

**Grassland Bypass Project
Interim Baseline Monitoring Program**

Monthly Data Report

April 2014



A Cooperative Effort Of:

U.S. Bureau of Reclamation

Central Valley Regional Water Quality Control Board

U.S. Fish and Wildlife Service

National Marine Fisheries Service

California Department of Fish and Wildlife

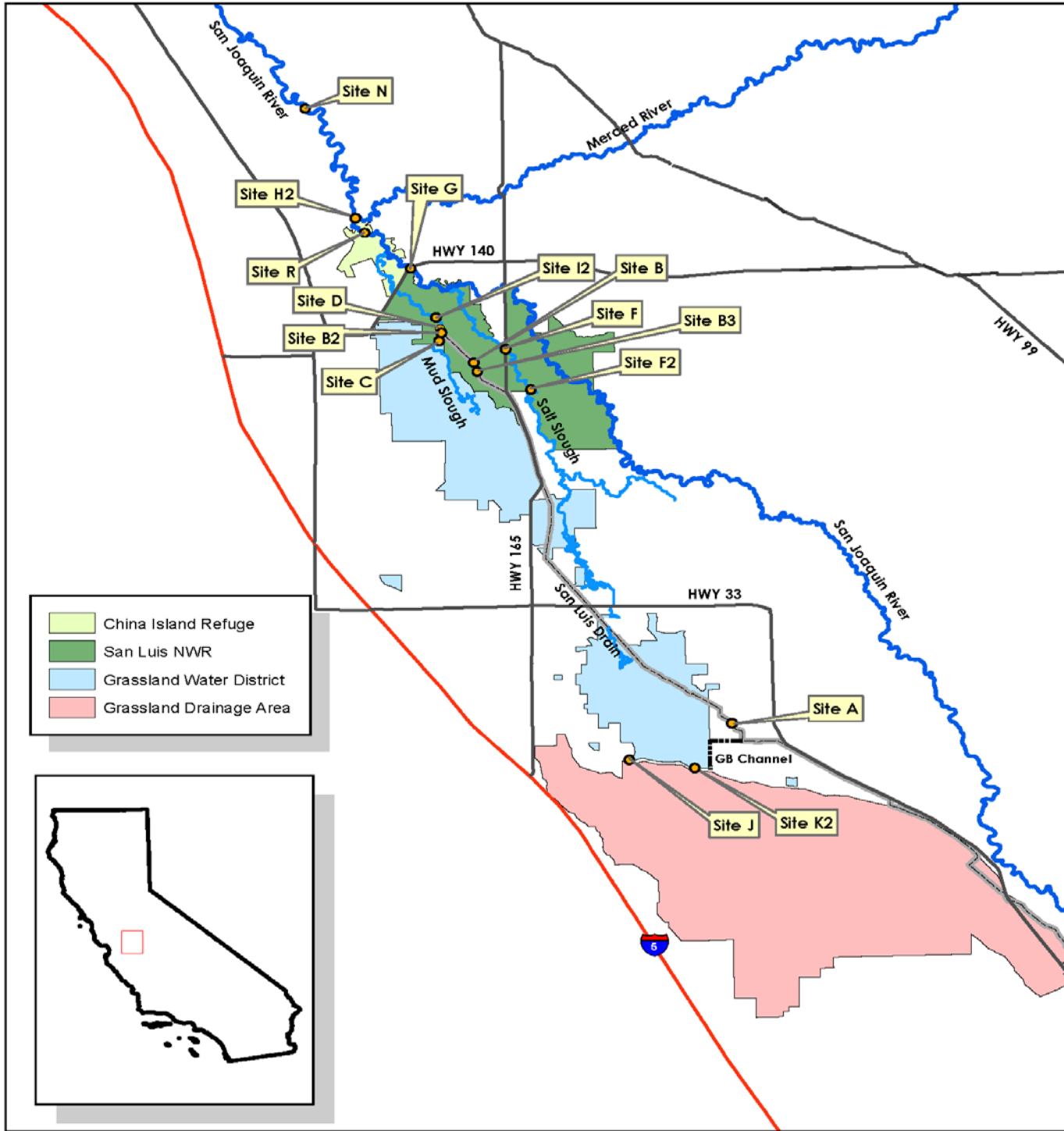
San Luis & Delta-Mendota Water Authority

U.S. Environmental Protection Agency

U.S. Geological Survey

Compiled by San Francisco Estuary Institute

Figure 1. Map of the Grassland Bypass Project area



Grassland Bypass Project

Monitoring Sites

0 2.5 5 10 Miles



Grassland Bypass Project
 NAD 1983 California Zone 10
 U.S. Bureau of Reclamation



**GRASSLAND BYPASS PROJECT
MONTHLY DATA REPORT**

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Table 1a. Water monitoring of inflow to the San Luis Drain (Station A)

