 pesticides, along with the fungicide azoxystrobin and herbicide degradate 3,4-DCA, which were detected in every sample. The other most frequently detected pesticides were the fungicide boscalid (detected in 94 percent of samples), the herbicides hexazinone (99 percent) and metolachlor (89 percent), and the insecticides methoxyfenozide (97 percent) and chlorantraniliprole (87 percent; table 14). Six pesticides were detected in suspended sediments with the fungicide azoxystrobin (13 percent) and the pyrethroid insecticide bifenthrin (10 percent) being the most frequently detected (table 15). Site RD22 had the highest average number of pesticides detected per sample (20), followed by sites RCS (16), LIS (15) and BLC and RYI (11).

Twenty-three percent (26 of 113) of all samples contained at least one pesticide with a concentration above an aquatic life benchmark as established by the U.S. Environmental Protection Agency (EPA; U.S. Environmental Protection Agency, 2019). Sixty-one percent of the samples collected at site RD22, which is immediately downstream from where treated wastewater from the city of Woodland enters the Bypass, contained at least one pesticide with a concentration above an aquatic life benchmark, whereas thirty-six percent of the samples collected at site RCS (primarily agricultural tailwater) contained pesticides at concentrations above benchmarks. Less than 10 percent of the samples from sites LIS, BL5, and RYI had pesticide concentrations above benchmarks.

When comparing average total pesticide concentrations at each site during the 3-year study, two general patterns were apparent. In each of the 3 years, concentrations were highest at the most upstream site (RCS) and declined steadily downstream to site BL5. Average total pesticide concentrations at site RYI (the furthest downstream), however, did not follow this pattern and were similar or higher than those at site BL5 likely because of pesticides in water from the Sacramento River being tidally transported into the lower CSC (fig. 3). Figure 3 also shows that average total pesticide concentrations generally were lowest in 2016 (Sacramento River pulse water) and highest in 2018 when agricultural tailwater from the Colusa Basin Drain was used to supply the flow pulse. Overall, the highest total pesticide concentrations at each site were detected either immediately before (RCS and RYI), or during the flow pulse in 2018.

The radar plot in figure 4 shows the percentage contribution of rice pesticides, urban pesticides, fluridone, and other pesticides to the total amount of pesticides measured in each sample. The plot axes show samples collected at each of the sampling locations. As an example, a sample collected at RCS for which 80 percent of the total pesticide burden consisted of rice pesticides and 20 percent consisted of other pesticides would have two points on the RCS axis (one at 80 percent and one at 20 percent with each point colored to represent the appropriate pesticide group).

Concentrations of rice pesticides accounted for more than 50 percent of the total pesticide concentration in nearly all samples collected at sites RCS, LIS, BL5, and RYI, whereas urban use pesticides accounted for most of the total in many samples from RD22. In addition, the aquatic herbicide fluridone was an important contributor at sites BL5 and RYI. Together, rice pesticides, urban pesticides, and fluridone accounted for more than 75 percent of the total pesticide burden in 106 of the 113 samples collected.

2016 Sampling

A total of 34 dissolved pesticides and pesticide degradates (9 fungicides, 13 herbicides, 11 insecticides, and 1 synergist) were detected in 18 water samples that were collected from 4 sites sampled in 2016 (table 12). The insecticide bifenthrin and the herbicide clomazone were detected in suspended-sediment samples at all four sites sampled during the first sampling event but no pesticides were detected in any subsequent suspended-sediment samples (table 13). Mixtures of from 9 to 25 pesticides were detected in every water sample and the fungicide azoxystrobin, the herbicides clomazone and hexazinone, and the herbicide degradate 3,4-DCA were detected in every sample. Other frequently detected pesticides included the fungicides boscalid and fluxapyroxad (94 percent), the herbicides metolachlor and penoxsulam (94 percent), and the insecticides methoxyfenozide (94 percent), and chlorantraniliprole (83 percent; table 14). Pesticide concentrations ranged from below the method detection limits to 1,280 ng/L (3,4-DCA; tables 12, 13).

The pyrethroid insecticide bifenthrin was detected in four samples at concentrations above the EPA's aquatic life benchmark of 1.3 ng/L for chronic invertebrate toxicity, and one of these samples also contained the insecticide fipronil at a concentration above the chronic invertebrate toxicity benchmark of 11.0 ng/L (U.S. Environmental Protection Agency, 2019).

