

**Grassland Bypass Project
Interim Baseline Monitoring Program**

Monthly Data Report

May 2014

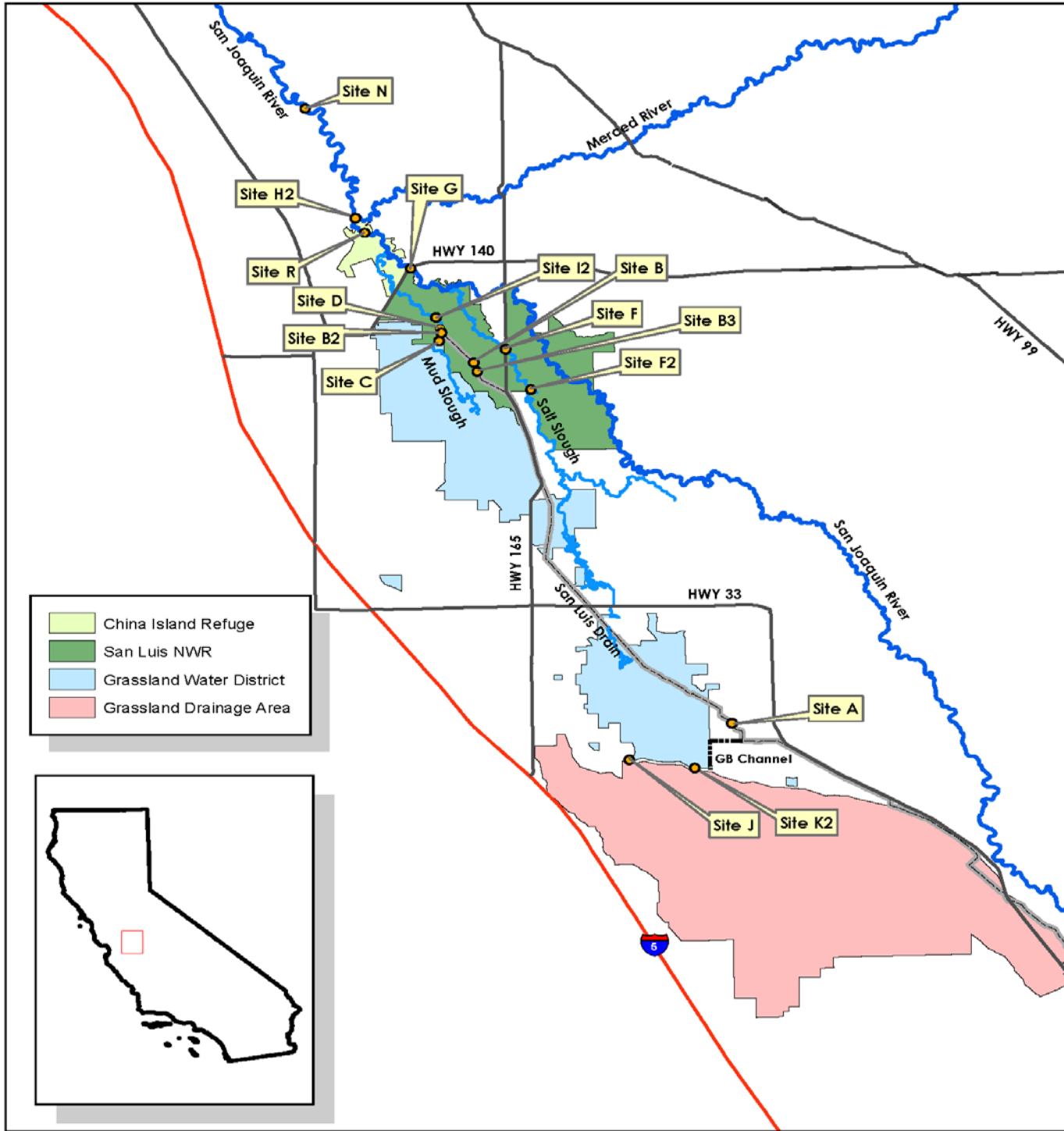


A Cooperative Effort Of:

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

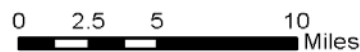
Compiled by San Francisco Estuary Institute