PARAMETER	Flow	Temperature	Specific Conductance	Total Dissolved Solids	Total Suspended Solids	Total Selenium	Daily Salt Load
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	Calculated	SLDMWA	SLDMWA/USBR	Calculated
UNITS	cfs	°C	µS/cm	mg/L	mg/L	µg/L	tons
Apr-01-2014	6	15.0	7,100	5,255		34	84
Apr-02-2014	8	15.4	7,050	5,214		38	117
Apr-03-2014	9	16.7	6,980	5,163		41	130
Apr-04-2014	10	16.4	6,940	5,134		42	133
Apr-05-2014	7	16.5	6,720	4,971		41	97
Apr-06-2014	8	18.5	6,620	4,896		38	106
Apr-07-2014	8	20.7	6,830	5,056	209	32	105
Apr-08-2014	6	22.3	6,790	5,025		25	85
Apr-09-2014	6	22.8	7,010	5,188		18	85
Apr-10-2014	6	20.4	7,090	5,248		19	88
Apr-11-2014	3	NA	7,430	5,495		15	46
Apr-12-2014						13	
Apr-13-2014						13	
Apr-14-2014	1		7,990	5,910	178	16	21
Apr-15-2014			NA			23	
Apr-16-2014	4		8,000	5,919		40	64
Apr-17-2014						31	
Apr-18-2014						27	
Apr-19-2014						25	
Apr-20-2014						28	
Apr-21-2014					32	25	
Apr-22-2014	3		7,370	5,455		28	47
Apr-23-2014	8		7,150	5,291		27	117
Apr-24-2014	9					27	
Apr-25-2014	4		7,170	5,306		36	57
Apr-26-2014	18					45	
Apr-27-2014	15					46	
Apr-28-2014	13		5,670	4,193	118	35	143
Apr-29-2014	18		5,670	4,196		36	206
Apr-30-2014	12		5,700	4,218		31	139

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

Preliminary Results

Flow measurement failures on 4/11 to 4/23, 4/25, & 4/28 to 4/30

EC measurement failures on 4/11 to 4/30

Flow and EC field data entered if available

Table 1b. Monthly Averages and Totals

	Total Flow	Average Temperature	Average Specific Conductance	Average Total Dissolved Solids	Average Total Suspended Solids	Average Selenium	Salt Load	Salt Load Objective
	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	UA3
	acre-feet	°C	µS/cm	mg/L	mg/L	µg/L	tons	tons
Jan-2014	650	9.8	7,320	5,418	46	26	4,620	4,283
Feb-2014	1,040	13.6	6,860	5,074	136	31	6,930	6,779
Mar-2014	600	17.3	7,190	5,323	96	27	3,990	8,031
Apr-2014	360	18.3	7,950	5,112	134	30	1,870	5,910
Cumulative Total	2,650						18,020	25,003

Notes:

Salt load objective based on 2014 critical year type

Table 2a. Water monitoring of San Luis Drain Discharge into Mud Slough (north)
Station B2 (Terminus at Mud Slough) and Station B3 (Gun Club Road)

PARAMETER	Flow (B2)	Temperature (B2)	Specific Conductance (B2)	Total Suspended Solids (B2)	Boron (B3)	Total Selenium (B3)	Daily Selenium Load
DATA SOURCE	SLDMWA♦	SLDMWA	SLDMWA	SLDMWA/USBR	USBR	USBR	Calculated
UNITS	cfs	°C	µS/cm	mg/L	mg/L	µg/L	lbs
Apr-01-2014	12	9.2	5,490		12.0	9.6	0.6
Apr-02-2014	10	12.1	5,540		12.0	10.0	0.6
Apr-03-2014	9	13.5	5,740		13.0	11.4	0.6
Apr-04-2014	10	13.1	6,150		13.0	13.2	0.7
Apr-05-2014	10	13.8	6,430		12.0	14.8	0.8
Apr-06-2014	10	16.6	6,310		12.0	18.1	1.0
Apr-07-2014	9	20.4	6,220	21	12.0	20.8	1.1
Apr-08-2014	9	22.7	6,540		12.0	20.3	1.0
Apr-09-2014	8	22.5	6,690		11.0	18.4	0.8
Apr-10-2014	7	20.6	6,560		11.0	17.5	0.7
Apr-11-2014	7	20.4	6,450		12.0	18.8	0.7
Apr-12-2014	6	18.8	6,400		11.0	19.2	0.6
Apr-13-2014	6	17.5	6,400		11.0	17.6	0.5
Apr-14-2014	6	20.3	6,430	36	12.0	17.0	0.5
Apr-15-2014	6	21.5	6,660		12.0	16.7	0.5
Apr-16-2014	5	20.1	6,780		13.0	15.8	0.5
Apr-17-2014	6	21.9	6,810		13.0	14.4	0.4
Apr-18-2014	7	20.1	6,750		13.0	13.2	0.5
Apr-19-2014	7	19.3	6,630		12.0	9.8	0.4
Apr-20-2014	6	18.9	6,530		12.0	4.7	0.1
Apr-21-2014	6	21.1	6,480	62	12.0	9.5	0.3
Apr-22-2014	5	17.4	6,570		13.0	9.5	0.3
Apr-23-2014	3	15.6	6,530		12.0	9.9	0.2
Apr-24-2014	5	18.3	6,540		13.0	7.3	0.2
Apr-25-2014	6	14.5	6,530		14.0	8.7	0.3
Apr-26-2014	9	15.7	6,550		16.0	4.3	0.2
Apr-27-2014	14	16.9	6,910		17.0	6.3	0.5
Apr-28-2014	13	16.6	7,410	170	19.0	6.9	0.5
Apr-29-2014	13	20.5	8,070		17.0	25.7	1.8
Apr-30-2014	17	24.1	7,950		17.0	24.0	2.3

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

Preliminary Data

Note: Flow failures on 4/11 to 4/23, 4/25, & 4/28 to 4/30.

EC failures on 4/11 to 4/30. Flow & EC field data entered if available.