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
RCS	384737121433201	06/23/2016	09:42	Pre-pulse	—	—	321	43.1	—	—	11.0	—
RD22	384035121383801	06/23/2016	11:05	Pre-pulse	—	—	201	44.7	—	—	8.1	—
LIS	382829121351801	06/23/2016	13:15	Pre-pulse	—	—	114	44.9	—	—	—	—
BL5	381627121395101	06/23/2016	12:30	Pre-pulse	—	—	64.3	24.4	—	—	—	—
RCS	384737121433201	07/19/2016	08:10	Pulse	—	—	169	16.8	(4.0)	—	8.6	—
RD22	384035121383801	07/19/2016	08:45	Pulse	—	—	170	19.6	(4.2)	—	9.4	—
LIS	382829121351801	07/19/2016	09:47	Pulse	—	—	178	20.0	(3.5)	—	8.4	—
BL5	381627121395101	07/19/2016	11:42	Pulse	—	—	96.9	9.7	—	—	—	—
RCS	384737121433201	07/28/2016	08:10	Pulse	—	—	744	11.4	—	—	9.7	—
RD22	384035121383801	07/28/2016	09:35	Pulse	—	—	515	11.1	—	—	9.0	—
LIS	382829121351801	07/28/2016	11:16	Pulse	—	—	332	9.8	—	—	6.9	—
BL5	381627121395101	07/28/2016	11:15	Pulse	—	—	67.3	6.1	—	—	(3.9)	—
RD22	384035121383801	08/02/2016	07:54	Post-pulse	—	—	1,020	33.3	—	5.3	13.8	—
LIS	382829121351801	08/02/2016	09:15	Post-pulse	—	—	509	9.2	—	—	(3.9)	—
BL5	381627121395101	08/02/2016	10:45	Post-pulse	—	—	101	7.1	—	—	(2.6)	—
RD22	384035121383801	08/09/2016	08:54	Post-pulse	(2.6)	—	658	36.7	110	—	17.7	—
LIS	382829121351801	08/09/2016	12:09	Post-pulse	—	—	537	10.4	—	—	6.6	—
BL5	381627121395101	08/09/2016	10:15	Post-pulse	—	—	32.7	—	—	—	(3.2)	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
RCS	384737121433201	06/29/2017	09:20	Ambient	—	—	316	39.6	—	105	4.3	—
LIS	382829121351801	06/28/2017	09:25	Ambient	—	—	188	31.0	—	22.5	13.8	—
BL5	381627121395101	06/28/2017	12:14	Ambient	—	6.3	82.3	14.8	—	—	—	—
RYI	11455350	06/28/2017	13:30	Ambient	—	—	55.5	8.1	—	—	—	—
RCS	384737121433201	07/13/2017	08:19	Ambient	—	—	553	24.8	—	49.2	232	—
RD22	384035121383801	07/13/2017	09:33	Ambient	—	—	434	50.5	—	342	130	—
LIS	382829121351801	07/13/2017	11:35	Ambient	—	—	173	31.8	—	68.3	24.9	—
BL5	381627121395101	07/13/2017	12:00	Ambient	—	—	70.5	13.0	—	66.6	—	—
RYI	11455350	07/13/2017	10:59	Ambient	—	—	75.0	7.0	—	91.2	—	—
RCS	384737121433201	07/27/2017	08:46	Ambient	—	—	734	8.9	—	—	69.4	—
RD22	384035121383801	07/27/2017	10:16	Ambient	—	—	268	25.2	—	919	56.2	—
LIS	382829121351801	07/27/2017	12:45	Ambient	—	—	52.8	6.1	—	—	5.1	—
BL5	381627121395101	07/27/2017	11:44	Ambient	—	—	54.3	3.1	—	109	(2.8)	—
RYI	11455350	07/27/2017	11:00	Ambient	—	—	67.9	—	—	111	(2.6)	—
RCS	384737121433201	08/10/2017	08:20	Ambient	—	—	2,510	8.6	—	—	68.6	—
RD22	384035121383801	08/10/2017	09:40	Ambient	—	—	138	29.6	—	1,550	106	—
LIS	382829121351801	08/10/2017	11:49	Ambient	—	—	31.6	6.6	—	73.1	21.3	—
BL5	381627121395101	08/10/2017	11:20	Ambient	—	—	66.1	4.2	—	92.6	5.0	—
RYI	11455350	08/10/2017	10:34	Ambient	—	—	141	2.8	—	130	(3.6)	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
RCS	384737121433201	08/31/2017	08:20	Ambient	—	—	2,320	14.5	—	—	56.0	—
RD22	384035121383801	08/31/2017	09:54	Ambient	—	—	421	47.1	—	799	17.7	—
LIS	382829121351801	08/30/2017	10:21	Ambient	—	—	100	11.4	—	60.1	20.0	—
BL5	381627121395101	08/30/2017	12:41	Ambient	—	—	257	9.0	—	63.5	4.0	—
RYI	11455350	08/30/2017	13:47	Ambient	—	—	322	4.4	—	—	(3.9)	—
RCS	384737121433201	09/13/2017	08:34	Ambient	—	—	2,000	11.4	—	—	38.4	—
RD22	384035121383801	09/13/2017	10:13	Ambient	—	—	415	35.0	—	331	43.9	—
LIS	382829121351801	09/13/2017	13:15	Ambient	—	—	410	20.1	—	115	44.6	—
BL5	381627121395101	09/13/2017	12:10	Ambient	—	—	245	7.9	—	38.8	—	—
RY1	11455350	09/13/2017	13:15	Ambient	—	—	276	—	—	65.7	(3.2)	—
RCS	384737121433201	09/20/2017	12:00	Ambient	—	—	1,070	4.3	—	—	18.6	—
RD22	384035121383801	09/20/2017	12:50	Ambient	—	—	120	14.7	—	—	40.9	—
LIS	382829121351801	09/20/2017	14:30	Ambient	—	—	116	6.5	—	76.3	31.3	—
BL5	381627121395101	09/20/2017	13:12	Ambient	—	—	83.1	—	—	43.5	(2.1)	—
RYI	11455350	09/20/2017	12:40	Ambient	—	—	85.7	—	—	—	—	—
RCS	384737121433201	10/04/2017	13:10	Ambient	—	—	659	12.2	—	—	24.1	—
RD22	384035121383801	10/04/2017	13:50	Ambient	—	—	273	37.7	—	1,190	11.5	—
LIS	382829121351801	10/04/2017	15:20	Ambient	—	—	167	6.3	—	51.3	(2.5)	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
BL5	381627121395101	10/04/2017	13:25	Ambient	—	—	113	—	—	56.6	—	—
RYI	11455350	10/04/2017	13:00	Ambient	—	—	83.3	4.6	—	—	—	—
RCS	384737121433201	10/18/2017	12:45	Ambient	—	—	392	12.6	—	—	33.4	—
RD22	384035121383801	10/18/2017	13:20	Ambient	—	—	82.4	42.7	—	2,040	11.1	—
LIS	382829121351801	10/18/2017	14:55	Ambient	—	—	70.1	6.5	—	—	4.6	—
BL5	381627121395101	10/18/2017	11:00	Ambient	—	—	46.0	5.2	—	—	(2.8)	—
RYI	11455350	10/18/2017	10:30	Ambient	—	—	30.4	5.0	—	—	(2.1)	—
RCS	384737121433201	11/01/2017	10:10	Ambient	—	—	486	7.9	—	—	14.9	—
RD22	384035121383801	11/01/2017	10:45	Ambient	—	—	55.3	24.4	—	1,080	6.4	—
LIS	382829121351801	11/01/2017	12:40	Ambient	—	—	50.2	5.2	—	54.2	(3.8)	—
BL5	381627121395101	11/01/2017	10:40	Ambient	—	—	39.4	4.2	—	66.1	(2.6)	—
RYI	11455350	11/01/2017	10:10	Ambient	—	—	34.9	5.3	—	76.2	—	—
RCS	384737121433201	07/10/2018	09:45	Pre-pulse	—	—	422	29.1	—	55.6	49.4	—
RD22	384035121383801	07/10/2018	11:02	Pre-pulse	—	—	72.1	18.5	—	603	6.6	—
LIS	382829121351801	07/11/2018	11:11	Pre-pulse	—	—	201	5.6	—	87.2	(3.4)	—
BL5	381627121395101	07/11/2018	12:09	Pre-pulse	—	—	47.8	5.4	—	94.3	—	—
RYI	11455350	07/11/2018	13:12	Pre-pulse	—	—	33.8	3.4	—	94.2	—	—
RCS	384737121433201	07/26/2018	09:13	Pre-pulse	—	—	782	16.5	—	—	26.9	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
RD22	384035121383801	07/26/2018	11:09	Pre-pulse	—	—	266	31.0	—	361	229	—
LIS	382829121351801	07/26/2018	13:11	Pre-pulse	—	—	134	8.9	—	41.8	4.9	—
BL5	381627121395101	07/26/2018	12:45	Pre-pulse	—	—	55.8	6.6	—	75.3	(2.6)	—
RYI	11455350	07/26/2018	11:30	Pre-pulse	—	—	86.7	5.3	—	63.2	—	—
RCS	384737121433201	08/07/2018	09:15	Pre-pulse	—	—	419	26.2	—	—	16.9	—
RD22	384035121383801	08/07/2018	10:50	Pre-pulse	—	—	2,210	11.6	—	263	35.7	—
LIS	382829121351801	08/08/2018	12:11	Pre-pulse	—	—	166	8.0	—	65.4	4.1	—
BL5	381627121395101	08/08/2018	13:08	Pre-pulse	—	—	131	6.3	—	58.3	(2.9)	—
RYI	11455350	08/08/2018	11:43	Pre-pulse	—	—	311	4.8	—	65.1	(2.1)	—
RCS	384737121433201	08/21/2018	09:43	Pre-pulse	—	—	8,780	10.3	—	—	10.9	5.6
RD22	384035121383801	08/21/2018	12:19	Pre-pulse	—	—	884	21.0	—	468	13.7	5.5
LIS	382829121351801	08/21/2018	09:08	Pre-pulse	—	—	180	8.4	—	25.3	5.1	4.6
BL5	381627121395101	08/22/2018	12:50	Pre-pulse	—	—	344	6.3	—	70.1	4.1	—
RYI	11455350	08/22/2018	11:20	Pre-pulse	—	—	514	5.1	—	59.3	(3.5)	—
RCS	384737121433201	08/30/2018	10:01	Pulse	—	—	4,310	11.7	—	—	14.7	—
RD22	384035121383801	08/30/2018	11:35	Pulse	11.6	—	4,330	12.4	—	—	19.5	—
LIS	382829121351801	08/30/2018	14:05	Pulse	(2.8)	—	3,400	15.4	—	70.1	16.4	—
BL5	381627121395101	08/30/2018	12:28	Pulse	—	—	326	6.3	—	—	(3.6)	—
RYI	11455350	08/30/2018	10:55	Pulse	—	—	497	5.5	—	42.4	(3.8)	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
RCS	384737121433201	09/04/2018	13:10	Pulse	—	—	3,170	11.4	—	16.1	13.2	(3.9)
RD22	384035121383801	09/04/2018	14:54	Pulse	—	—	2,780	11.6	—	31.1	14.1	—
LIS	382829121351801	09/04/2018	09:26	Pulse	(2.3)	—	1,970	12.9	—	26.8	18.9	8.0
BL5	381627121395101	09/05/2018	12:20	Pulse	—	—	324	5.4	—	68.1	5.2	—
RYI	11455350	09/05/2018	13:15	Pulse	—	—	348	7.2	—	84.3	(3.9)	7.8
RCS	384737121433201	09/18/2018	09:25	Pulse	—	—	1,270	15.7	—	—	10.2	—
RD22	384035121383801	09/18/2018	10:51	Pulse	—	—	1,870	19.4	—	38.9	13.0	—
LIS	382829121351801	09/19/2018	10:00	Pulse	—	—	1,820	22.0	—	26.2	18.0	—
BLS	381627121395101	09/19/2018	12:49	Pulse	—	—	631	13.1	—	40.5	(3.9)	—
RYI	11455350	09/19/2018	10:19	Pulse	—	—	347	8.5	—	—	(3.4)	—
RCS	384737121433201	10/09/2018	09:34	Post-pulse	—	—	421	18.5	—	46.6	10.7	—
RD22	384035121383801	10/09/2018	11:30	Post-pulse	—	—	323	44.7	—	718	15.7	—
LIS	382829121351801	10/10/2018	08:45	Post-pulse	—	—	280	17.5	—	70.1	(2.2)	—
BL5	381627121395101	10/10/2018	12:28	Post-pulse	—	—	148	10.5	—	—	(2.8)	—
RYI	11455350	10/10/2018	13:38	Post-pulse	—	—	111	10.2	—	—	(2.9)	—
RCS	384737121433201	10/25/2018	08:07	Post-pulse	—	—	308	15.7	—	12.7	10.4	—
RD22	384035121383801	10/25/2018	09:43	Post-pulse	—	—	216	40.0	—	658	13.2	—
LIS	382829121351801	10/25/2018	13:28	Post-pulse	—	—	157	—	—	26.2	5.5	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Acetamiprid [68302]	Atrazine [65065]	Azoxystrobin [66589]	Boscalid [67550]	Carbaryl [65069]	Carbendazim [68548]	Chlorantraniliprole [51856]	Chlorothalonil [65071]
BL5	381627121395101	10/25/2018	11:21	Post-pulse	—	—	111	10.0	—	21.7	(2.9)	—
RYI	11455350	10/25/2018	12:26	Post-pulse	—	—	72.3	9.0	—	30.8	(2.2)	—
LIS	382829121351801	11/08/2018	12:27	Post-pulse	—	—	182	15.8	—	—	7.7	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
RCS	384737121433201	06/23/2016	09:42	—	515	—	—	4.7	14.5	4.8	—	—
RD22	384035121383801	06/23/2016	11:05	—	581	—	—	5.8	10.6	12.0	—	—
LIS	382829121351801	06/23/2016	13:15	—	87.5	—	—	—	—	10.3	—	—
BL5	381627121395101	06/23/2016	12:30	—	112	—	—	—	—	4.2	—	—
RCS	384737121433201	07/19/2016	08:10	8.2	54.2	—	—	(2.3)	3.9	—	—	—
RD22	384035121383801	07/19/2016	08:45	5.3	56.3	—	—	(2.3)	3.8	—	—	—
LIS	382829121351801	07/19/2016	09:47	—	81.5	—	—	3.8	7.6	—	—	—
BL5	381627121395101	07/19/2016	11:42	—	23.5	—	—	—	—	—	—	—
RCS	384737121433201	07/28/2016	08:10	—	48.1	—	—	3.7	3.7	—	—	—
RD22	384035121383801	07/28/2016	09:35	—	48.4	—	—	4.8	6.3	—	—	—
LIS	382829121351801	07/28/2016	11:16	—	38.7	—	—	(3.0)	(2.7)	—	—	—
BL5	381627121395101	07/28/2016	11:15	—	33.1	—	—	(3.2)	(3.3)	—	—	—
RD22	384035121383801	08/02/2016	07:54	—	108	—	—	3.5	7.2	3.9	—	—
LIS	382829121351801	08/02/2016	09:15	—	26.8	—	—	(3.0)	4.1	—	—	—
BL5	381627121395101	08/02/2016	10:45	—	20.2	—	—	(3.0)	(2.4)	—	—	—
RD22	384035121383801	08/09/2016	08:54	—	79.1	—	—	4.5	7.4	—	—	—
LIS	382829121351801	08/09/2016	12:09	—	23.3	—	—	4.6	7.6	—	—	—
BL5	381627121395101	08/09/2016	10:15	—	8.3	—	—	(3.2)	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
RCS	384737121433201	06/29/2017	09:20	—	504	—	(7.0)	15.4	11.9	—	—	—
LIS	382829121351801	06/28/2017	09:25	—	339	—	—	6.2	—	—	—	—
BL5	381627121395101	06/28/2017	12:14	—	116	—	—	(3.0)	—	—	—	—
RYI	11455350	06/28/2017	13:30	—	63.9	—	—	—	—	—	—	—
RCS	384737121433201	07/13/2017	08:19	—	85.7	—	(5.2)	10.3	34.0	—	—	—
RD22	384035121383801	07/13/2017	09:33	—	208	—	(6.1)	8.6	15.1	7.2	—	—
LIS	382829121351801	07/13/2017	11:35	—	279	—	—	4.1	(2.9)	—	—	—
BL5	381627121395101	07/13/2017	12:00	—	62.2	—	—	—	—	—	—	—
RYI	11455350	07/13/2017	10:59	—	20.7	—	—	—	—	—	—	—
RCS	384737121433201	07/27/2017	08:46	—	37.0	—	(4.1)	(2.0)	5.4	—	—	—
RD22	384035121383801	07/27/2017	10:16	—	43.4	—	(3.8)	5.3	13.5	8.7	—	—
LIS	382829121351801	07/27/2017	12:45	—	55.6	—	—	—	—	—	—	—
BL5	381627121395101	07/27/2017	11:44	—	22.3	—	—	(3.0)	—	—	—	—
RYI	11455350	07/27/2017	11:00	—	14.7	—	—	—	—	—	—	—
RCS	384737121433201	08/10/2017	08:20	—	20.0	—	—	—	—	—	—	—
RD22	384035121383801	08/10/2017	09:40	—	14.6	—	—	4.1	10.4	8.1	—	—
LIS	382829121351801	08/10/2017	11:49	—	26.3	—	—	—	—	—	—	—
BL5	381627121395101	08/10/2017	11:20	—	13.9	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
RYI	11455350	08/10/2017	10:34	—	7.2	—	—	—	—	—	—	—
RCS	384737121433201	08/31/2017	08:20	—	10.5	—	—	—	4.4	—	—	—
RD22	384035121383801	08/31/2017	09:54	—	7.4	—	—	—	8.2	7.7	—	—
LIS	382829121351801	08/30/2017	10:21	—	10.7	—	—	—	—	—	—	—
BL5	381627121395101	08/30/2017	12:41	—	6.4	—	—	—	—	—	—	—
RYI	11455350	08/30/2017	13:47	—	4.2	—	—	—	—	—	—	—
RCS	384737121433201	09/13/2017	08:34	—	8.6	—	—	(2.9)	6.0	—	—	—
RD22	384035121383801	09/13/2017	10:13	—	4.5	—	—	(3.4)	5.6	6.5	—	—
LIS	382829121351801	09/13/2017	13:15	—	8.0	—	—	(3.2)	7.4	3.7	—	—
BL5	381627121395101	09/13/2017	12:10	—	4.2	—	—	—	—	—	—	—
RY1	11455350	09/13/2017	13:15	—	3.3	—	—	—	(2.4)	—	—	—
RCS	384737121433201	09/20/2017	12:00	—	6.1	—	—	—	—	—	—	—
RD22	384035121383801	09/20/2017	12:50	—	—	—	—	(2.3)	—	7.8	—	—
LIS	382829121351801	09/20/2017	14:30	—	6.2	—	—	(2.7)	—	3.4	—	—
BL5	381627121395101	09/20/2017	13:12	—	—	—	—	—	—	—	—	—
RYI	11455350	09/20/2017	12:40	—	—	—	—	—	—	—	—	—
RCS	384737121433201	10/04/2017	13:10	—	—	—	—	—	—	—	—	—
RD22	384035121383801	10/04/2017	13:50	—	—	—	—	—	—	12.1	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
LIS	382829121351801	10/04/2017	15:20	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/04/2017	13:25	—	—	—	—	—	—	—	—	—
RYI	11455350	10/04/2017	13:00	—	—	—	—	—	—	—	—	—
RCS	384737121433201	10/18/2017	12:45	—	—	—	—	—	—	—	—	—
RD22	384035121383801	10/18/2017	13:20	—	—	—	—	—	—	15.2	12.4	—
LIS	382829121351801	10/18/2017	14:55	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/18/2017	11:00	—	—	—	—	—	—	—	—	—
RYI	11455350	10/18/2017	10:30	—	—	—	—	—	—	—	—	—
RCS	384737121433201	11/01/2017	10:10	—	4.6	—	—	—	—	—	—	13.2
RD22	384035121383801	11/01/2017	10:45	—	—	—	—	—	—	11.8	—	—
LIS	382829121351801	11/01/2017	12:40	—	—	—	—	—	—	—	—	6.2
BL5	381627121395101	11/01/2017	10:40	—	—	—	—	—	—	—	—	3.9
RYI	11455350	11/01/2017	10:10	—	—	—	—	—	—	—	—	3.9
RCS	384737121433201	07/10/2018	09:45	—	239	—	—	9.6	12.6	—	—	—
RD22	384035121383801	07/10/2018	11:02	—	66.4	18.1	—	4.2	4.2	9.1	—	—
LIS	382829121351801	07/11/2018	11:11	—	68.9	—	—	(2.6)	(2.5)	2.1	—	—
BL5	381627121395101	07/11/2018	12:09	—	58.4	—	—	(3.0)	—	—	—	—
RYI	11455350	07/11/2018	13:12	—	24.6	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
RCS	384737121433201	07/26/2018	09:13	—	23.8	—	—	4.0	6.3	—	—	—
RD22	384035121383801	07/26/2018	11:09	—	18.4	20.9	—	3.6	5.7	4.9	—	—
LIS	382829121351801	07/26/2018	13:11	—	18.7	—	—	—	—	—	—	—
BL5	381627121395101	07/26/2018	12:45	—	11.5	—	—	(2.4)	—	1.9	—	—
RYI	11455350	07/26/2018	11:30	—	7.6	—	—	—	—	—	—	—
RCS	384737121433201	08/07/2018	09:15	—	35.3	—	—	—	—	6.0	—	—
RD22	384035121383801	08/07/2018	10:50	—	11.4	9.9	—	(2.5)	6.5	—	—	—
LIS	382829121351801	08/08/2018	12:11	—	14.8	—	—	—	—	—	—	—
BL5	381627121395101	08/08/2018	13:08	—	5.7	—	—	—	—	—	—	—
RYI	11455350	08/08/2018	11:43	—	4.4	—	—	—	—	—	—	—
RCS	384737121433201	08/21/2018	09:43	—	5.2	—	—	—	(2.5)	—	—	—
RD22	384035121383801	08/21/2018	12:19	—	15.1	—	(2.5)	—	—	5.9	—	—
LIS	382829121351801	08/21/2018	09:08	—	6.4	—	—	—	—	—	—	—
BL5	381627121395101	08/22/2018	12:50	—	3.2	—	—	—	—	—	—	—
RYI	11455350	08/22/2018	11:20	—	3.2	—	—	—	—	—	—	—
RCS	384737121433201	08/30/2018	10:01	—	5.7	—	—	—	—	—	—	—
RD22	384035121383801	08/30/2018	11:35	—	5.8	—	—	—	—	—	—	—
LIS	382829121351801	08/30/2018	14:05	—	6.7	—	—	(2.3)	(3.0)	—	—	—
BL5	381627121395101	08/30/2018	12:28	—	3.0	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
RYI	11455350	08/30/2018	10:55	—	(2.5)	—	—	—	—	—	—	—
RCS	384737121433201	09/04/2018	13:10	—	4.7	—	—	(2.1)	(3.0)	—	—	—
RD22	384035121383801	09/04/2018	14:54	—	5.0	—	—	—	—	—	—	—
LIS	382829121351801	09/04/2018	09:26	—	5.6	—	—	—	—	—	—	—
BL5	381627121395101	09/05/2018	12:20	—	—	—	—	—	—	—	—	—
RYI	11455350	09/05/2018	13:15	—	3.0	—	—	—	—	—	—	—
RCS	384737121433201	09/18/2018	09:25	—	—	—	—	—	—	—	—	—
RD22	384035121383801	09/18/2018	10:51	—	—	—	—	—	—	—	—	—
LIS	382829121351801	09/19/2018	10:00	—	—	—	—	—	—	—	—	—
BLS	381627121395101	09/19/2018	12:49	—	—	—	—	—	—	—	—	—
RYI	11455350	09/19/2018	10:19	—	—	—	—	—	—	—	—	—
RCS	384737121433201	10/09/2018	09:34	—	—	—	—	—	—	—	—	—
RD22	384035121383801	10/09/2018	11:30	—	—	—	(2.5)	(2.5)	—	9.1	—	—
LIS	382829121351801	10/10/2018	08:45	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/10/2018	12:28	—	—	—	—	—	—	—	—	—
RYI	11455350	10/10/2018	13:38	—	—	—	—	—	—	—	—	—
RCS	384737121433201	10/25/2018	08:07	—	—	—	—	—	—	—	—	—
RD22	384035121383801	10/25/2018	09:43	—	—	—	—	(2.6)	—	9.2	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Chlorpyrifos [65072]	Clomazone [67562]	Clothianidin [68221]	Cyprodinil [67574]	DCPMU [68231]	DCPU [68226]	Desulfinylfipronil [66607]	Desulfinylfipronil amide [68570]	Diazinon [65078]
LIS	382829121351801	10/25/2018	13:28	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/25/2018	11:21	—	—	—	—	—	—	—	—	—
RYI	11455350	10/25/2018	12:26	—	—	—	—	—	—	—	—	—
LIS	382829121351801	11/08/2018	12:27	—	—	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
RCS	384737121433201	06/23/2016	09:42	1,240	NA	—	—	5.4	4.8	7.4	32.3	NA	—
RD22	384035121383801	06/23/2016	11:05	677	NA	—	5.3	11.7	9.0	15.6	25.7	NA	—
LIS	382829121351801	06/23/2016	13:15	43.1	NA	—	—	8.4	8.8	14.4	31.4	NA	4.8
BL5	381627121395101	06/23/2016	12:30	23.4	NA	—	—	—	—	—	14.0	NA	—
RCS	384737121433201	07/19/2016	08:10	811	NA	—	—	—	—	—	12.9	NA	—
RD22	384035121383801	07/19/2016	08:45	742	NA	—	—	4.1	—	—	14.8	NA	—
LIS	382829121351801	07/19/2016	09:47	1,280	NA	—	—	5.2	—	—	15.4	NA	—
BL5	381627121395101	07/19/2016	11:42	42.9	NA	—	—	—	—	—	8.0	NA	—
RCS	384737121433201	07/28/2016	08:10	599	NA	—	4.9	—	—	—	—	NA	—
RD22	384035121383801	07/28/2016	09:35	476	NA	—	4.6	—	—	—	—	NA	—
LIS	382829121351801	07/28/2016	11:16	336	NA	—	3.6	—	—	—	—	NA	—
BL5	381627121395101	07/28/2016	11:15	116	NA	—	(2.7)	—	—	—	—	NA	(3.4)
RD22	384035121383801	08/02/2016	07:54	337	NA	—	4.5	(1.9)	—	—	—	NA	—
LIS	382829121351801	08/02/2016	09:15	269	NA	—	—	—	—	—	—	NA	—
BL5	381627121395101	08/02/2016	10:45	62.8	NA	—	(2.8)	—	—	—	—	NA	—
RD22	384035121383801	08/09/2016	08:54	1,080	NA	—	13.0	5.4	—	—	—	NA	—
LIS	382829121351801	08/09/2016	12:09	188	NA	—	3.7	—	—	—	—	NA	—
BL5	381627121395101	08/09/2016	10:15	23.4	NA	—	5.2	—	—	—	—	NA	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
RCS	384737121433201	06/29/2017	09:20	3,610	—	—	11.9	—	—	—	31.2	—	—
LIS	382829121351801	06/28/2017	09:25	232	—	—	4.0	—	—	—	18.2	—	(3.2)
BL5	381627121395101	06/28/2017	12:14	48.3	—	—	(2.0)	—	—	—	—	—	84.2
RYI	11455350	06/28/2017	13:30	94.3	—	—	—	4.1	—	—	—	—	50.6
RCS	384737121433201	07/13/2017	08:19	1,350	—	—	7.8	—	—	—	22.4	—	—
RD22	384035121383801	07/13/2017	09:33	734	—	—	14.2	5.6	—	—	29.6	—	(2.8)
LIS	382829121351801	07/13/2017	11:35	115	—	—	—	—	—	—	23.4	—	11.4
BL5	381627121395101	07/13/2017	12:00	50.1	—	—	—	—	—	—	9.2	—	90.0
RYI	11455350	07/13/2017	10:59	142	—	—	—	—	—	—	—	—	95.4
RCS	384737121433201	07/27/2017	08:46	1,040	—	—	(2.3)	—	—	—	9.4	(2.9)	—
RD22	384035121383801	07/27/2017	10:16	290	—	5.6	6.9	6.4	—	—	12.3	—	19.4
LIS	382829121351801	07/27/2017	12:45	148	—	—	—	—	—	—	5.4	—	68.7
BL5	381627121395101	07/27/2017	11:44	128	—	—	—	—	—	—	—	—	205
RYI	11455350	07/27/2017	11:00	171	—	—	—	—	—	—	—	—	112
RCS	384737121433201	08/10/2017	08:20	585	25.5	—	—	—	—	—	—	—	—
RD22	384035121383801	08/10/2017	09:40	233	39.1	—	5.5	8.4	—	3.7	—	—	3.9
LIS	382829121351801	08/10/2017	11:49	122	—	—	—	—	—	—	—	—	108
BL5	381627121395101	08/10/2017	11:20	76.7	—	—	—	—	—	—	—	—	177