Table 2b. Monthly Averages and Totals

	Flow (B2)	Average Temperature (B2)	Average Specific Conductance (B2)	Average Total Suspended Solids	Average Boron (B3)	Average Selenium	Selenium Load	Selenium Load Objective
	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	UA3
	acre-feet	°C	µS/cm	mg/L	mg/L	µg/L	lbs	lbs
Jan-2014	970	10.1	5,290	13	10.2	14.0	39	151
Feb-2014	1,270	12.6	6,100	139	12.6	26.0	88	93
Mar-2014	900	15.0	5,980	50	11.8	20.8	63	92
Apr-2014	490	18.1	6,570	72	13.0	13.8	19	101
Cumulative Load Totals	3,630						209	437

Notes:

Selenium load objective based on 2014 critical year type

Table 2c. Water quality monitoring at Station B3 (discharge from San Luis Drain)

PARAMETER	Physicals					Total Selenium	Total Boron	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity			
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE			
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
Feb-07-2014	10.0	8.0	5,820	10.1	12.8	19		
Feb-14-2014	9.1	7.9	6,340	15.9	19.5	27		
Feb-21-2014	12.7	8.3	6,350	13.5	21.6	33		
Feb-27-2014	11.1	8.4	5,140	16.3	17.6	26		
Mar-06-2014	12.0	8.6	6,050	19.6	21.9	33	11	
Mar-14-2014	19.8	8.8	5,970	17.2	24.9	21	12	26
Mar-21-2014	12.9	8.4	5,950	16.9		17	12	
Mar-26-2014	12.7	8.8	5,950	20.0		15	12	
Apr-04-2014	14.7	8.5	6,480	18.9		13	13	
Apr-11-2014	10.5	8.5	6,380	23.8	17.0	19	12	21
Apr-18-2014	10.2	8.4	6,450	21.0	22.5	13	12	
Apr-30-2014	15.7	8.9	7,060	23.9	13.7	23	14	

Notes:

	Nutrients				
	Nitrates as N (Dissolved)	Ammonia as N	Total Kjeldahl Nitrogen	Total Phosphorous as P	Ortho-phosphate as P
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	0.5	0.1	1.4	0.094 V	0.015 T
Feb-27-2014	3.7 T	0.2 L	1.7	0.095 T	<0.010
Mar-26-2014	<0.02	0.1	2.6	0.190 T	<0.010
Apr-25-2014					

Notes:

Results of the Interim Monitoring Program Oct 2013 - Feb 2014

	General Minerals						
	Calcium	Magnesium	Potassium	Sodium	Chloride (Dissolved)	Sulfate (Dissolved)	Total Organic Carbon
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	270	110	6.8	620	670	1,400	NA
Feb-27-2014	220	100	4.0	880	750	1,500	8.5

Notes:

	Total Metals								
	Arsenic	Boron	Cadmium	Copper	Lead	Mercury	Molybdenum	Nickel	Zinc
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Jan-09-2014	5.5	9,000	<1.0	41	<2.5	100	31.0	17.0	<5.0
Feb-27-2014	<10		<1.0	<50	<2.5	<100	24.0	23.0	<10

Notes:

Figure 2. Monthly selenium discharges from the terminus of the San Luis Drain into Mud Slough compared to load values.

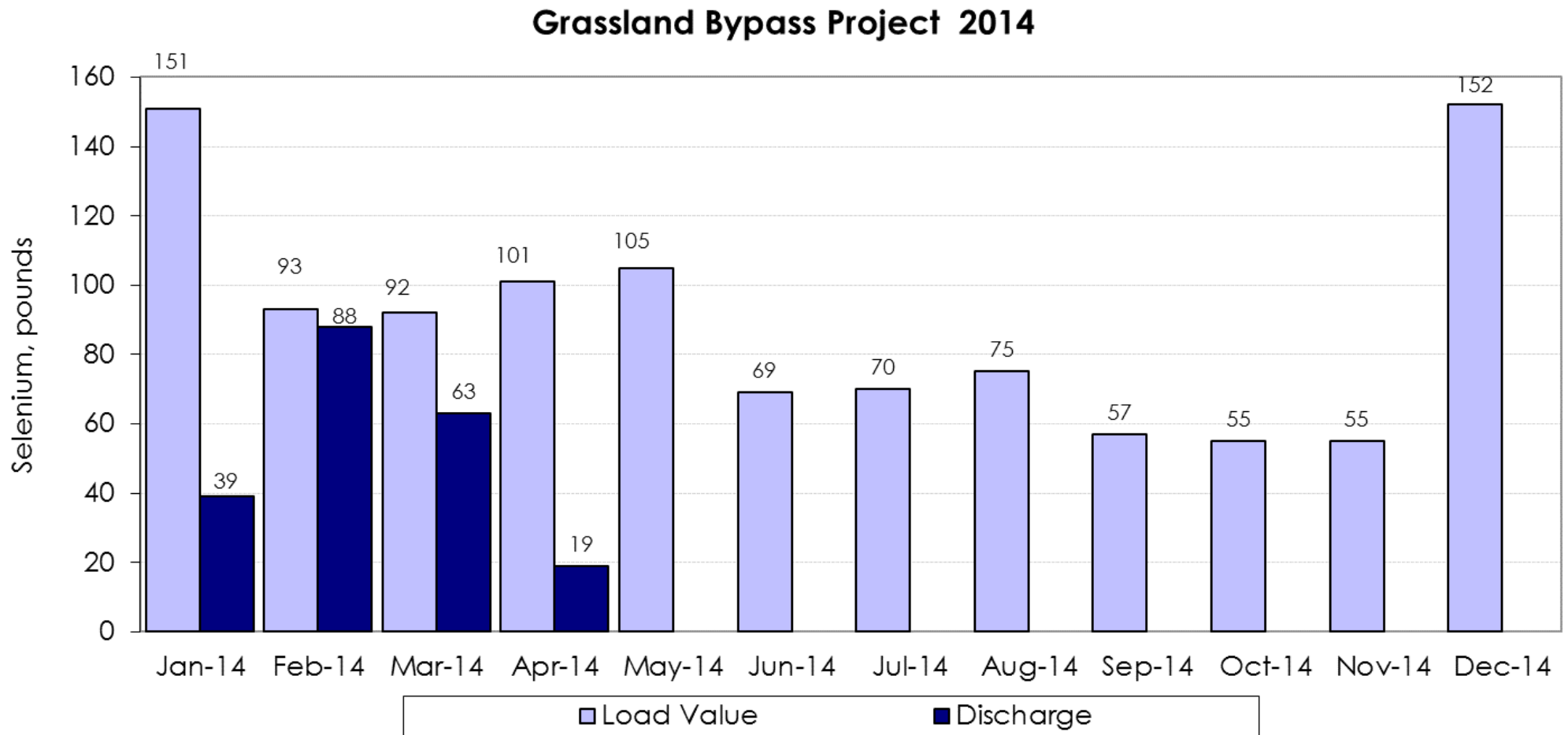


Table 3a. Water monitoring in Mud Slough (north) below San Luis Drain Discharge Station D