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
RYI	11455350	08/10/2017	10:34	96.2	—	—	—	—	—	—	—	—	95.7
RCS	384737121433201	08/31/2017	08:20	561	—	—	—	—	—	—	13.5	4.6	—
RD22	384035121383801	08/31/2017	09:54	96.8	30.6	—	3.9	5.2	3.5	—	15.5	—	5.5
LIS	382829121351801	08/30/2017	10:21	39.1	—	—	—	—	—	—	10.1	—	94.3
BL5	381627121395101	08/30/2017	12:41	25.2	—	—	—	—	—	—	9.9	—	151
RYI	11455350	08/30/2017	13:47	43.6	—	3.2	—	—	—	—	7.5	—	41.6
RCS	384737121433201	09/13/2017	08:34	562	—	—	—	—	—	—	11.5	8.9	—
RD22	384035121383801	09/13/2017	10:13	161	—	—	3.4	5.5	3.1	—	18.9	—	19.1
LIS	382829121351801	09/13/2017	13:15	146	—	—	(2.2)	—	—	—	13.8	—	31.1
BL5	381627121395101	09/13/2017	12:10	17.6	—	—	—	—	—	—	9.3	—	72.2
RY1	11455350	09/13/2017	13:15	60.0	—	—	(2.0)	—	—	—	5.1	—	43.9
RCS	384737121433201	09/20/2017	12:00	485	—	—	—	—	—	—	—	3.5	—
RD22	384035121383801	09/20/2017	12:50	210	—	—	5.6	6.2	3.9	—	—	—	—
LIS	382829121351801	09/20/2017	14:30	101	—	—	—	—	—	—	—	—	40.0
BL5	381627121395101	09/20/2017	13:12	27.3	—	—	—	—	—	—	—	—	112
RYI	11455350	09/20/2017	12:40	37.9	—	—	—	—	—	—	—	—	111
RCS	384737121433201	10/04/2017	13:10	201	—	4.2	—	—	—	—	—	—	—
RD22	384035121383801	10/04/2017	13:50	77.8	—	—	6.9	7.6	4.2	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
LIS	382829121351801	10/04/2017	15:20	31.2	—	—	—	—	—	—	—	—	91.6
BL5	381627121395101	10/04/2017	13:25	18.6	—	—	—	—	—	—	—	—	90.1
RYI	11455350	10/04/2017	13:00	13.3	—	—	—	—	—	—	—	—	84.1
RCS	384737121433201	10/18/2017	12:45	173	—	—	—	—	—	—	—	(2.6)	—
RD22	384035121383801	10/18/2017	13:20	102	—	3.5	21.6	19.7	7.4	10.1	—	—	—
LIS	382829121351801	10/18/2017	14:55	18.4	—	—	—	—	—	—	—	—	69.8
BL5	381627121395101	10/18/2017	11:00	11.4	—	—	—	—	—	—	—	—	65.6
RYI	11455350	10/18/2017	10:30	9.1	—	—	(3.2)	—	—	—	—	—	68.9
RCS	384737121433201	11/01/2017	10:10	416	—	—	—	—	—	—	9.8	—	—
RD22	384035121383801	11/01/2017	10:45	148	—	—	12.8	20.4	2.8	(2.9)	—	—	—
LIS	382829121351801	11/01/2017	12:40	31.7	—	—	—	—	—	—	—	—	66.5
BL5	381627121395101	11/01/2017	10:40	14.0	—	—	—	—	—	—	—	—	77.6
RYI	11455350	11/01/2017	10:10	19.0	—	—	(3.1)	—	—	—	—	—	80.6
RCS	384737121433201	07/10/2018	09:45	1,190	—	—	13.3	—	—	—	20.7	11.3	—
RD22	384035121383801	07/10/2018	11:02	126	—	—	10.4	13.1	2.9	(3.2)	10.3	—	4.3
LIS	382829121351801	07/11/2018	11:11	287	—	—	(3.1)	—	—	—	7.0	—	184
BL5	381627121395101	07/11/2018	12:09	31.1	—	—	3.2	—	—	—	6.3	—	210
RYI	11455350	07/11/2018	13:12	85.2	—	—	(2.2)	(2.6)	—	—	—	—	193

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
RCS	384737121433201	07/26/2018	09:13	1,010	—	—	(3.0)	—	—	—	14.3	4.2	—
RD22	384035121383801	07/26/2018	11:09	831	—	—	6.5	5.8	2.0	—	13.0	—	—
LIS	382829121351801	07/26/2018	13:11	66.1	—	—	—	—	—	—	7.9	—	165
BL5	381627121395101	07/26/2018	12:45	37.2	—	—	(3.0)	—	—	—	5.1	—	177
RYI	11455350	07/26/2018	11:30	68.1	8.9	—	—	—	—	—	4.1	—	113
RCS	384737121433201	08/07/2018	09:15	673	—	—	—	11.4	2.5	—	16.2	7.7	—
RD22	384035121383801	08/07/2018	10:50	806	—	—	6.6	11.4	—	—	12.6	—	—
LIS	382829121351801	08/08/2018	12:11	115	—	—	—	15.3	—	—	7.0	—	118
BL5	381627121395101	08/08/2018	13:08	28.2	—	—	—	(2.6)	—	—	4.9	—	105
RYI	11455350	08/08/2018	11:43	56.2	—	—	—	—	—	—	4.7	—	55.2
RCS	384737121433201	08/21/2018	09:43	386	—	—	—	—	—	—	10.8	4.0	—
RD22	384035121383801	08/21/2018	12:19	201	—	—	3.5	12.8	—	—	12.9	—	—
LIS	382829121351801	08/21/2018	09:08	76.8	—	—	(2.0)	8.9	—	—	8.8	—	94.7
BL5	381627121395101	08/22/2018	12:50	24.6	—	—	(2.0)	—	—	—	6.9	—	66.1
RYI	11455350	08/22/2018	11:20	34.3	—	—	—	—	—	—	6.4	—	39.4
RCS	384737121433201	08/30/2018	10:01	364	—	—	3.4	—	—	—	12.7	4.1	—
RD22	384035121383801	08/30/2018	11:35	260	—	—	(2.2)	—	—	—	13.0	3.6	—
LIS	382829121351801	08/30/2018	14:05	254	—	—	(1.9)	—	—	—	13.9	3.9	(2.4)
BL5	381627121395101	08/30/2018	12:28	24.8	—	—	(2.1)	—	—	—	6.9	—	50.7

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
RYI	11455350	08/30/2018	10:55	40.0	—	—	(2.0)	—	—	—	—	—	24.0
RCS	384737121433201	09/04/2018	13:10	381	—	—	(2.1)	—	—	—	12.1	4.6	—
RD22	384035121383801	09/04/2018	14:54	278	—	—	—	—	—	—	11.7	4.9	—
LIS	382829121351801	09/04/2018	09:26	290	—	—	(2.1)	—	—	—	11.5	6.9	3.9
BL5	381627121395101	09/05/2018	12:20	47.1	—	—	(2.5)	—	—	—	—	—	50.5
RYI	11455350	09/05/2018	13:15	46.9	—	—	(2.0)	—	—	—	—	—	17.8
RCS	384737121433201	09/18/2018	09:25	298	—	—	—	—	—	—	11.3	—	—
RD22	384035121383801	09/18/2018	10:51	331	—	—	—	—	—	—	14.3	—	—
LIS	382829121351801	09/19/2018	10:00	289	—	—	—	—	—	—	13.7	—	(2.7)*
BLS	381627121395101	09/19/2018	12:49	67.3	—	—	—	—	—	—	11.1	—	49.9
RYI	11455350	09/19/2018	10:19	50.3	—	—	—	—	—	—	—	—	123*
RCS	384737121433201	10/09/2018	09:34	215	—	—	—	—	—	—	12.0	—	—
RD22	384035121383801	10/09/2018	11:30	163	—	—	11.8	10.1	—	—	14.8	—	—
LIS	382829121351801	10/10/2018	08:45	28.3	—	—	—	—	—	—	8.8	—	27.5
BL5	381627121395101	10/10/2018	12:28	18.1	—	—	—	—	—	—	—	—	65.4
RYI	11455350	10/10/2018	13:38	15.5	—	—	(2.4)	—	—	—	—	—	66.0
RCS	384737121433201	10/25/2018	08:07	164	—	—	—	—	—	—	—	—	—
RD22	384035121383801	10/25/2018	09:43	87.4	—	—	13.0	12.7	3.2	6.4	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	3,4-Dichloroaniline [66584]	Dichlorvos [68572]	Dithiopyr [51837]	Diuron [66598]	Fipronil [66604]	Fipronil sulfide [66610]	Fipronil sulfone [66613]	Fluopyram [52761]	Flupyradifurone [52764]	Fluridone [51864]
LIS	382829121351801	10/25/2018	13:28	38.7	—	—	—	—	—	—	—	—	60.8
BL5	381627121395101	10/25/2018	11:21	10.8	—	—	(2.1)	—	—	—	—	—	119
RYI	11455350	10/25/2018	12:26	7.2	—	—	(2.3)	(2.0)	—	—	—	—	267
LIS	382829121351801	11/08/2018	12:27	26.0	—	—	—	—	—	—	—	—	69.4

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
RCS	384737121433201	06/23/2016	09:42	14.6	36.6	46.4	—	NA	NA	7.0	66.3	—
RD22	384035121383801	06/23/2016	11:05	12.4	30.6	45.3	—	NA	NA	6.0	81.1	8.3
LIS	382829121351801	06/23/2016	13:15	13.6	26.7	43.4	—	NA	NA	2.9	77.1	8.7
BL5	381627121395101	06/23/2016	12:30	—	10.2	36.0	—	NA	NA	—	33.9	—
RCS	384737121433201	07/19/2016	08:10	—	11.2	21.7	—	NA	NA	35.8	17.6	—
RD22	384035121383801	07/19/2016	08:45	—	12.3	21.9	—	NA	NA	35.9	28.3	—
LIS	382829121351801	07/19/2016	09:47	—	11.5	20.7	—	NA	NA	35.0	21.2	—
BL5	381627121395101	07/19/2016	11:42	—	(3.1)	15.6	—	NA	NA	2.8	9.0	—
RCS	384737121433201	07/28/2016	08:10	—	5.9	17.7	—	NA	NA	81.6	27.5	—
RD22	384035121383801	07/28/2016	09:35	—	5.8	19.4	—	NA	NA	75.6	17.3	—
LIS	382829121351801	07/28/2016	11:16	—	6.0	15.9	(2.0)	NA	NA	60.2	11.0	—
BL5	381627121395101	07/28/2016	11:15	—	(2.8)	9.4	—	NA	NA	18.0	9.6	—
RD22	384035121383801	08/02/2016	07:54	—	12.7	28.3	4.0	NA	NA	56.7	35.4	—
LIS	382829121351801	08/02/2016	09:15	—	(3.3)	16.2	—	NA	NA	43.8	18.3	—
BL5	381627121395101	08/02/2016	10:45	—	(3.1)	12.7	—	NA	NA	18.7	6.0	—
RD22	384035121383801	08/09/2016	08:54	—	11.6	24.5	9.7	NA	NA	44.1	40.3	—
LIS	382829121351801	08/09/2016	12:09	—	9.0	14.7	5.1	NA	NA	40.5	33.0	—
BL5	381627121395101	08/09/2016	10:15	—	—	12.8	—	NA	NA	15.6	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
RCS	384737121433201	06/29/2017	09:20	—	28.5	29.3	18.1	—	NA	9.8	157	—
LIS	382829121351801	06/28/2017	09:25	—	16.9	19.7	33.5	—	NA	5.9	204	—
BL5	381627121395101	06/28/2017	12:14	—	—	24.8	—	—	NA	—	55.3	—
RYI	11455350	06/28/2017	13:30	—	—	22.9	—	—	NA	—	29.8	—
RCS	384737121433201	07/13/2017	08:19	—	32.2	24.1	10.2	—	NA	1,500	40.3	—
RD22	384035121383801	07/13/2017	09:33	—	25.9	23.6	23.3	6.8	NA	433	93.6	—
LIS	382829121351801	07/13/2017	11:35	—	18.4	24.1	—	—	NA	15.7	150	—
BL5	381627121395101	07/13/2017	12:00	—	—	23.1	—	—	NA	3.5	24.0	—
RYI	11455350	07/13/2017	10:59	—	—	19.1	—	—	NA	18.3	12.2	—
RCS	384737121433201	07/27/2017	08:46	—	11.7	30.6	(3.2)	—	NA	776	18.7	—
RD22	384035121383801	07/27/2017	10:16	—	9.8	25.7	6.0	—	NA	272	112	—
LIS	382829121351801	07/27/2017	12:45	—	12.9	20.0	—	—	NA	52.8	70.1	—
BL5	381627121395101	07/27/2017	11:44	—	—	20.4	—	—	NA	53.3	17.1	—
RYI	11455350	07/27/2017	11:00	—	—	22.9	—	—	NA	86.9	13.9	—
RCS	384737121433201	08/10/2017	08:20	—	19.1	39.2	—	—	NA	548	22.4	—
RD22	384035121383801	08/10/2017	09:40	—	21.5	29.2	8.0	—	NA	318	370	—
LIS	382829121351801	08/10/2017	11:49	—	—	26.4	—	—	NA	34.7	40.2	—
BL5	381627121395101	08/10/2017	11:20	—	—	26.6	—	—	NA	74.9	9.2	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
RYI	11455350	08/10/2017	10:34	—	—	26.7	—	—	NA	84.8	7.1	—
RCS	384737121433201	08/31/2017	08:20	—	10.3	31.4	—	—	NA	403	7.3	—
RD22	384035121383801	08/31/2017	09:54	—	11.9	28.0	—	—	NA	108	188	—
LIS	382829121351801	08/30/2017	10:21	—	8.3	18.8	—	—	NA	50.9	39.3	—
BL5	381627121395101	08/30/2017	12:41	—	5.0	19.3	—	—	NA	65.4	6.5	—
RYI	11455350	08/30/2017	13:47	—	—	21.9	—	—	NA	72.2	5.2	—
RCS	384737121433201	09/13/2017	08:34	—	9.5	34.9	3.8	—	NA	206	8.9	—
RD22	384035121383801	09/13/2017	10:13	—	11.7	24.5	—	—	NA	96.2	73.8	—
LIS	382829121351801	09/13/2017	13:15	—	9.5	24.1	—	—	NA	84.9	40.7	—
BL5	381627121395101	09/13/2017	12:10	—	6.1	24.4	—	—	NA	29.8	6.2	—
RY1	11455350	09/13/2017	13:15	—	—	26.4	—	—	NA	39.7	4.5	—
RCS	384737121433201	09/20/2017	12:00	—	9.2	27.8	—	—	NA	310	7.4	—
RD22	384035121383801	09/20/2017	12:50	—	8.7	22.4	(3.2)	—	NA	87.8	87.1	—
LIS	382829121351801	09/20/2017	14:30	—	7.1	16.0	(3.1)	—	NA	79.3	33.7	—
BL5	381627121395101	09/20/2017	13:12	—	—	17.6	—	—	NA	46.9	6.0	—
RYI	11455350	09/20/2017	12:40	—	—	18.3	—	—	NA	36.5	10.3	—
RCS	384737121433201	10/04/2017	13:10	—	16.3	37.4	—	—	NA	134	13.8	—
RD22	384035121383801	10/04/2017	13:50	—	7.2	34.7	—	—	NA	46.9	38.6	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
LIS	382829121351801	10/04/2017	15:20	—	—	27.2	—	—	NA	41.9	12.3	—
BL5	381627121395101	10/04/2017	13:25	—	—	25.5	—	—	NA	22.9	15.1	—
RYI	11455350	10/04/2017	13:00	—	—	27.4	—	—	NA	13.2	21.1	—
RCS	384737121433201	10/18/2017	12:45	—	12.4	26.1	—	—	NA	278	7.2	—
RD22	384035121383801	10/18/2017	13:20	—	7.7	21.5	7.6	9.9	NA	16.2	12.5	—
LIS	382829121351801	10/18/2017	14:55	—	(4.5)	21.4	—	—	NA	16.7	7.6	—
BL5	381627121395101	10/18/2017	11:00	—	—	19.8	—	—	NA	10.3	6.4	—
RYI	11455350	10/18/2017	10:30	—	—	18.3	—	—	NA	5.8	4.2	—
RCS	384737121433201	11/01/2017	10:10	—	10.3	17.7	—	—	NA	88.7	4.3	—
RD22	384035121383801	11/01/2017	10:45	—	(4.4)	13.4	10.2	6.2	NA	10.2	10.9	—
LIS	382829121351801	11/01/2017	12:40	—	—	15.1	—	—	NA	16.2	5.2	—
BL5	381627121395101	11/01/2017	10:40	—	—	14.8	—	—	NA	10.9	3.5	—
RYI	11455350	11/01/2017	10:10	—	—	14.2	—	—	NA	8.9	—	—
RCS	384737121433201	07/10/2018	09:45	—	17.7	16.3	5.2	—	—	93.5	42.4	—
RD22	384035121383801	07/10/2018	11:02	—	(4.4)	9.2	—	—	—	28.9	31.7	—
LIS	382829121351801	07/11/2018	11:11	—	(3.1)	10.2	—	—	—	11.0	11.5	—
BL5	381627121395101	07/11/2018	12:09	—	(2.7)	9.4	—	—	—	8.8	9.5	—
RYI	11455350	07/11/2018	13:12	—	—	10.7	—	—	—	15.1	5.9	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
RCS	384737121433201	07/26/2018	09:13	—	12.0	20.8	(2.3)	—	—	373	16.0	—
RD22	384035121383801	07/26/2018	11:09	—	12.6	17.3	13.6	—	23.7	142	57.7	—
LIS	382829121351801	07/26/2018	13:11	—	(4.0)	16.4	—	—	—	16.3	25.1	—
BL5	381627121395101	07/26/2018	12:45	—	—	13.9	—	—	—	32.4	5.1	—
RYI	11455350	07/26/2018	11:30	—	—	14.9	—	—	—	44.3	5.9	—
RCS	384737121433201	08/07/2018	09:15	—	13.9	17.0	—	—	—	249	57.0	—
RD22	384035121383801	08/07/2018	10:50	—	11.6	23.5	13.9	—	—	98.9	11.2	—
LIS	382829121351801	08/08/2018	12:11	—	(3.5)	15.7	—	—	—	29.7	25.1	—
BL5	381627121395101	08/08/2018	13:08	—	—	15.1	—	—	—	42.7	4.3	—
RYI	11455350	08/08/2018	11:43	—	—	15.6	—	—	—	66.5	4.2	—
RCS	384737121433201	08/21/2018	09:43	—	8.7	15.9	—	—	—	148	—	—
RD22	384035121383801	08/21/2018	12:19	—	13.2	12.2	—	—	—	67.8	8.4	—
LIS	382829121351801	08/21/2018	09:08	—	(3.9)	14.3	—	—	—	44.9	19.8	—
BL5	381627121395101	08/22/2018	12:50	—	(2.9)	12.4	—	—	—	47.7	3.8	—
RYI	11455350	08/22/2018	11:20	—	(2.5)	13.0	—	—	—	49.4	4.2	—
RCS	384737121433201	08/30/2018	10:01	—	10.2	18.2	—	—	—	170	—	—
RD22	384035121383801	08/30/2018	11:35	—	11.2	19.7	—	—	—	156	5.9	—
LIS	382829121351801	08/30/2018	14:05	—	11.5	20.0	—	—	—	153	11.2	—
BL5	381627121395101	08/30/2018	12:28	—	(3.1)	13.5	—	—	—	46.2	4.3	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
RYI	11455350	08/30/2018	10:55	—	(2.8)	14.1	—	—	—	50.9	—	—
RCS	384737121433201	09/04/2018	13:10	—	11.5	21.2	—	—	—	137	6.0	—
RD22	384035121383801	09/04/2018	14:54	—	10.8	18.4	—	—	—	144	5.9	—
LIS	382829121351801	09/04/2018	09:26	—	10.1	16.8	—	—	—	142	13.1	—
BL5	381627121395101	09/05/2018	12:20	—	(2.8)	13.4	—	—	—	63.7	—	—
RYI	11455350	09/05/2018	13:15	—	(3.3)	12.9	—	—	—	55.4	4.5	—
RCS	384737121433201	09/18/2018	09:25	—	14.3	—	—	—	—	112	—	—
RD22	384035121383801	09/18/2018	10:51	—	16.6	24.7	—	—	—	132	—	—
LIS	382829121351801	09/19/2018	10:00	—	16.0	24.4	—	—	—	143	8.3	—
BLS	381627121395101	09/19/2018	12:49	—	(4.6)	19.2	—	—	—	25.2	—	—
RYI	11455350	09/19/2018	10:19	—	(3.1)	18.2	—	—	—	42.5	—	—
RCS	384737121433201	10/09/2018	09:34	—	14.2	17.4	—	—	—	56.6	—	—
RD22	384035121383801	10/09/2018	11:30	—	18.9	16.2	—	—	—	71.4	6.0	3.3
LIS	382829121351801	10/10/2018	08:45	—	9.7	17.7	—	—	—	16.9	7.1	—
BL5	381627121395101	10/10/2018	12:28	—	—	13.5	—	—	—	18.7	7.7	—
RYI	11455350	10/10/2018	13:38	—	—	141	—	—	—	13.4	11.8	—
RCS	384737121433201	10/25/2018	08:07	—	6.9	11.6	—	—	—	42.3	—	—
RD22	384035121383801	10/25/2018	09:43	—	10.7	11.4	—	—	—	62.3	4.7	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Flutolanil [51842]	Fluxapyroxad [51851]	Hexazinone [65085]	Imidacloprid [68426]	Imidacloprid urea [51859]	Indaziflam [53960]	Methoxy-fenozide [68647]	Metolachlor [65090]	Oxadiazon [51843]
LIS	382829121351801	10/25/2018	13:28	—	(3.9)	14.1	—	—	—	29.6	5.6	—
BL5	381627121395101	10/25/2018	11:21	—	(2.5)	12.4	—	—	—	14.1	7.2	—
RYI	11455350	10/25/2018	12:26	—	—	12.9	—	—	—	7.5	6.6	—
LIS	382829121351801	11/08/2018	12:27	—	8.9	13.3	—	—	—	31.9	7.1	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
RCS	384737121433201	06/23/2016	09:42	70.4	NA	—	675	—	—	—	6.8	—
RD22	384035121383801	06/23/2016	11:05	103	NA	—	132	—	—	—	5.6	—
LIS	382829121351801	06/23/2016	13:15	9.1	NA	—	94.8	—	—	—	6.1	18.0
BL5	381627121395101	06/23/2016	12:30	—	NA	—	73.8	—	—	—	—	—
RCS	384737121433201	07/19/2016	08:10	11.1	NA	72.8	47.3	12.0	—	—	—	—
RD22	384035121383801	07/19/2016	08:45	6.7	NA	50.1	38.1	10.2	—	—	—	—
LIS	382829121351801	07/19/2016	09:47	18.2	NA	44.5	203	8.4	—	—	—	—
BL5	381627121395101	07/19/2016	11:42	(2.2)	NA	9.8	(5.4)	—	—	—	—	—
RCS	384737121433201	07/28/2016	08:10	8.4	NA	19.0	27.0	—	—	—	—	—
RD22	384035121383801	07/28/2016	09:35	8.5	NA	16.3	30.4	—	—	—	—	—
LIS	382829121351801	07/28/2016	11:16	5.7	NA	32.1	—	—	—	—	—	—
BL5	381627121395101	07/28/2016	11:15	5.1	NA	—	—	—	—	—	—	—
RD22	384035121383801	08/02/2016	07:54	9.0	NA	45.9	—	—	—	—	—	—
LIS	382829121351801	08/02/2016	09:15	24.4	NA	14.7	—	—	—	—	—	—
BL5	381627121395101	08/02/2016	10:45	4.1	NA	—	—	—	—	—	—	—
RD22	384035121383801	08/09/2016	08:54	8.7	NA	55.0	—	—	—	—	—	—
LIS	382829121351801	08/09/2016	12:09	15.7	NA	—	—	—	—	—	—	—
BL5	381627121395101	08/09/2016	10:15	(2.7)	NA	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
RCS	384737121433201	06/29/2017	09:20	122	—	20.4	734	—	38.7	9.2	—	16.5
LIS	382829121351801	06/28/2017	09:25	81.1	—	—	—	—	17.6	4.3	—	15.7
BL5	381627121395101	06/28/2017	12:14	—	—	4.3	—	—	—	—	—	—
RYI	11455350	06/28/2017	13:30	—	—	6.1	26.4	—	8.2	—	—	—
RCS	384737121433201	07/13/2017	08:19	259	—	69.2	49.4	—	19.0	5.5	—	11.0
RD22	384035121383801	07/13/2017	09:33	188	—	47.9	—	—	27.9	8.5	—	—
LIS	382829121351801	07/13/2017	11:35	46.1	—	—	—	—	—	4.9	—	14.3
BL5	381627121395101	07/13/2017	12:00	7.5	—	—	—	—	—	—	—	—
RYI	11455350	07/13/2017	10:59	5.3	—	7.5	24.1	—	—	—	—	—
RCS	384737121433201	07/27/2017	08:46	45.6	—	86.3	43.9	—	—	4.2	—	—
RD22	384035121383801	07/27/2017	10:16	37.1	—	30.8	—	—	—	6.7	—	—
LIS	382829121351801	07/27/2017	12:45	—	—	12.9	—	—	—	—	—	—
BL5	381627121395101	07/27/2017	11:44	(3.1)	—	4.9	—	—	—	—	—	—
RYI	11455350	07/27/2017	11:00	(3.3)	—	12.8	18.0	—	—	—	—	—
RCS	384737121433201	08/10/2017	08:20	29.0	—	24.0	—	—	—	—	—	—
RD22	384035121383801	08/10/2017	09:40	21.0	—	—	—	—	—	7.0	—	—
LIS	382829121351801	08/10/2017	11:49	(3.0)	—	—	—	—	—	—	—	—
BL5	381627121395101	08/10/2017	11:20	—	—	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
RYI	11455350	08/10/2017	10:34	(2.5)	—	—	—	—	—	—	—	—
RCS	384737121433201	08/31/2017	08:20	11.2	—	61.6	—	—	—	(3.0)	—	—
RD22	384035121383801	08/31/2017	09:54	4.0	—	21.6	—	—	—	6.3	—	—
LIS	382829121351801	08/30/2017	10:21	4.7	—	—	—	—	—	—	—	6.6
BL5	381627121395101	08/30/2017	12:41	(2.1)	—	—	—	—	—	—	—	—
RYI	11455350	08/30/2017	13:47	—	—	6.6	—	—	—	—	—	—
RCS	384737121433201	09/13/2017	08:34	8.2	—	13.8	—	—	—	(2.8)	—	—
RD22	384035121383801	09/13/2017	10:13	3.5	—	—	—	—	—	5.4	—	—
LIS	382829121351801	09/13/2017	13:15	4.2	—	7.0	—	—	—	(2.7)	—	8.7
BL5	381627121395101	09/13/2017	12:10	—	—	—	—	—	—	—	—	—
RY1	11455350	09/13/2017	13:15	—	—	6.4	—	—	—	—	—	—
RCS	384737121433201	09/20/2017	12:00	(2.3)	—	—	—	—	10.7	—	—	—
RD22	384035121383801	09/20/2017	12:50	(2.0)	—	—	—	—	—	—	—	—
LIS	382829121351801	09/20/2017	14:30	—	—	—	—	—	—	—	—	7.8
BL5	381627121395101	09/20/2017	13:12	—	—	—	—	—	—	—	—	—
RYI	11455350	09/20/2017	12:40	—	—	4.2	—	—	—	—	—	—
RCS	384737121433201	10/04/2017	13:10	(2.1)	—	—	—	—	14.0	(3.5)	—	—
RD22	384035121383801	10/04/2017	13:50	(2.4)	—	—	—	—	—	(4.4)	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
LIS	382829121351801	10/04/2017	15:20	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/04/2017	13:25	—	—	—	—	—	—	—	—	—
RYI	11455350	10/04/2017	13:00	—	—	—	—	—	—	—	—	—
RCS	384737121433201	10/18/2017	12:45	5.5	—	—	—	—	—	—	—	—
RD22	384035121383801	10/18/2017	13:20	(2.1)	—	—	—	—	—	—	—	—
LIS	382829121351801	10/18/2017	14:55	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/18/2017	11:00	—	—	—	—	—	—	—	—	—
RYI	11455350	10/18/2017	10:30	—	—	—	—	—	—	—	—	—
RCS	384737121433201	11/01/2017	10:10	(3.0)	—	—	—	—	—	—	—	—
RD22	384035121383801	11/01/2017	10:45	—	—	—	—	—	—	(2.7)	—	—
LIS	382829121351801	11/01/2017	12:40	—	—	—	—	—	—	—	—	—
BL5	381627121395101	11/01/2017	10:40	—	—	—	—	—	—	—	—	—
RYI	11455350	11/01/2017	10:10	—	—	—	—	—	—	—	—	—
RCS	384737121433201	07/10/2018	09:45	101	10.2	193	79.8	—	—	(3.7)	—	—
RD22	384035121383801	07/10/2018	11:02	5.5	—	13.1	—	—	—	—	—	—
LIS	382829121351801	07/11/2018	11:11	4.1	—	—	(8.3)	—	—	—	—	—
BL5	381627121395101	07/11/2018	12:09	(2.5)	—	—	(8.2)	—	—	(2.1)	—	—
RYI	11455350	07/11/2018	13:12	—	—	—	24.7	—	—	(1.6)	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
RCS	384737121433201	07/26/2018	09:13	33.4	—	27.8	28.1	—	39.9	—	—	—
RD22	384035121383801	07/26/2018	11:09	16.0	—	22.3	39.6	—	—	—	—	—
LIS	382829121351801	07/26/2018	13:11	—	—	—	—	—	—	—	—	—
BL5	381627121395101	07/26/2018	12:45	—	—	—	—	—	—	—	—	—
RYI	11455350	07/26/2018	11:30	—	—	5.3	16.7	—	—	—	—	—
RCS	384737121433201	08/07/2018	09:15	(3.0)	—	27.3	—	—	—	—	—	—
RD22	384035121383801	08/07/2018	10:50	10.8	—	33.7	—	—	146	—	—	—
LIS	382829121351801	08/08/2018	12:11	—	—	—	—	—	—	—	—	—
BL5	381627121395101	08/08/2018	13:08	—	—	—	—	—	—	—	—	—
RYI	11455350	08/08/2018	11:43	—	—	8.2	—	—	11.4	—	—	—
RCS	384737121433201	08/21/2018	09:43	(3.4)	—	25.2	—	—	87.1	—	—	—
RD22	384035121383801	08/21/2018	12:19	(2.2)	—	8.1	—	—	—	—	—	—
LIS	382829121351801	08/21/2018	09:08	—	—	—	—	—	—	—	—	—
BL5	381627121395101	08/22/2018	12:50	—	—	—	—	—	10.3	—	—	—
RYI	11455350	08/22/2018	11:20	—	—	5.0	—	—	12.9	—	—	—
RCS	384737121433201	08/30/2018	10:01	—	—	12.4	—	—	75.3	—	—	—
RD22	384035121383801	08/30/2018	11:35	—	—	24.0	—	—	83.4	—	—	—
LIS	382829121351801	08/30/2018	14:05	(3.2)	—	9.6	—	—	86.0	—	—	—
BL5	381627121395101	08/30/2018	12:28	—	—	3.3	—	—	9.9	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
RYI	11455350	08/30/2018	10:55	—	—	6.7	—	—	19.5	—	—	—
RCS	384737121433201	09/04/2018	13:10	3.7	—	7.4	—	—	95.0	—	—	—
RD22	384035121383801	09/04/2018	14:54	(3.0)	—	—	—	—	86.4	—	—	—
LIS	382829121351801	09/04/2018	09:26	4.8	—	6.9	—	—	64.2	—	—	—
BL5	381627121395101	09/05/2018	12:20	—	—	4.3	—	—	15.4	—	—	—
RYI	11455350	09/05/2018	13:15	—	—	—	—	—	15.9	—	—	—
RCS	384737121433201	09/18/2018	09:25	(3.3)	—	—	—	—	37.0	—	—	—
RD22	384035121383801	09/18/2018	10:51	5.4	—	—	—	—	47.1	—	—	—
LIS	382829121351801	09/19/2018	10:00	5.7	—	—	—	—	43.2	—	—	—
BLS	381627121395101	09/19/2018	12:49	(2.4)	—	—	—	—	17.7	—	—	—
RYI	11455350	09/19/2018	10:19	—	—	—	—	—	9.2	—	—	—
RCS	384737121433201	10/09/2018	09:34	(3.0)	—	—	—	—	78.5	—	—	—
RD22	384035121383801	10/09/2018	11:30	(2.8)	—	—	—	—	—	—	—	—
LIS	382829121351801	10/10/2018	08:45	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/10/2018	12:28	—	—	—	—	—	—	—	—	—
RYI	11455350	10/10/2018	13:38	—	—	—	—	—	—	—	—	—
RCS	384737121433201	10/25/2018	08:07	—	—	—	—	—	22.4	—	—	—
RD22	384035121383801	10/25/2018	09:43	—	—	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Penoxsulam [51863]	Penthiopyrad [52769]	Piperonyl butoxide [65102]	Propanil [66641]	Propargite [68677]	Propiconazole [66643]	Pyrimethanil [67717]	Quinoxyfen [51847]	Simazine [65105]
LIS	382829121351801	10/25/2018	13:28	—	—	—	—	—	—	—	—	—
BL5	381627121395101	10/25/2018	11:21	—	—	—	—	—	—	—	—	—
RYI	11455350	10/25/2018	12:26	—	—	—	—	—	—	—	—	—
LIS	382829121351801	11/08/2018	12:27	—	—	—	—	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
RCS	384737121433201	06/23/2016	09:42	—	—	—	191	11.2
RD22	384035121383801	06/23/2016	11:05	—	—	—	125	10.9
LIS	382829121351801	06/23/2016	13:15	—	—	—	105	14.0
BL5	381627121395101	06/23/2016	12:30	—	—	—	15.5	—
RCS	384737121433201	07/19/2016	08:10	—	—	—	75.7	—
RD22	384035121383801	07/19/2016	08:45	—	—	—	59.0	—
LIS	382829121351801	07/19/2016	09:47	—	—	—	49.0	—
BL5	381627121395101	07/19/2016	11:42	—	—	—	—	—
RCS	384737121433201	07/28/2016	08:10	—	—	—	60.3	—
RD22	384035121383801	07/28/2016	09:35	—	—	—	50.5	—
LIS	382829121351801	07/28/2016	11:16	—	—	—	32.6	—
BL5	381627121395101	07/28/2016	11:15	—	—	—	—	—
RD22	384035121383801	08/02/2016	07:54	—	—	—	36.0	—
LIS	382829121351801	08/02/2016	09:15	—	—	—	27.0	—
BL5	381627121395101	08/02/2016	10:45	—	—	—	—	—
RD22	384035121383801	08/09/2016	08:54	—	8.2	—	—	—
LIS	382829121351801	08/09/2016	12:09	—	—	—	—	—
BL5	381627121395101	08/09/2016	10:15	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
RCS	384737121433201	06/29/2017	09:20	—	—	—	254	—
LIS	382829121351801	06/28/2017	09:25	626	—	—	—	17.1
BL5	381627121395101	06/28/2017	12:14	—	—	—	—	—
RYI	11455350	06/28/2017	13:30	—	—	—	7.4	—
RCS	384737121433201	07/13/2017	08:19	—	—	—	114	—
RD22	384035121383801	07/13/2017	09:33	—	3.9	6.0	78.7	—
LIS	382829121351801	07/13/2017	11:35	—	—	—	—	—
BL5	381627121395101	07/13/2017	12:00	—	—	—	—	—
RYI	11455350	07/13/2017	10:59	—	—	—	—	—
RCS	384737121433201	07/27/2017	08:46	—	—	—	76.0	—
RD22	384035121383801	07/27/2017	10:16	—	5.6	—	20.1	—
LIS	382829121351801	07/27/2017	12:45	—	—	—	6.5	—
BL5	381627121395101	07/27/2017	11:44	—	—	—	4.2	—
RYI	11455350	07/27/2017	11:00	—	—	—	4.7	—
RCS	384737121433201	08/10/2017	08:20	—	—	—	60.7	—
RD22	384035121383801	08/10/2017	09:40	—	7.5	—	17.5	—
LIS	382829121351801	08/10/2017	11:49	—	—	—	—	—
BL5	381627121395101	08/10/2017	11:20	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
RYI	11455350	08/10/2017	10:34	—	—	—	4.0	—
RCS	384737121433201	08/31/2017	08:20	—	—	—	—	—
RD22	384035121383801	08/31/2017	09:54	—	8.1	—	—	—
LIS	382829121351801	08/30/2017	10:21	—	—	—	—	—
BL5	381627121395101	08/30/2017	12:41	—	—	—	—	—
RYI	11455350	08/30/2017	13:47	—	—	—	—	—
RCS	384737121433201	09/13/2017	08:34	—	—	—	—	—
RD22	384035121383801	09/13/2017	10:13	—	—	—	—	—
LIS	382829121351801	09/13/2017	13:15	—	—	—	—	—
BL5	381627121395101	09/13/2017	12:10	—	—	—	—	—
RY1	11455350	09/13/2017	13:15	—	—	—	—	—
RCS	384737121433201	09/20/2017	12:00	—	—	—	—	—
RD22	384035121383801	09/20/2017	12:50	—	4.1	—	—	—
LIS	382829121351801	09/20/2017	14:30	—	—	—	—	—
BL5	381627121395101	09/20/2017	13:12	—	—	—	—	—
RYI	11455350	09/20/2017	12:40	—	—	—	—	—
RCS	384737121433201	10/04/2017	13:10	—	—	—	—	—
RD22	384035121383801	10/04/2017	13:50	—	6.6	(3.2)	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
LIS	382829121351801	10/04/2017	15:20	—	—	—	—	—
BL5	381627121395101	10/04/2017	13:25	—	—	—	—	—
RYI	11455350	10/04/2017	13:00	—	—	—	—	—
RCS	384737121433201	10/18/2017	12:45	—	—	—	—	—
RD22	384035121383801	10/18/2017	13:20	—	12.8	—	—	—
LIS	382829121351801	10/18/2017	14:55	—	—	—	—	—
BL5	381627121395101	10/18/2017	11:00	—	—	—	—	—
RYI	11455350	10/18/2017	10:30	—	—	—	—	—
RCS	384737121433201	11/01/2017	10:10	—	—	—	5.8	—
RD22	384035121383801	11/01/2017	10:45	—	6.3	—	—	—
LIS	382829121351801	11/01/2017	12:40	—	—	—	—	—
BL5	381627121395101	11/01/2017	10:40	—	—	—	—	—
RYI	11455350	11/01/2017	10:10	—	—	—	—	—
RCS	384737121433201	07/10/2018	09:45	—	—	4.2	62.9	—
RD22	384035121383801	07/10/2018	11:02	—	7.3	3.6	20.2	—
LIS	382829121351801	07/11/2018	11:11	—	—	—	—	—
BL5	381627121395101	07/11/2018	12:09	—	—	—	—	—
RYI	11455350	07/11/2018	13:12	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
RCS	384737121433201	07/26/2018	09:13	—	—	—	69.4	—
RD22	384035121383801	07/26/2018	11:09	—	(3.3)	3.4	35.1	—
LIS	382829121351801	07/26/2018	13:11	—	—	—	—	—
BL5	381627121395101	07/26/2018	12:45	—	—	—	—	—
RYI	11455350	07/26/2018	11:30	—	—	—	—	—
RCS	384737121433201	08/07/2018	09:15	—	—	(2.1)	—	—
RD22	384035121383801	08/07/2018	10:50	—	3.9	—	46.6	—
LIS	382829121351801	08/08/2018	12:11	—	—	—	—	—
BL5	381627121395101	08/08/2018	13:08	—	—	—	—	—
RYI	11455350	08/08/2018	11:43	—	—	—	—	—
RCS	384737121433201	08/21/2018	09:43	—	—	—	35.2	—
RD22	384035121383801	08/21/2018	12:19	—	8.3	—	—	—
LIS	382829121351801	08/21/2018	09:08	—	—	—	—	—
BL5	381627121395101	08/22/2018	12:50	—	—	—	—	—
RYI	11455350	08/22/2018	11:20	—	—	—	—	—
RCS	384737121433201	08/30/2018	10:01	—	—	—	44.0	—
RD22	384035121383801	08/30/2018	11:35	—	—	—	24.8	—
LIS	382829121351801	08/30/2018	14:05	—	—	—	—	—
BL5	381627121395101	08/30/2018	12:28	—	—	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
RYI	11455350	08/30/2018	10:55	—	—	—	—	—
RCS	384737121433201	09/04/2018	13:10	—	—	—	41.8	—
RD22	384035121383801	09/04/2018	14:54	—	—	—	—	—
LIS	382829121351801	09/04/2018	09:26	—	—	—	—	—
BL5	381627121395101	09/05/2018	12:20	—	—	—	—	—
RYI	11455350	09/05/2018	13:15	—	—	—	—	—
RCS	384737121433201	09/18/2018	09:25	—	—	—	—	—
RD22	384035121383801	09/18/2018	10:51	—	—	—	—	—
LIS	382829121351801	09/19/2018	10:00	—	—	—	—	—
BLS	381627121395101	09/19/2018	12:49	—	—	—	—	—
RYI	11455350	09/19/2018	10:19	—	—	—	—	—
RCS	384737121433201	10/09/2018	09:34	—	—	—	—	—
RD22	384035121383801	10/09/2018	11:30	—	6.4	—	—	—
LIS	382829121351801	10/10/2018	08:45	—	—	—	—	—
BL5	381627121395101	10/10/2018	12:28	—	—	—	—	—
RYI	11455350	10/10/2018	13:38	—	—	—	—	—
RCS	384737121433201	10/25/2018	08:07	—	—	—	—	—
RD22	384035121383801	10/25/2018	09:43	—	7.5	—	—	—