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Apr-01-2014	58	14.5	3,330
Apr-02-2014	58	15.0	3,290
Apr-03-2014	53	16.2	3,300
Apr-04-2014	54	16.9	3,400
Apr-05-2014	57	16.9	3,520
Apr-06-2014	51	18.3	3,600
Apr-07-2014	45	20.4	3,520
Apr-08-2014	45	22.0	3,360
Apr-09-2014	40	22.8	3,340
Apr-10-2014	39	22.3	3,130
Apr-11-2014	39	21.8	3,230
Apr-12-2014	42	21.4	2,830
Apr-13-2014	41	20.8	3,070
Apr-14-2014	36	21.2	3,170
Apr-15-2014	31	22.1	3,280
Apr-16-2014	25	21.3	3,690
Apr-17-2014	23	21.7	3,990
Apr-18-2014	26	21.6	4,230
Apr-19-2014	23	21.4	4,380
Apr-20-2014	19	20.7	4,580
Apr-21-2014	16	21.2	4,900
Apr-22-2014	15	20.7	4,590
Apr-23-2014	17	18.7	4,270
Apr-24-2014	17	19.5	4,590
Apr-25-2014	18	18.9	4,690
Apr-26-2014	20	18.7	4,880
Apr-27-2014	21	19.5	5,820
Apr-28-2014	20	19.6	6,270
Apr-29-2014	19	20.5	6,770
Apr-30-2014	22	22.8	6,910

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.
Preliminary Data

Table 3b. Monthly Averages

PARAMETER	Total Flow	Temperature	Specific Conductance
DATA SOURCE	Calculated	USGS	USGS
UNITS	acre-feet	°C	µS/cm
January	3,360	11	3,120
February	4,250	14	3,600
March	5,390	17	3,230
April	1,960	20	4,130
May			
June			
July			
August			
September			
October			
November			
December			

Table 3c. Water quality monitoring in Mud Slough (north) below San Luis Drain discharge (Station D)

PARAMETER	Physicals					Total Selenium	Total Boron	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity			
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE			
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
Feb-07-2014	8.7	7.9	3,710	10.7	22.3	5.4		16
Feb-14-2014	9.3	7.8	3,570	14.8	33.5	8.0		16
Feb-21-2014	9.8	8.0	3,680	13.4	26.8	7.9		15
Feb-27-2014	9.9	7.4	3,320	16.4	35.9	5.2		16
Mar-06-2014	9.1	8.0	3,860	18.5	33.5	9.6	4.9	
Mar-14-2014	10.2	8.1	2,940	17.3	42.1	2.4	3.3	11
Mar-21-2014	9.2	8.1	3,100	17.3		1.5	3.4	
Mar-26-2014	10.9	8.1	3,630	19.4		1.4	3.9	
Apr-04-2014	10.9	8.0	3,830	18.6		1.7	4.9	
Apr-11-2014	10.1	8.0	3,590	23.5	41.0	2.2	3.9	9
Apr-18-2014	7.7	8.1	4,360	21.5	50.3	3.2	5.4	
Apr-30-2014	16.3	8.6	7,040	24.5	28.4	20 U	13.0	

Notes:

	Nutrients				
	Nitrates as N (dissolved)	Ammonia as N	Total Kjeldahl Nitrogen	Total phosphorous as P	Ortho-phosphate as P
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	0.2	0.2	<5.0	0.12 V	0.046 T
Feb-27-2014	1.0 T	0.2 L	1.5	0.33 T	0.026
Mar-26-2014	0.02	0.2	2.5	0.62 T, U	0.220
Apr-25-2014					

Notes:

Results of the Interim Monitoring Program Oct 2013 - Feb 2014

	General Minerals						
	Calcium	Magnesium	Potassium	Sodium	Chloride (dissolved)	Sulfate (dissolved)	Total Organic Carbon
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	120	76	6.5	400	470	650	NA
Feb-27-2014	110	75	6.0	480	480	670	11.0

Notes:

	Total Metals						
	Arsenic	Cadmium	Copper	Lead	Mercury	Nickel	Zinc
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Jan-09-2014	5.3	<1.0	29 L	<2.5	110	10.0	<5.0
Feb-27-2014	<5.0	<1.0	<50	<2.5	<100	16.0	<10

Notes:

Table 4. Water quality monitoring in Mud Slough (north) above the San Luis Drain (Station C)

PARAMETER	Physicals				Boron	Total Selenium
	Dissolved Oxygen	Specific Conductance	Turbidity	pH		
DATA SOURCE	WSJRW	WSJRW	WSJRW	USBR	WSJRW	WSJRW
UNITS	mg/L	µS/cm	NTU	units	mg/L	µg/L
Feb-10-2014	5.2*	2,870	65		2.0*	0.3*
Mar-06-2014	9.1	2,800	34	8.0	2.2	0.2
Mar-14-2014	10.2	2,660	42	8.1	2.5	0.5
Mar-21-2014	9.2	2,670		8.1	2.5	0.5
Mar-26-2014	10.9	3,090		8.1	2.7	0.2
Apr-04-2014	18.7	3,160		8.1	2.9	<0.4
Apr-11-2014	8.4	2,850	52	7.9	2.3	<0.4
Apr-18-2014	10.0	3,090	59	8.1	2.7	<0.4
Apr-30-2014	11.6	4,140	30	8.2	3.9	0.5