Table 12. Pesticide concentrations measured in environmental water samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Bifenthrin, Bromuconazole, Butralin, Butylate, Captan, Carbofuran, Carboxin, Chlorfenapyr, Chlorpyrifos oxon, Coumaphos, Cyantraniliprole, Cyazofamid, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cymoxanil, Cypermethrin, Cyproconazole, DCPA, Deltamethrin, Desthio-prothioconazole, Diazoxon, 3,5-Dichloroaniline, Difenoconazole, Dimethomorph, Dinotefuran, EPTC, Esfenvalerate, Ethaboxam, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpropathrin, Fenpyroximate, Fenthion, Flonicamid, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluoxastrobin, Flusilazole, Flutriafol, Imazalil, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Mandipropamid, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Molinate, Myclobutanil, Napropamide, Novaluron, Oryzalin, Oxathiapiprolin, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Prodiamine, Prometon, Prometryn, Propyzamide, Pyraclostrobin, Pyridaben, Pyriproxyfen, Resmethrin, Sedaxane, Sulfoxaflor, tau-Fluvalinate, Tebufenozide, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiacloprid, Thiamethoxam degradate (NOA-355190), Thiamethoxam degradate (NOA-407475), Thiazopyr, Tolfenpyrad, Triadimefon, Triadimenol, Triallate, Tribufos, Tricyclazole, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected; NA, not analyzed; *, values coded in NWIS as "V" analyte detected in laboratory blank]

DWR Site Code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Tebuconazole [66649]	Thiabendazole [67161]	Thiamethoxam [68245]	Thiobencarb [65107]	Trifloxystrobin [66660]
LIS	382829121351801	10/25/2018	13:28	—	—	—	—	—
BL5	381627121395101	10/25/2018	11:21	—	—	—	—	—
RYI	11455350	10/25/2018	12:26	—	—	—	—	—
LIS	382829121351801	11/08/2018	12:27	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
RCS	384737121433201	06/23/2016	09:42	Pre-pulse	—	2.2	9.9	—	—	—
RD22	384035121383801	06/23/2016	11:05	Pre-pulse	—	1.8	12.7	—	—	—
LIS	382829121351801	06/23/2016	13:15	Pre-pulse	—	3.3	4.1	—	—	—
BL5	381627121395101	06/23/2016	12:30	Pre-pulse	—	4.2	4.9	—	—	—
RCS	384737121433201	07/19/2016	08:10	Pulse	—	—	—	—	—	—
RD22	384035121383801	07/19/2016	08:45	Pulse	—	—	—	—	—	—
LIS	382829121351801	07/19/2016	09:47	Pulse	—	—	—	—	—	—
BL5	381627121395101	07/19/2016	11:42	Pulse	—	—	—	—	—	—
RCS	384737121433201	07/28/2016	08:10	Pulse	—	—	—	—	—	—
RD22	384035121383801	07/28/2016	09:35	Pulse	—	—	—	—	—	—
LIS	382829121351801	07/28/2016	11:16	Pulse	—	—	—	—	—	—
BL5	381627121395101	07/28/2016	11:15	Pulse	—	—	—	—	—	—
RD22	384035121383801	08/02/2016	07:54	Post-pulse	—	—	—	—	—	—
LIS	382829121351801	08/02/2016	09:15	Post-pulse	—	—	—	—	—	—
BL5	381627121395101	08/02/2016	10:45	Post-pulse	—	—	—	—	—	—
RD22	384035121383801	08/09/2016	08:54	Post-pulse	—	—	—	—	—	—
LIS	382829121351801	08/09/2016	12:09	Post-pulse	—	—	—	—	—	—
BL5	381627121395101	08/09/2016	10:15	Post-pulse	—	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
RCS	384737121433201	06/29/2017	09:20	Ambient	—	—	6.8	—	—	5.8
LIS	382829121351801	06/28/2017	09:25	Ambient	—	—	4.7	—	—	—
BL5	381627121395101	06/28/2017	12:14	Ambient	—	—	—	—	—	—
RYI	11455350	06/28/2017	13:30	Ambient	—	—	—	—	—	—
RCS	384737121433201	07/13/2017	08:19	Ambient	—	2.3	—	—	—	5.6
RD22	384035121383801	07/13/2017	09:33	Ambient	—	—	—	—	—	—
LIS	382829121351801	07/13/2017	11:35	Ambient	—	—	4.8	—	—	—
BL5	381627121395101	07/13/2017	12:00	Ambient	—	—	—	—	—	—
RYI	11455350	07/13/2017	10:59	Ambient	—	—	—	—	—	—
RCS	384737121433201	07/27/2017	08:46	Ambient	—	3.1	—	—	—	—
RD22	384035121383801	07/27/2017	10:16	Ambient	—	3.2	—	—	—	—
LIS	382829121351801	07/27/2017	12:45	Ambient	—	—	—	—	—	—
BL5	381627121395101	07/27/2017	11:44	Ambient	—	—	—	—	—	—
RYI	11455350	07/27/2017	11:00	Ambient	—	—	—	—	—	—
RCS	384737121433201	08/10/2017	08:20	Ambient	11.4	3.2	—	—	—	—
RD22	384035121383801	08/10/2017	09:40	Ambient	—	—	—	—	—	—
LIS	382829121351801	08/10/2017	11:49	Ambient	—	—	—	—	—	—
BL5	381627121395101	08/10/2017	11:20	Ambient	—	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
RYI	11455350	08/10/2017	10:34	Ambient	—	—	—	—	—	—
RCS	384737121433201	08/31/2017	08:20	Ambient	—	—	—	—	—	—
RD22	384035121383801	08/31/2017	09:54	Ambient	—	3.1	—	—	—	—
LIS	382829121351801	08/30/2017	10:21	Ambient	—	—	—	—	—	—
BL5	381627121395101	08/30/2017	12:41	Ambient	—	—	—	—	—	—
RYI	11455350	08/30/2017	13:47	Ambient	—	—	—	—	—	—
RCS	384737121433201	09/13/2017	08:34	Ambient	—	—	—	—	—	—
RD22	384035121383801	09/13/2017	10:13	Ambient	—	—	—	—	—	—
LIS	382829121351801	09/13/2017	13:15	Ambient	—	—	—	—	—	—
BL5	381627121395101	09/13/2017	12:10	Ambient	—	—	—	—	—	—
RY1	11455350	09/13/2017	13:15	Ambient	—	—	—	—	—	—
RCS	384737121433201	09/20/2017	12:00	Ambient	—	—	—	—	—	—
RD22	384035121383801	09/20/2017	12:50	Ambient	—	—	—	—	—	—
LIS	382829121351801	09/20/2017	14:30	Ambient	—	—	—	—	—	—
BL5	381627121395101	09/20/2017	13:12	Ambient	—	—	—	—	—	—
RYI	11455350	09/20/2017	12:40	Ambient	—	—	—	—	—	—
RCS	384737121433201	10/04/2017	13:10	Ambient	—	2.6	—	—	—	—
RD22	384035121383801	10/04/2017	13:50	Ambient	—	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
LIS	382829121351801	10/04/2017	15:20	Ambient	—	—	—	—	—	—
BL5	381627121395101	10/04/2017	13:25	Ambient	—	—	—	—	—	—
RYI	11455350	10/04/2017	13:00	Ambient	—	—	—	—	—	—
RCS	384737121433201	10/18/2017	12:45	Ambient	—	2.6	—	—	—	—
RD22	384035121383801	10/18/2017	13:20	Ambient	—	—	—	—	—	—
LIS	382829121351801	10/18/2017	14:55	Ambient	—	—	—	—	—	—
BL5	381627121395101	10/18/2017	11:00	Ambient	—	—	—	—	—	—
RYI	11455350	10/18/2017	10:30	Ambient	—	—	—	—	—	—
RCS	384737121433201	11/01/2017	10:10	Ambient	—	—	—	—	—	—
RD22	384035121383801	11/01/2017	10:45	Ambient	—	—	—	—	—	—
LIS	382829121351801	11/01/2017	12:40	Ambient	—	—	—	—	—	—
BL5	381627121395101	11/01/2017	10:40	Ambient	—	—	—	—	—	—
RYI	11455350	11/01/2017	10:10	Ambient	—	—	—	—	—	—
RCS	384737121433201	07/10/2018	09:45	Pre-pulse	(2.8)	—	—	—	—	—
RD22	384035121383801	07/10/2018	11:02	Pre-pulse	—	—	—	—	—	—
LIS	382829121351801	07/11/2018	11:11	Pre-pulse	—	—	—	—	—	—
BL5	381627121395101	07/11/2018	12:09	Pre-pulse	—	—	—	—	—	—
RYI	11455350	07/11/2018	13:12	Pre-pulse	—	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
RCS	384737121433201	07/26/2018	09:13	Pre-pulse	—	—	—	4.8	48.2	—
RD22	384035121383801	07/26/2018	11:09	Pre-pulse	—	—	—	21.7	—	—
LIS	382829121351801	07/26/2018	13:11	Pre-pulse	—	—	—	—	—	—
BL5	381627121395101	07/26/2018	12:45	Pre-pulse	—	—	—	—	—	—
RYI	11455350	07/26/2018	11:30	Pre-pulse	—	—	—	—	—	—
RCS	384737121433201	08/07/2018	09:15	Pre-pulse	22.0	—	—	—	42.2	—
RD22	384035121383801	08/07/2018	10:50	Pre-pulse	6.1	—	—	—	142	—
LIS	382829121351801	08/08/2018	12:11	Pre-pulse	—	—	—	—	—	—
BL5	381627121395101	08/08/2018	13:08	Pre-pulse	—	—	—	—	—	—
RYI	11455350	08/08/2018	11:43	Pre-pulse	—	—	—	—	—	—
RCS	384737121433201	08/21/2018	09:43	Pre-pulse	12.6	—	—	—	—	—
RD22	384035121383801	08/21/2018	12:19	Pre-pulse	7.8	—	—	—	—	—
LIS	382829121351801	08/21/2018	09:08	Pre-pulse	—	—	—	—	—	—
BL5	381627121395101	08/22/2018	12:50	Pre-pulse	—	—	—	—	—	—
RYI	11455350	08/22/2018	11:20	Pre-pulse	—	—	—	—	—	—
RCS	384737121433201	08/30/2018	10:01	Pulse	6.8	—	—	—	—	—
RD22	384035121383801	08/30/2018	11:35	Pulse	11.0	—	—	—	—	—
LIS	382829121351801	08/30/2018	14:05	Pulse	4.9	—	—	—	—	—
BL5	381627121395101	08/30/2018	12:28	Pulse	9.2	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
RYI	11455350	08/30/2018	10:55	Pulse	—	—	—	—	—	—
RCS	384737121433201	09/04/2018	13:10	Pulse	5.8	—	—	—	—	—
RD22	384035121383801	09/04/2018	14:54	Pulse	6.5	—	—	—	—	—
LIS	382829121351801	09/04/2018	09:26	Pulse	—	—	—	—	—	—
BL5	381627121395101	09/05/2018	12:20	Pulse	—	—	—	—	—	—
RYI	11455350	09/05/2018	13:15	Pulse	—	—	—	—	—	—
RCS	384737121433201	09/18/2018	09:25	Pulse	—	—	—	—	—	—
RD22	384035121383801	09/18/2018	10:51	Pulse	15.3	—	—	—	—	—
LIS	382829121351801	09/19/2018	10:00	Pulse	5.5	—	—	—	—	—
BLS	381627121395101	09/19/2018	12:49	Pulse	—	—	—	—	—	—
RYI	11455350	09/19/2018	10:19	Pulse	—	—	—	—	—	—
RCS	384737121433201	10/09/2018	09:34	Post-pulse	—	—	—	—	—	—
RD22	384035121383801	10/09/2018	11:30	Post-pulse	—	—	—	—	—	—
LIS	382829121351801	10/10/2018	08:45	Post-pulse	—	—	—	—	—	—
BL5	381627121395101	10/10/2018	12:28	Post-pulse	—	—	—	—	—	—
RYI	11455350	10/10/2018	13:38	Post-pulse	—	—	—	—	—	—
RCS	384737121433201	10/25/2018	08:07	Post-pulse	—	—	—	—	—	—
RD22	384035121383801	10/25/2018	09:43	Post-pulse	13.3	—	—	—	—	—

Table 13. Pesticide concentrations measured in environmental suspended-sediment samples collected from sites in the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Numbers in brackets are U.S. Geological Survey (USGS) National Water Information System (NWIS) parameter codes. Concentrations are in nanograms per liter. Results in parenthesis () are below method detection limits and are estimates. The following compounds were analyzed but were not detected in any samples: Acetochlor, Acibenzolar-S-methyl, Alachlor, Allethrin, Atrazine, Azinphos-methyl, Azinphos-methyl oxon, Benfluralin, Benzovindiflupyr, Boscalid, Bromuconazole, Butralin, Butylate, Captan, Carbaryl, Carbofuran, Chlorfenapyr, Chlorothalonil, Chlorpyrifos, Chlorpyrifos oxon, Coumaphos, Cycloate, Cyfluthrin, Cyhalofop-butyl, Cyhalothrin, Cypermethrin, Cyproconazole, Cyprodinil, DCPA, Deltamethrin, Desulfinylfipronil, Desulfinylfipronil Amide, Diazinon, Diazoxon, 3,4-Dichloroaniline, 3,5-Dichloroaniline, Dichlorvos, Difenoconazole, Dimethomorph, Dithiopyr, EPTC, Esfenvalerate, Ethalfluralin, Etofenprox, Etoxazole, Famoxadone, Fenamidone, Fenarimol, Fenbuconazole, Fenhexamid, Fenpyroximate, Fenthion, Fipronil, Fipronil sulfide, Fipronil sulfone, Fluazinam, Flubendiamide, Fludioxonil, Flufenacet, Flumetralin, Fluopicolide, Fluopyram, Flusilazole, Flutolanil, Flutriafol, Fluxapyroxad, Hexazinone, Imazalil, Indaziflam, Indoxacarb, Ipconazole, Iprodione, Isofetamid, Kresoxim-methyl, Malaoxon, Malathion, Metalaxyl, Metconazole, Methidathion, Methoprene, Methyl parathion, Metolachlor, Molinate, Myclobutanil, Napropamide, Novaluron, Oxadiazon, Oxyfluorfen, p,p'-DDD, p,p'-DDE, p,p'-DDT, Paclobutrazol, Pebulate, Pendimethalin, Pentachloroanisole, Pentachloronitrobenzene, Permethrin, Phenothrin, Phosmet, Picoxystrobin, Piperonyl butoxide, Prodiamine, Prometon, Prometryn, Propanil, Propargite, Propiconazole, Propyzamide, Pyraclostrobin, Pyridaben, Pyrimethanil, Pyriproxyfen, Quinoxyfen, Resmethrin, Sedaxane, Simazine, tau-Fluvalinate, Tebuconazole, Tebupirimfos, Tebupirimfos oxon, Tefluthrin, Tetraconazole, Tetradifon, Tetramethrin, Thiazopyr, Triadimefon, Triadimenol, Triallate, Tribufos, Trifloxystrobin, Triflumizole, Trifluralin, Triticonazole, and Zoxamide. **Abbreviations**: DWR, Department of Water Resources; mm/dd/yyyy, month/day/year; hh:mm, hours:minutes; —, not detected]

DWR Site code	USGS Station code	Sample date (mm/dd/yyyy)	Sample time (hh:mm)	Hydrologic condition	Azoxystrobin [66589]	Bifenthrin [65067]	Clomazone [67562]	Fenpropathrin [65083]	Fluoxastrobin [67645]	Thiobencarb [65107]
LIS	382829121351801	10/25/2018	13:28	Post-pulse	—	—	—	—	—	—
BL5	381627121395101	10/25/2018	11:21	Post-pulse	—	—	—	—	—	—
RYI	11455350	10/25/2018	12:26	Post-pulse	—	—	—	—	—	—
LIS	382829121351801	11/08/2018	12:27	Post-pulse	—	—	—	—	—	—

Table 14. Detection frequencies and maximum concentrations of dissolved pesticides and pesticide degradates detected in water samples collected from the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.