Notes:

Table 5. Water quality monitoring in Mud Slough (north) backwater below San Luis Drain discharge (Station I2)

PARAMETER	Physicals					Total Selenium
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity	
DATA SOURCE	USB	USB	USB	USB	USB	USB
UNITS	mg/L	units	µS/cm	°C	NTU	µg/L
Feb-07-2014						
Feb-14-2014						
Feb-21-2014						
Feb-27-2014						
Mar-06-2014						
Mar-14-2014						
Mar-21-2014						
Mar-26-2014						
Apr-04-2014						
Apr-11-2014						
Apr-18-2014						
Apr-30-2014						

Notes:

Samples collected only when site is flooded

Site was dry during January and February (no sample collected)

**Table 6a. Water monitoring in Salt Slough at Highway 165
Station F**

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Apr-01-2014	109	15.0	1,910
Apr-02-2014	105	14.9	1,910
Apr-03-2014	109	15.8	1,880
Apr-04-2014	112	16.8	1,760
Apr-05-2014	108	16.4	1,780
Apr-06-2014	113	17.5	1,770
Apr-07-2014	119	19.4	1,730
Apr-08-2014	158	21.2	1,720
Apr-09-2014	163	22.4	1,630
Apr-10-2014	157	22.2	1,720
Apr-11-2014	142	21.8	1,720
Apr-12-2014	113	21.0	1,900
Apr-13-2014	94	20.5	2,060
Apr-14-2014	86	20.8	2,050
Apr-15-2014	84	22.0	1,920
Apr-16-2014	78	21.9	1,940
Apr-17-2014	75	21.5	1,900
Apr-18-2014	76	21.8	1,790
Apr-19-2014	75	21.5	1,650
Apr-20-2014	77	20.9	1,740
Apr-21-2014	80	21.5	1,500
Apr-22-2014	69	20.8	1,630
Apr-23-2014	55	19.4	1,940
Apr-24-2014	51	19.2	2,100
Apr-25-2014	49	19.1	2,050
Apr-26-2014	58	17.9	1,960
Apr-27-2014	62	18.4	1,730
Apr-28-2014	59	19.6	1,780
Apr-29-2014	64	19.9	1,740
Apr-30-2014	62	22.5	1,630

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.
Preliminary Data

Table 6b. Monthly Averages

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	Calculated	USGS	USGS
UNITS	acre-feet	°C	µS/cm
January	4,820	17	1,760
February	3,800	14	1,960
March	4,600	17	2,170
April	5,480	20	1,820
May			
June			
July			
August			
September			
October			
November			
December			

Table 6c. Water quality monitoring in Salt Slough at Highway 165 (Station F)

PARAMETER	Physicals					Total Selenium	Total Boron	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity			
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE			
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
Feb-07-2014	8.4	7.3	1,940	10.5	23.3	<0.4		10
Feb-14-2014	8.7	8.0	2,140	15.1	41.4	<0.4		13
Feb-21-2014	9.8	7.7	1,380	12.2	35.7	<0.4		13
Feb-27-2014	9.9	7.7	2,070	15.3	47.5	<0.4		12
Mar-06-2014	8.5	7.6	2,160	18.5	68.9	<0.4	0.9	
Mar-14-2014	9.3	7.6	2,150	16.5	72.2	<0.4	1.2	10
Mar-21-2014	10.1	6.8	2,180	16.6		<0.4	1.1	
Mar-26-2014	10.2	7.6	2,170	19.2		<0.4	1.0	
Apr-04-2014	10.1	7.7	1,780	16.2		<0.4	0.9	
Apr-11-2014	8.4	7.7	1,890	21.8	82.0	0.4	1.1	8
Apr-18-2014	8.6	7.5	1,880	19.6	82.4	0.6	0.9	
Apr-30-2014	11.5	7.6	1,810	22.9	37.1	<0.4	0.8	

Notes:

	Nutrients				
	Nitrates as N (dissolved)	Ammonia as N	Total Kjeldahl Nitrogen	Total phosphorous	Ortho-phosphate as P
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	<10	0.3	0.8	0.095 L,V	0.050 T
Feb-27-2014	1.3 T	0.3 L	1.0	0.320 T	<0.010
Mar-26-2014	0.8	0.1	1.0	0.290 T	0.057
Apr-25-2014					

Notes:

Results of the Interim Monitoring Program Oct 2013 - Feb 2014

	General Minerals						
	Calcium	Magnesium	Potassium	Sodium	Chloride (dissolved)	Sulfate (dissolved)	Total Organic Carbon
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	68	40	4.2	220	290	230	NA
Feb-27-2014	85	53	4.6	310	360	280	5.4

Notes:

	Total Metals							
	Arsenic	Cadmium	Copper	Lead	Mercury	Molybdenum	Nickel	Zinc
	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Jan-09-2014	<5.0	<1.0	18	<2.5	110	9.4	<10	5.3
Feb-27-2014	<5.0	<1.0	<50	<2.5	<100	12.0	11	<10

Notes:

**Table 7a. Water quality monitoring in Grasslands Wetlands Water Supply Channels
Station J Camp 13 Ditch headworks**

PARAMETER	Flow	Specific Conductance	Temperature	Total Selenium
DATA SOURCE	GWD	USBR	GWD	USBR
UNITS	cfs	µS/cm	°C	µg/L
Feb-03-2014	32	533	10.4	1.0
Feb-10-2014	32	790	12.8	1.4
Feb-18-2014	34	1,010	14.3	1.2
Feb-24-2014	24	1,140	15.3	1.0
Mar-06-2014	<20			
Mar-14-2014	<20			
Mar-21-2014	<20			
Mar-26-2014	<20			
Apr-04-2014	<20			
Apr-11-2014	<20			
Apr-18-2014	<20			
Apr-30-2014	<20			

Notes:

Samples only collected when flow is passing site
 March and April: Flow <20 cfs (no sample collected)

**Table 7b. Water quality monitoring in Grasslands Wetlands Water Supply Channels
Station K2 Agatha Canal headworks**

PARAMETER	Flow	Specific Conductance	Temperature	Total Selenium
DATA SOURCE	GWD	USBR	GWD	USBR
UNITS	cfs	µS/cm	°C	µg/L
Feb-03-2014	<20			
Feb-10-2014	<20			
Feb-18-2014	<20			
Feb-24-2014	<20			
Mar-06-2014	<20			
Mar-14-2014	<20			
Mar-21-2014	<20			
Mar-26-2014	<20			
Apr-04-2014	<20			
Apr-11-2014	<20			
Apr-18-2014	<20			
Apr-30-2014	<20			

Notes:

Samples only collected when flow is passing site

Table 8a. Water monitoring in the San Joaquin River above Merced River Station H2

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Apr-01-2014	224	15.0	2,680
Apr-02-2014	242	15.3	2,610
Apr-03-2014	239	16.0	2,710
Apr-04-2014	227	16.9	2,670
Apr-05-2014	224	17.0	2,650
Apr-06-2014	225	18.3	2,710
Apr-07-2014	214	20.3	2,660
Apr-08-2014	209	22.0	2,600
Apr-09-2014	207	23.1	2,250
Apr-10-2014	201	22.6	2,200
Apr-11-2014	193	22.2	2,210
Apr-12-2014	186	21.9	2,360
Apr-13-2014	182	21.5	2,460
Apr-14-2014	178	21.5	2,650
Apr-15-2014	166	22.4	2,700
Apr-16-2014	148	21.9	2,680
Apr-17-2014	138	22.1	2,880
Apr-18-2014	132	22.3	3,000
Apr-19-2014	130	21.9	3,000
Apr-20-2014	124	21.2	2,840
Apr-21-2014	126	21.7	2,480
Apr-22-2014	126	21.2	1,880
Apr-23-2014	121	19.6	2,290
Apr-24-2014	120	19.9	2,450
Apr-25-2014	144	19.2	2,070
Apr-26-2014	146	18.7	2,370
Apr-27-2014	139	19.3	2,670
Apr-28-2014	127	19.8	3,200
Apr-29-2014	113	17.6	
Apr-30-2014	105	23.3	3,110

168.53 20.19 2,587.59

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.
Preliminary Data

Table 8b. Monthly Averages

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	Calculated	USGS	USGS
UNITS	acre-feet	°C	µS/cm
January	11,780	13	2,600
February	12,100	14	2,580
March	13,040	17	2,680
April	10,030	20	2,590
May			
June			
July			
August			
September			
October			
November			
December			

Table 9. Water quality monitoring in the San Joaquin River above Merced River at China Island Refuge Station R

PARAMETER	Physicals					Total Selenium	Total Boron	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity			
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
Feb-07-2014	8.4	7.6	3,030	10.7	34.5	2.1 U		13
Feb-14-2014	8.6	7.7	2,950	14.3	50.9	2.8 U		14
Feb-21-2014	9.5	7.9	3,250	13.2	26.8	4.0 U		15
Mar-21-2014	10.9	8.1	3,070	17.6		0.8	2.3	
Mar-26-2014	11.9	8.2	3,060	19.3		0.6	2.2	
Apr-04-2014	11.9	8.0	2,680	17.6		0.6	2.0	
Apr-11-2014	9.4	7.9	2,440	22.9	95.0	0.9	1.8	7
Apr-18-2014	8.8	7.9	3,060	21.2	66.1	0.7	1.9	
Apr-30-2014	16.4	8.2	2,660	25.3	40.6	1.0	3.5	

Notes: No nutrients, general minerals or total minerals collected at Site R in February due to unsafe site conditions

	Nutrients				
	Nitrates as N (Dissolved)	Total ammonia	Total Kjeldahl Nitrogen	Total phosphorous	Ortho-phosphate as P
	USBR	USBR	USBR	USBR	USBR
	mg/L	mg/L	mg/L	mg/L	mg/L
Jan-09-2014	0.16	0.098	0.85	0.16V	0.054 T
Feb-27-2014					
Mar-26-2014	0.05	0.110	2.00	0.53 T	0.150
Apr-25-2014					

Notes: No nutrients, general minerals or total minerals collected at Site R in February due to unsafe site conditions

Results of the Interim Monitoring Program Oct 2013 - Feb 2014

	General Minerals							
	Calcium	Magnesium	Potassium	Sodium	Chloride (Dissolved)	Sulfate (Dissolved)	Total Organic Carbon	Total Dissolved Solids
	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Units	mg/L
Jan-09-2014	91	59	5.1	310	430	430	NA	NA
Feb-27-2014								

Notes: No nutrients, general minerals or total minerals collected at Site R in February due to unsafe site conditions

	Total Metals									
	Arsenic	Boron	Cadmium	Copper	Lead	Mercury	Molybdenum	Nickel	Zinc	
	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Jan-09-2014	<5.0	1,800	<1.0	23	<2.5	<100	12	<10	<5.0	
Feb-27-2014										