[Results in parenthesis () are below method detection limits and are estimates. **Abbreviations:** ng/L, nanograms per liter; ND, not detected; NA, not analyzed]

Pesticide or pesticide degradate	Pesticide type	2016 detection frequency (percent)	2016 maximum concentration (ng/L)	2017 detection frequency (percent)	2017 maximum concentration (ng/L)	2018 detection frequency (percent)	2018 maximum concentration (ng/L)	Overall detection frequency (percent)
Acetamiprid	Insecticide	6	(2.6)	ND	ND	7	11.6	4
Atrazine	Herbicide	ND	ND	2	6.3	ND	ND	1
Azoxystrobin	Fungicide	100	1,020	100	2,510	100	8,870	100
Boscalid	Fungicide	94	44.9	90	50.5	98	44.7	94
Carbaryl	Insecticide	22	110	ND	ND	ND	ND	4
Carbendazim	Fungicide	6	5.3	63	2,040	76	718	59
Chlorantraniliprole	Insecticide	83	17.7	82	232	93	229	87
Chlorothalonil	Fungicide	ND	ND	ND	ND	13	8.0	5
Chlorpyrifos	Insecticide	11	8.2	ND	ND	ND	ND	2
Clomazone	Herbicide	100	581	65	504	63	239	70
Clothianidin	Insecticide	ND	ND	ND	ND	7	20.9	3
Cyprodinil	Fungicide	ND	ND	10	(7.0)	4	(2.5)	6
DCPMU	Herbicide degradate	83	5.8	31	15.4	26	9.6	37
DCPU	Herbicide degradate	78	14.5	27	34.0	20	12.6	32
Desulfinylfipronil	Insecticide degradate	28	12.0	22	15.2	17	9.2	21
Desulfinylfipronil amide	Insecticide degradate	ND	ND	2	12.4	ND	ND	1
Diazinon	Insecticide	ND	ND	8	13.2	ND	ND	4
3,4-Dichloroaniline	Herbicide degradate	100	1,280	100	3,610	100	1,190	100
Dichlorvos	Insecticide	NA	NA	6	39.1	2	8.9	4
Dithiopyr	Herbicide	ND	ND	8	5.6	ND	ND	4
Diuron	Herbicide	56	13.0	37	21.6	57	13.3	48
Fipronil	Insecticide	39	11.7	20	20.4	26	15.3	26
Fipronil sulfide	Insecticide degradate	17	9.0	12	7.4	9	3.2	12
Fipronil sulfone	Insecticide degradate	17	15.6	6	10.1	4	6.4	7
Fluopyram	Fungicide	44	32.3	41	31.2	72	20.7	54
Flupyradifurone	Insecticide	NA	NA	10	8.9	22	11.3	16
Fluridone	Herbicide	11	4.8	71	205	63	267	58
Flutolanil	Fungicide	17	14.6	ND	ND	ND	ND	3
Fluxapyroxad	Fungicide	94	36.6	57	32.2	83	18.9	73
Hexazinone	Herbicide	100	46.4	100	39.2	98	141	99
Imidacloprid	Insecticide	22	9.7	24	33.5	9	13.9	18
Imidacloprid urea	Insecticide degradate	NA	NA	6	9.9	ND	ND	3
Indaziflam	Herbicide	NA	NA	NA	NA	2	23.7	2

Table 14. Detection frequencies and maximum concentrations of dissolved pesticides and pesticide degradates detected in water samples collected from the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.—Continued

[Results in parenthesis () are below method detection limits and are estimates. **Abbreviations:** ng/L, nanograms per liter; ND, not detected; NA, not analyzed]

Pesticide or pesticide degradate	Pesticide type	2016 detection frequency (percent)	2016 maximum concentration (ng/L)	2017 detection frequency (percent)	2017 maximum concentration (ng/L)	2018 detection frequency (percent)	2018 maximum concentration (ng/L)	Overall detection frequency (percent)
Methoxyfenozide	Insecticide	94	81.6	96	1,500	100	373	97
Metolachlor	Herbicide	94	81.1	98	370	78	57.7	89
Oxadiazon	Herbicide	11	8.7	ND	ND	2	3.3	3
Penoxsulam	Herbicide	94	103	59	259	53	101	58
Penthiopyrad	Fungicide	NA	NA	ND	ND	2	10.2	1
Piperonyl butoxide	Synergist	56	72.8	39	86.3	41	193	42
Propanil	Herbicide	56	675	12	734	15	79.8	20
Propargite	Insecticide	17	12.0	ND	ND	ND	ND	3
Propiconazole	Fungicide	ND	ND	14	38.7	50	146	27
Pyrimethanil	Fungicide	ND	ND	33	9.2	7	(3.7)	17
Quinoxyfen	Fungicide	17	6.8	ND	ND	ND	ND	3
Simazine	Herbicide	6	18.0	14	16.5	ND	ND	7
Tebuconazole	Fungicide	ND	ND	2	626	ND	ND	1
Thiabendazole	Fungicide	6	8.2	16	12.8	13	8.3	13
Thiamethoxam	Insecticide	ND	ND	4	6.0	9	4.2	5
Thiobencarb	Herbicide	67	191	27	254	20	69.4	30
Trifloxystrobin	Fungicide	17	14.0	2	17.1	ND	ND	4

Table 15. Detection frequencies and maximum concentrations of pesticides detected in suspended-sediment collected from the Yolo Bypass and Cache Slough Complex in 2016, 2017, and 2018.

[ng/L, nanograms per liter; ND, not detected]

Pesticide or pesticide degradate	Pesticide type	2016 detection frequency (percent)	2016 maximum concentration (ng/L)	2017 detection frequency (percent)	2017 maximum concentration (ng/L)	2018 detection frequency (percent)	2018 maximum concentration (ng/L)	Overall detection frequency (percent)
Azoxystrobin	Fungicide	ND	ND	2	11.4	30	22.5	13
Bifenthrin	Insecticide	22	4.2	15	3.2	ND	ND	10
Clomazone	Herbicide	22	12.7	6	6.8	ND	ND	6
Fenpropathrin	Insecticide	ND	ND	ND	ND	4	21.7	2
Fluoxastrobin	Fungicide	ND	ND	ND	ND	7	142	3
Thiobencarb	Herbicide	ND	ND	4	5.8	ND	ND	2

In 2016, Sacramento River water was used to generate a pulse flow in the Yolo Bypass during the last 2 weeks of July (fig. 2). Total pesticide concentrations per sample at the two most upstream sites (RCS and RD22) were lower during the flow pulse compared to before or after the pulse (figs. 5, 6). At the tidally affected LIS site, total pesticide concentrations were higher in the first sample collected during the flow pulse compared to other samples because of high rice pesticide concentrations (fig. 7; tables 12, 13). Flow data are not available for site BL5; however, total pesticide concentrations were highest before the flow pulse and lowest following the pulse (tables 12, 13).

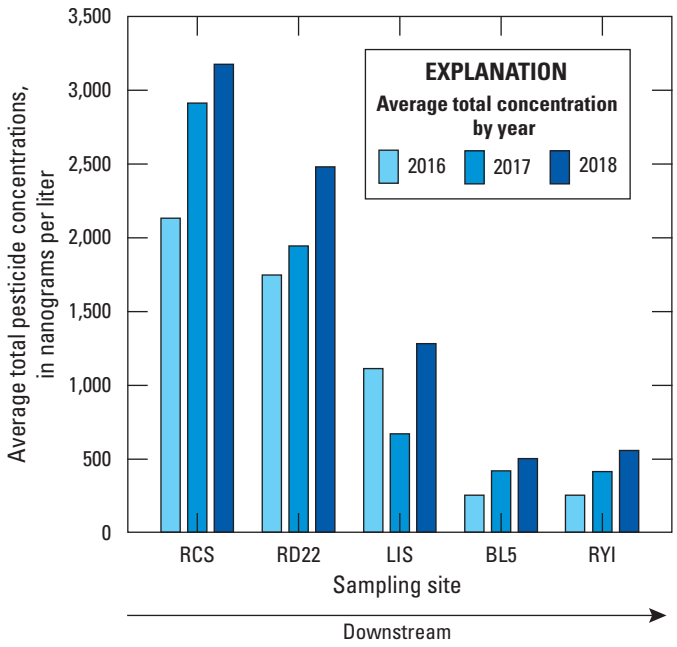

Figure 3. Average total pesticide concentrations by sampling site for 2016, 2017, and 2018.

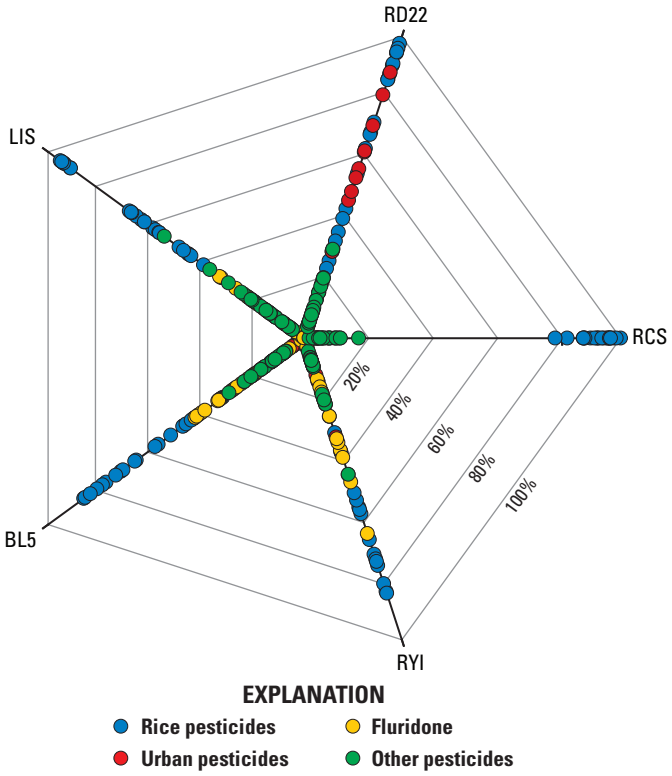

Figure 4. Percentage contribution of four groups of pesticides to the total concentration of all pesticides in a given sample per site for 2016, 2017, and 2018 (Abbreviation: %, percent).

2017 Sampling

In 2017, a total of 39 pesticides and pesticide degradates were detected in water samples (11 fungicides, 14 herbicides, 13 insecticides, and 1 synergist; table 12). The fungicide azoxystrobin, the herbicides clomazone and thiobencarb and the insecticide bifenthrin were detected in the suspended sediments filtered from the water samples (table 13). Mixtures of 7–27 pesticides were detected in every water sample with the fungicide azoxystrobin, the herbicide hexazinone, and the herbicide degradate 3,4-DCA detected in every sample. Other frequently detected pesticides included the fungicide boscalid (90 percent), the herbicide metolachlor (98 percent), and the insecticides methoxyfenozide (96 percent), and chlorantraniliprole (82 percent; table 14). Pesticide concentrations ranged from below the method detection limits to 3,610 ng/L (3,4-DCA; tables 12, 13).

Of the 49 samples collected in 2017, 14 contained at least 1 pesticide with a concentration above the EPA's aquatic life benchmarks. Pesticides detected above chronic invertebrate toxicity benchmarks included the insecticides bifenthrin (seven samples), dichlorvos (two samples), fipronil (two samples) and imidacloprid (five samples). One sample from site RD22 contained the insecticide dichlorvos at a concentration above the acute invertebrate toxicity benchmark of 35 ng/L. Lastly, in four samples collected from site RD22, concentrations of the fungicide carbendazim were above the chronic fish toxicity benchmark of 990 ng/L.

A managed flow pulse was not done in the Yolo Bypass and CSC in 2017. At all sites total pesticide concentrations per sample were similar or generally decreasing through the 2017 study period (figs. 5–8, tables 12, 13).

2018 Sampling

In 2018, a total of 37 pesticides and pesticide degradates were detected in water samples (11 fungicides, 13 herbicides, 12 insecticides, and 1 synergist; table 12). The fungicides azoxystrobin and fluoxastrobin and the insecticide fenpropathrin were detected in the suspended sediments filtered from the water samples (table 13). Mixtures of 8–27 pesticides were detected in every water sample and the fungicide azoxystrobin, the herbicide degradate 3,4-DCA and the insecticide methoxyfenozide were detected in every sample. Other frequently detected pesticides included the fungicides boscalid (98 percent) and fluxapyroxad (83 percent), the herbicide hexazinone (98 percent), and the insecticide chlorantraniliprole (93 percent; table 14). Pesticide concentrations ranged from below the method detection limits to 8,870 ng/L (azoxystrobin; tables 12, 13).

Of the 46 samples collected in 2018, 8 contained at least 1 pesticide with a concentration above the EPA's chronic invertebrate toxicity benchmarks (U.S. Environmental Protection Agency, 2019). Pesticides detected above benchmarks included the insecticides dichlorvos (one sample), fipronil (six samples), and imidacloprid (two samples).

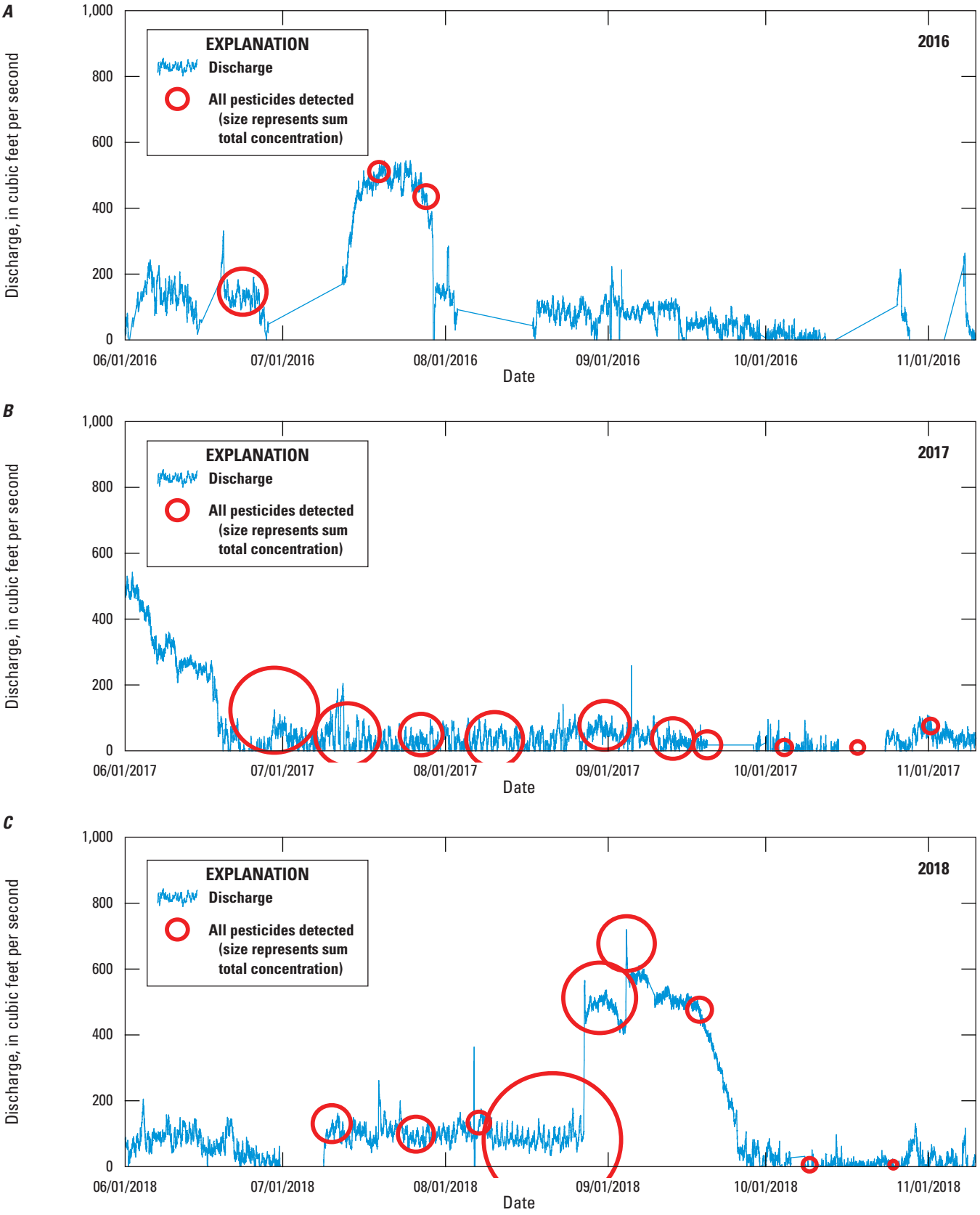

Figure 5. Discharge and total pesticide concentrations at site RCS in *A*, 2016; *B*, 2017; and *C*, 2018. The size of the open circle represents the sum-total concentration of all pesticides detected in a sample and is depicted at a common scale for all three graphs.