Notes: No nutrients, general minerals or total minerals collected at Site R in February due to unsafe site conditions

Table 10a. Water monitoring in the San Joaquin River at Fremont Ford (Stati

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Apr-01-2014	138	15.2	2,020
Apr-02-2014	141	15.1	2,040
Apr-03-2014	136	15.8	2,160
Apr-04-2014	137	17.0	2,050
Apr-05-2014	135	16.8	2,030
Apr-06-2014	134	17.8	2,000
Apr-07-2014	135	19.6	1,980
Apr-08-2014	147	21.5	1,870
Apr-09-2014	163	22.7	1,720
Apr-10-2014	161	22.6	1,800
Apr-11-2014	158	22.1	1,880
Apr-12-2014	141	21.6	2,120
Apr-13-2014	124	21.4	2,250
Apr-14-2014	111	21.1	2,370
Apr-15-2014	101	22.4	2,410
Apr-16-2014	97	22.1	2,340
Apr-17-2014	97	21.8	2,410
Apr-18-2014	96	22.4	2,360
Apr-19-2014	95	21.9	2,260
Apr-20-2014	92	21.3	2,310
Apr-21-2014	97	21.6	2,120
Apr-22-2014	94	21.3	2,050
Apr-23-2014	85	19.9	2,390
Apr-24-2014	75	19.8	2,860
Apr-25-2014	74	19.4	2,860
Apr-26-2014	76	18.3	2,770
Apr-27-2014	83	18.4	2,380
Apr-28-2014	81	19.7	2,370
Apr-29-2014	82	20.3	2,360
Apr-30-2014	79	22.4	2,300

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.
Preliminary Data

Table 10b. Monthly Averages

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	Calculated	USGS	USGS
UNITS	acre-feet	°C	µS/cm
January	6,310	10	1,990
February	6,040	14	2,150
March	6,900	17	2,270
April	6,670	20	2,230
May			
June			
July			
August			
September			
October			
November			
December			

Table 11a. Water monitoring in the San Joaquin River at Crows Landing (Station N)

PARAMETER	Flow	Temperature	Specific Conductance	Total Selenium
DATA SOURCE	USGS	USGS	USGS	USBR
UNITS	cfs	°C	µS/cm	µg/L
Apr-01-2014	384	15.3	1,790	< 0.4
Apr-02-2014	421	15.2	1,730	< 0.4
Apr-03-2014	430	16.2	1,770	< 0.4
Apr-04-2014	417	17.0	1,830	0.4
Apr-05-2014	403	17.3	1,880	0.4
Apr-06-2014	413	18.4	1,860	0.5
Apr-07-2014	405	20.3	1,820	0.5
Apr-08-2014	394	22.1	1,820	0.5
Apr-09-2014	394	23.3	1,760	0.6
Apr-10-2014	382	22.8	1,720	0.6
Apr-11-2014	365	22.4	1,720	0.6
Apr-12-2014	347	22.0	1,800	0.6
Apr-13-2014	341	21.7	1,880	0.6
Apr-14-2014	329	21.8	1,910	0.6
Apr-15-2014	312	22.6	1,990	0.5
Apr-16-2014	282	22.0	2,000	0.5
Apr-17-2014	249	21.8	2,070	0.5
Apr-18-2014	244	21.8	1,990	0.5
Apr-19-2014	243	21.4	2,030	0.5
Apr-20-2014	253	21.0	2,020	0.7
Apr-21-2014	253	21.6	2,010	0.7
Apr-22-2014	270	21.1	1,780	0.6
Apr-23-2014	262	19.6	1,630	0.5
Apr-24-2014	249	19.9	1,780	0.4
Apr-25-2014	323	19.1	1,670	0.5
Apr-26-2014	450	18.4	1,120	< 0.4
Apr-27-2014	518	18.4	992	< 0.4
Apr-28-2014	584	18.6	871	< 0.4
Apr-29-2014	571	19.4	868	< 0.4
Apr-30-2014	469	21.3	1,040	< 0.4

Notes:

Preliminary Data

11b. Monthly Averages

PARAMETER	Flow	Temperature	Specific Conductance	Selenium
DATA SOURCE	Calculated	Calculated	Calculated	Calculated
UNITS	acre-feet	°C	µS/cm	µg/L
January	22,200	10	1,620	0.7
February	22,450	13	1,760	1.3
March	22,480	17	2,180	1.1
April	11,060	20	1,710	0.5
May				
June				
July				
August				
September				
October				
November				
December				

Table 11c. Water quality monitoring in the San Joaquin River at Crows Landing (Station N)

PARAMETER	Physicals					Selenium	Boron
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity		
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	µg/L	mg/L
Feb-07-2014	9.2	7.5	1,180	10.0	19.3	1.1	1.3
Feb-14-2014	9.1	8.0	1,730	14.0	27.8	1.5	1.3
Feb-21-2014	10.2	7.9	2,210	13.0	18.5	2.4 U	1.8
Feb-27-2014	10.0	7.9	1,900	15.3	21.3	1.0	1.1
Mar-06-2014	9.5	8.0	2,200	18.2	33.7	2.3 U	1.7
Mar-14-2014	10.5	8.1	2,160	16.2	33.0	0.9	1.5
Mar-21-2014	11.6	8.2	2,480	17.9		0.7	1.7
Apr-04-2014	11.8	8.0	2,010	16.8		0.4	1.3
Apr-11-2014	10.1	8.0	1,820	22.5	28.8	0.6	1.1
Apr-18-2014	8.8	7.8	2,220	20.2	32.3	0.4	1.2
Apr-30-2014	14.8	8.3	1,030	27.7	22.9	<0.4	0.7

Notes:

Table 12. Summary of fathead minnow (*Pimephales promelas*) larvae survival in 7-day tests using water samples collected from March 2014 to March 2016. Each value is the mean of 4 replicates with 10 fish in each replicate.

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal	Laboratory Control
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA
UNITS	%	%	%	%	%	%
Mar-2014	90	93	98	93	73 ^a	95
Jun-2014						
Sep-2014						
Nov-2014						
Mar-2015						
Jun-2015						
Sep-2015						
Mar-2016						

Table 13. Summary of fathead minnow (*Pimephales promelas*) larvae growth in 7-day tests using water samples collected from March 2014 to March 2016. Each value is the mean of 4 replicates with 10 fish in each replicate.

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal	Laboratory Control
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA
UNITS	mg	mg	mg	mg	mg	mg
Mar-2014	0.84	0.70	0.78	0.68	0.74	0.74
Jun-2014						
Sep-2014						
Nov-2014						
Mar-2015						
Jun-2015						
Sep-2015						
Mar-2016						

Table 14. Summary of *Daphnia magna* survival in 7-day tests using water samples collected from March 2014 to March 2016. Each value is the mean of 10 replicates with 1 animal in each replicate.

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal	Laboratory Control
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA
UNITS	%	%	%	%	%	%
Mar-2014	100	90	100	100	100	100
Jun-2014						
Sep-2014						
Nov-2014						
Mar-2015						
Jun-2015						
Sep-2015						
Mar-2016						

Table 15. Summary of *Daphnia magna* reproduction in 7-day tests using water samples collected from March 2014 to March 2016. Each value is the mean of 10 replicates with 1 animal in each replicate.

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal	Laboratory Control
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA
UNITS	neonates per female	neonates per female	neonates per female	neonates per female	neonates per female	neonates per female
Mar-2014	67.4*	72.3	86.9	88.8	85.0	82.9
Jun-2014						
Sep-2014						
Nov-2014						
Mar-2015						
Jun-2015						
Sep-2015						
Mar-2016						

Table 16. Summary of *Selenastrum capricornutum* growth in 4-day tests using water samples collected from March 2014 to March 2016. Each value is the mean of 4 replicates.

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal	Laboratory Control
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA
UNITS	10 ⁵ cells/mL	10 ⁵ cells/mL	10 ⁵ cells/mL	10 ⁵ cells/mL	10 ⁵ cells/mL	10 ⁵ cells/mL
Mar-2014	4.2*	7.2	7.9	7.7 ^a	7.3	4.1
Jun-2014						
Sep-2014						
Nov-2014						
Mar-2015						
Jun-2015						
Sep-2015						
Mar-2016						

Table 17. Summary of selenium concentrations in grab water samples collected at study stations for use in laboratory toxicity tests

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal
DATA SOURCE	SLDMWA/USBR	SLDMWA/USBR	SLDMWA/USBR	SLDMWA/USBR	SLDMWA/USBR
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L
3/17/2014	18	< 0.8	1.3	0.5	< 0.4
3/19/2014	18	< 0.8	1.5	0.5	< 0.4
3/21/2014	18	< 0.8	1.7	0.4	< 0.4
Jun-2014					
Sep-2014					
Nov-2014					
Mar-2015					
Jun-2015					
Sep-2015					
Mar-2016					

Table 18. Summary of total suspended solids concentrations in grab water samples collected at study stations for use in laboratory toxicity tests

See Table 19 for explanation of footnotes and agency abbreviations.

LOCATION	Station B	Station C	Station D	Station F	Delta Mendota Canal
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	SLDMWA	SLDMWA
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L
3/17/2014	87 **	61	79	60	6.0
3/19/2014	< 5.0 T,V **	69 T,V	62 T,V	62 T,V	5.8 T,V
3/21/2014	46	64	59	58	6.0
Jun-2014					
Sep-2014					
Nov-2014					
Mar-2015					
Jun-2015					
Sep-2015					
Mar-2016					

Table 19. Explanations of footnotes and agency abbreviations.

Agency	
CVRWQCB	California Regional Water Quality Control Board, Central Valley Region
GWD	Grasslands Water District
SLDMWA	San Luis & Delta-Mendota Water Authority
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
WSJRWC	Westside San Joaquin River Watershed Coalition (WSJRWC)
Water Quality Monitoring	
e	Estimated value
.	Not applicable
<	Less than MDL
D	Sample was dechlorinated
G	Data from records of the Grassland Water District.
H	Result may have high bias
J	Result is between the MDL and RL
L	Result may have low bias
MDL	Minimum detection level
	Not analyzed - operator error, data will not be available in the future
NP	Not Provided. Data may be available in the future.
NT	Not tested
P	Pending, data not available at this time but will be available in the future
RL	Reporting level
T	Result obtained past the holding time
U	Result determined to be an outlier at the time of data validation
V	Result may vary excessively from the true value
UA3	Use Agreement for Continued Use of the San Luis Drain January 2010 - December 2019
Toxicity	
*	Significantly reduced from Delta Mendota Canal ($p < 0.05$)
**	Sample re-analyzed and result confirmed.
L	Result may be biased low. Sample was not preserved in the field
†	DMC water failed to meet the survival (>80%) acceptability criteria.
†††	DMC water failed to meet the reproduction (>10 neonates/adult) acceptability criteria.
††††	DMC water failed to meet minimum growth (10^6 cell/mL) acceptability criteria.
‡	Control value exceeds suggested maximum variance (20%) acceptability criteria.
‡‡	Fungal growth observed on test organisms.
‡‡‡	Failed cell density requirement of $1E6$ cells.
#	New testing laboratory with reporting limit of $0.4 \mu\text{g/L}$ as of June 1998.
v	Based on definitive bioassay, NOEC is 50 percent
a	The growth response for one of the replicates at this test treatment was determined