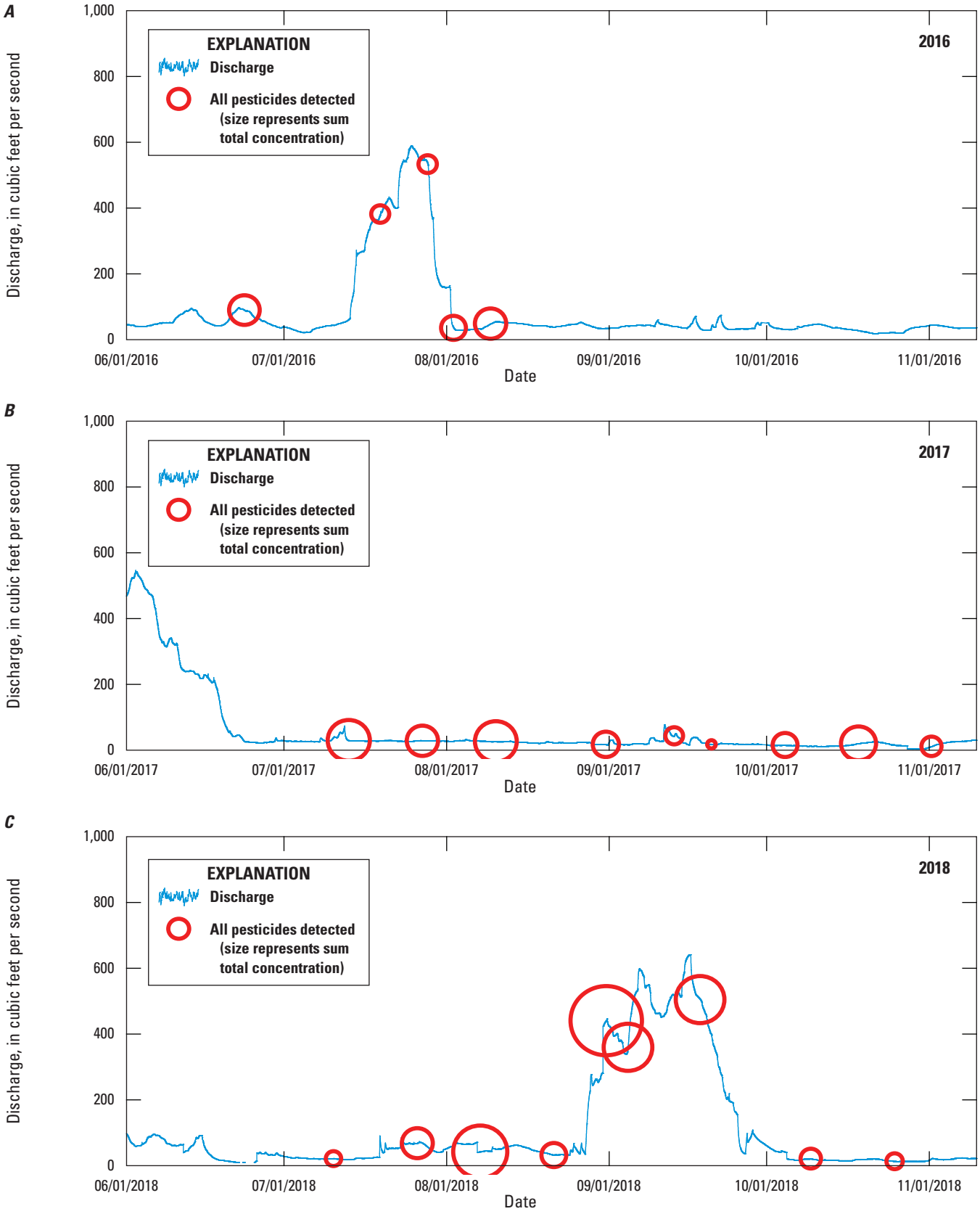

Figure 6. Discharge and total pesticide concentrations at site RD22 in *A*, 2016; *B*, 2017; and *C*, 2018. The size of the open circle represents the sum-total concentration of all pesticides detected in a sample and is depicted at a common scale for all three graphs.

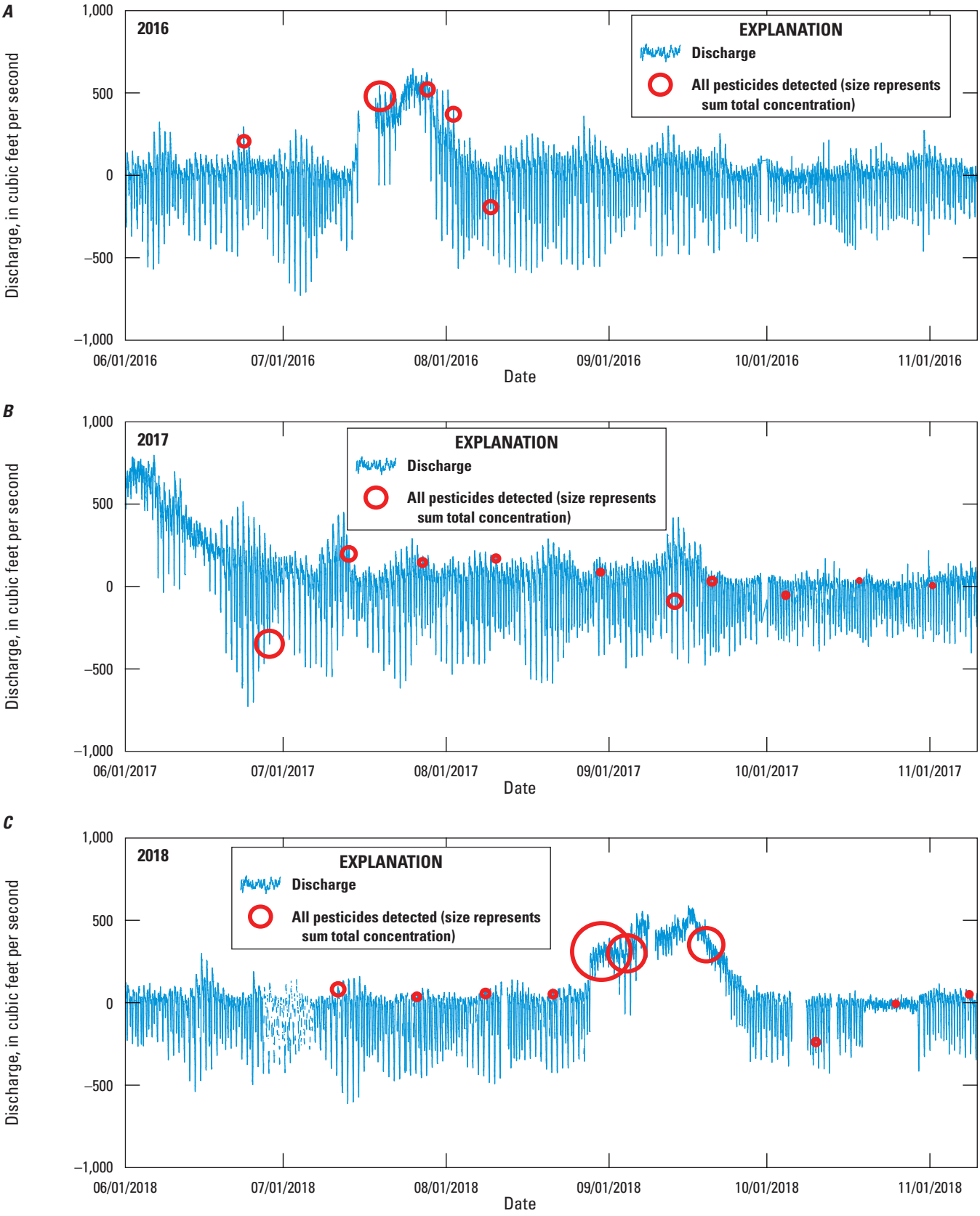

Figure 7. Discharge and total pesticide concentrations at site LIS in *A*, 2016; *B*, 2017; and *C*, 2018. The size of the open circle represents the sum-total concentration of all pesticides detected in a sample and is depicted at a common scale for all three graphs.

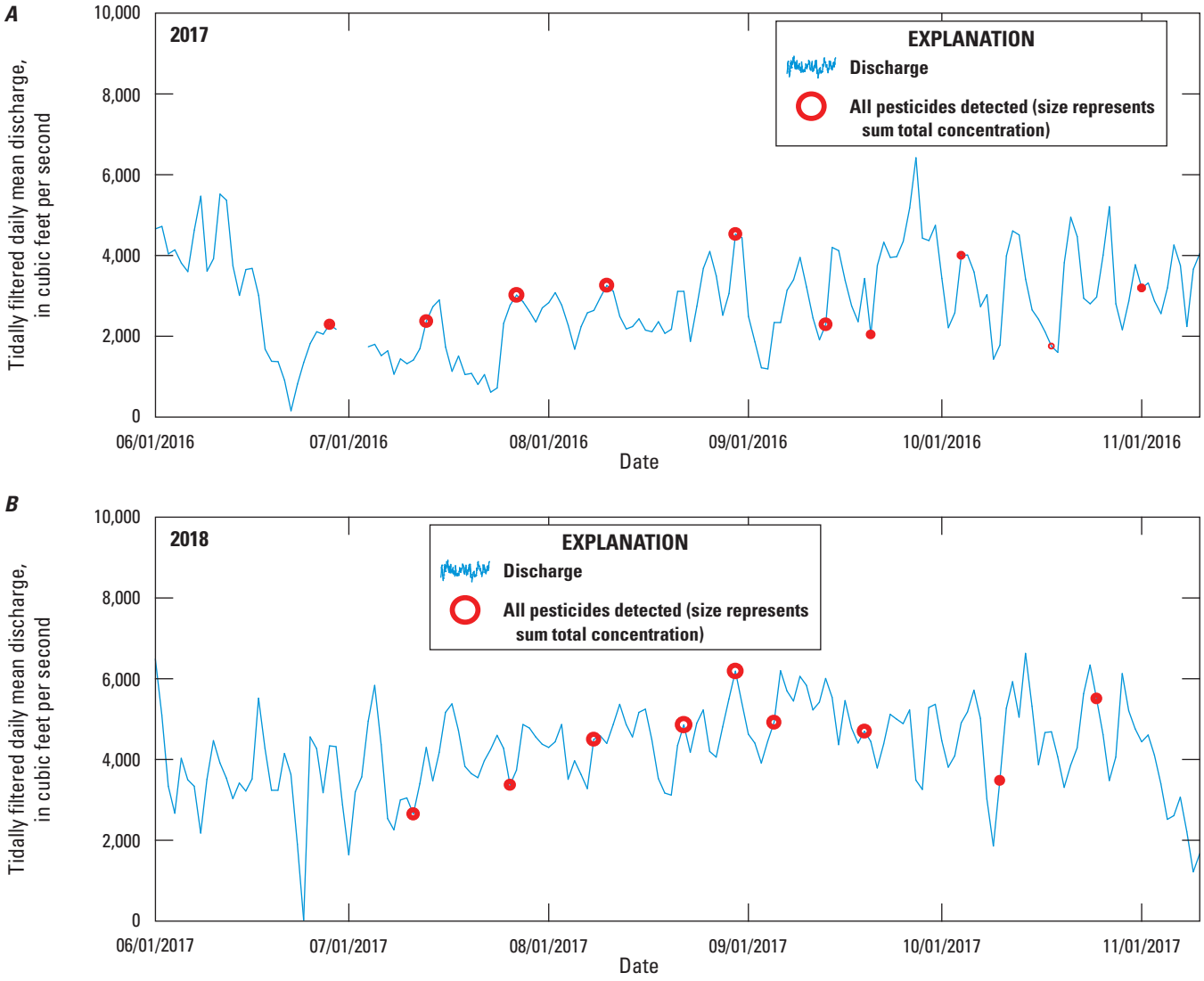

Figure 8. Tidally filtered daily mean discharge and total pesticide concentrations at site RYI in *A*, 2016; *B*, 2017; and *C*, 2018. The size of the open circle represents the sum-total concentration of all pesticides detected in a sample and is depicted at a common scale for all graphs.

In 2018, a managed flow pulse was done from the end of August through the end of September using agricultural tailwater from the Colusa Basin Drain. Total pesticide concentrations per sample at the most upstream site (RCS) were highest immediately before the flow pulse (as water was being pooled to supply the pulse) and remained elevated during the pulse, though the concentrations decreased as the pulse went on (fig. 5). At sites RD22 and LIS, total pesticide concentrations per sample were elevated during the flow pulse compared to nearly all other samples collected at those sites during 2018 (figs. 6, 7). Concentrations at site BL5 increased during the flow pulse and then dropped by roughly two thirds immediately after the pulse (table 12). Finally, at site RYI, total pesticide concentrations per sample were similar before and during the flow pulse and lower after the pulse (fig. 8).

Discussion

Artificial summer and fall pulse flows in the Yolo Bypass and CSC have the potential to benefit the downstream Delta ecosystem by contributing much needed phytoplankton and zooplankton biomass. Although the necessary factors influencing biomass production in the Yolo Bypass and CSC during the summer and fall have not yet been determined, water source and timing of pulse flows are likely critical factors. Contaminants such as current-use pesticides are present in pulse flows and can affect the quantity and quality of biomass produced. Water source influences the amount and type of pesticides present in pulse flows. Pesticides used in growing rice are the dominant pesticides present in most areas of the Bypass and CSC during the summer and fall period; however, the area receives inputs of pesticides from other crops as well as urban use pesticides and herbicides used for invasive aquatic weed control. As a result, waters of the Yolo Bypass and CSC consistently contain mixtures of multiple current-use pesticides and pesticide degradates. Waters from sampling sites in the northern portions of the Yolo Bypass often contain pesticides at concentrations above EPA's chronic invertebrate toxicity benchmarks. Currently, little data exists concerning the toxicity of mixtures of pesticides (like those detected throughout this study) to aquatic invertebrates, phytoplankton, or zooplankton. Data gathered during this study will aid the DWR and other agencies in adaptively managing pulse flows in the Yolo Bypass and CSC to increase phytoplankton and zooplankton biomass while mitigating for the presence of contaminants such as current-use pesticides.

The program of managed flow pulses in the Yolo Bypass and CSC is planned to continue for several years and the DWR and USGS plan to continue monitoring the presence of current-use pesticides. Additionally, the USGS and DWR research that is focused on understanding the occurrence of pesticides in zooplankton in the Yolo Bypass and CSC and how the presence of these contaminants can affect fish health is currently in progress.

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