Figure 1. Map of the Grassland Bypass Project area



Grassland Bypass Project

Monitoring Sites



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
May-01-2014	8	24.3	5,870	4,344		29	91
May-02-2014	10	23.9	5,980	4,425		30	119
May-03-2014	10	22.3	5,800	4,292		31	115
May-04-2014	9	20.7	5,760	4,262		30	108
May-05-2014	10	19.8	5,710	4,225	95	33	108
May-06-2014	7	17.8	5,860	4,336		30	77
May-07-2014	5	19.2	6,100	4,514		29	58
May-08-2014	4	19.6	6,470	4,788		29	56
May-09-2014	4	20.9	6,770	5,010		33	59
May-10-2014	4	18.9	6,730	4,980		39	59
May-11-2014	4	17.9	6,650	4,921		43	48
May-12-2014	3	20.7	6,340	4,692	87	40	42
May-13-2014	1	23.1	6,820	5,047		34	15
May-14-2014	1	24.8	6,870	5,084		31	15
May-15-2014	2	24.9	7,390	5,469		32	24
May-16-2014	2	23.9	7,620	5,639		32	32
May-17-2014	2	22.5	7,540	5,580		39	23
May-18-2014	2	21.3	7,480	5,535		39	25
May-19-2014	3	20.6	7,010	5,187	111	49	35
May-20-2014	6	19.6	6,670	4,936		53	77
May-21-2014	3	22.3	6,160	4,558		49	33
May-22-2014	0	24.0	6,160	4,558		44	0
May-23-2014	4	24.2	5,980	4,425		42	50
May-24-2014	6	24.2	5,440	4,026		39	62
May-25-2014	6	25.1	5,050	3,737		32	58
May-26-2014	10	24.8	5,240	3,878		P	101
May-27-2014	6	23.8	5,130	3,796	96	P	62
May-28-2014	6	20.4	4,880	3,611		P	55
May-29-2014	4	21.1	5,280	3,907		P	40
May-30-2014	2	21.8	5,450	4,033		P	18
May-31-2014	2	21.9	6,040	4,470		P	22

Notes:

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

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
May-2014	280	21.9	6,200	4,589	97	36	1,690	5,792
Cumulative Total	2,930						19,100	30,795

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
May-01-2014	14	26.2	7,990			25.1	1.9
May-02-2014	10	24.0	7,010			23.0	1.3
May-03-2014	9	20.4	6,050			25.3	1.3
May-04-2014	10	19.2	6,240			29.0	1.5
May-05-2014	9	17.6	6,200	33		29.0	1.5
May-06-2014	9	16.6	5,970			26.2	1.3
May-07-2014	8	17.7	5,950		10.0	21.9	1.0
May-08-2014	6	20.0	5,910		11.0	18.9	0.6
May-09-2014	6	20.8	5,950		11.0	18.1	0.6
May-10-2014	5	17.0	6,050		11.0	18.6	0.5
May-11-2014	5	20.1	6,180		12.0	17.1	0.4
May-12-2014	6	21.0	6,290	49	12.0	10.4	0.3
May-13-2014	7	24.8	6,440		12.0	10.6	0.4
May-14-2014	6	26.9	6,370		12.0	7.7	0.2
May-15-2014	5	27.4	6,470		12.0	14.4	0.4
May-16-2014	5	25.2	6,620		12.0	12.2	0.3
May-17-2014	4	23.2	6,710		12.0	10.9	0.3
May-18-2014	4	21.1	6,700		12.0	10.6	0.3
May-19-2014	5	19.1	6,730	45	12.0	10.9	0.3
May-20-2014	5	18.6	6,790		12.0	11.1	0.3
May-21-2014	6	21.7	6,760		12.0	11.0	0.3
May-22-2014	6	22.9	6,730		13.0	5.1	0.2
May-23-2014	6	24.9	7,090		13.0	5.9	0.2
May-24-2014	6	25.8	7,350		14.0	5.3	0.2
May-25-2014	6	26.4	6,980		15.0	2.0	0.1
May-26-2014	6	25.8	7,220		15.0	5.6	0.2
May-27-2014	7	24.6	7,470	58	14.0	2.5	0.1
May-28-2014	7	20.4	7,700		14.0	8.0	0.3
May-29-2014	6	22.3	7,700		15.0	4.6	0.1
May-30-2014	6	23.4	7,600		15.0	7.5	0.2
May-31-2014	6	20.9	7,850		17.0	13.6	0.4

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

Preliminary Data

Low autosampler volume May 1- 6 (Se analysis only)

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	1270	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
May-2014	400	22.1	6,740	46	12.8	13.6	17	105
Cumulative Load Totals	4,030						226	542

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
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	
May-08-2014	14.6	9.0	6,050	23.9	15.9	19	11	21
May-16-2014	15.0	8.9	6,370	23.0	27.3	14	12	
May-23-2014	17.7	9.2	6,720	24.8	19.2	11	13	
May-30-2014	29.3	9.2	8,600	28.3		14	18	

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
May-08-2014	0.2	0.3	3.0	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.

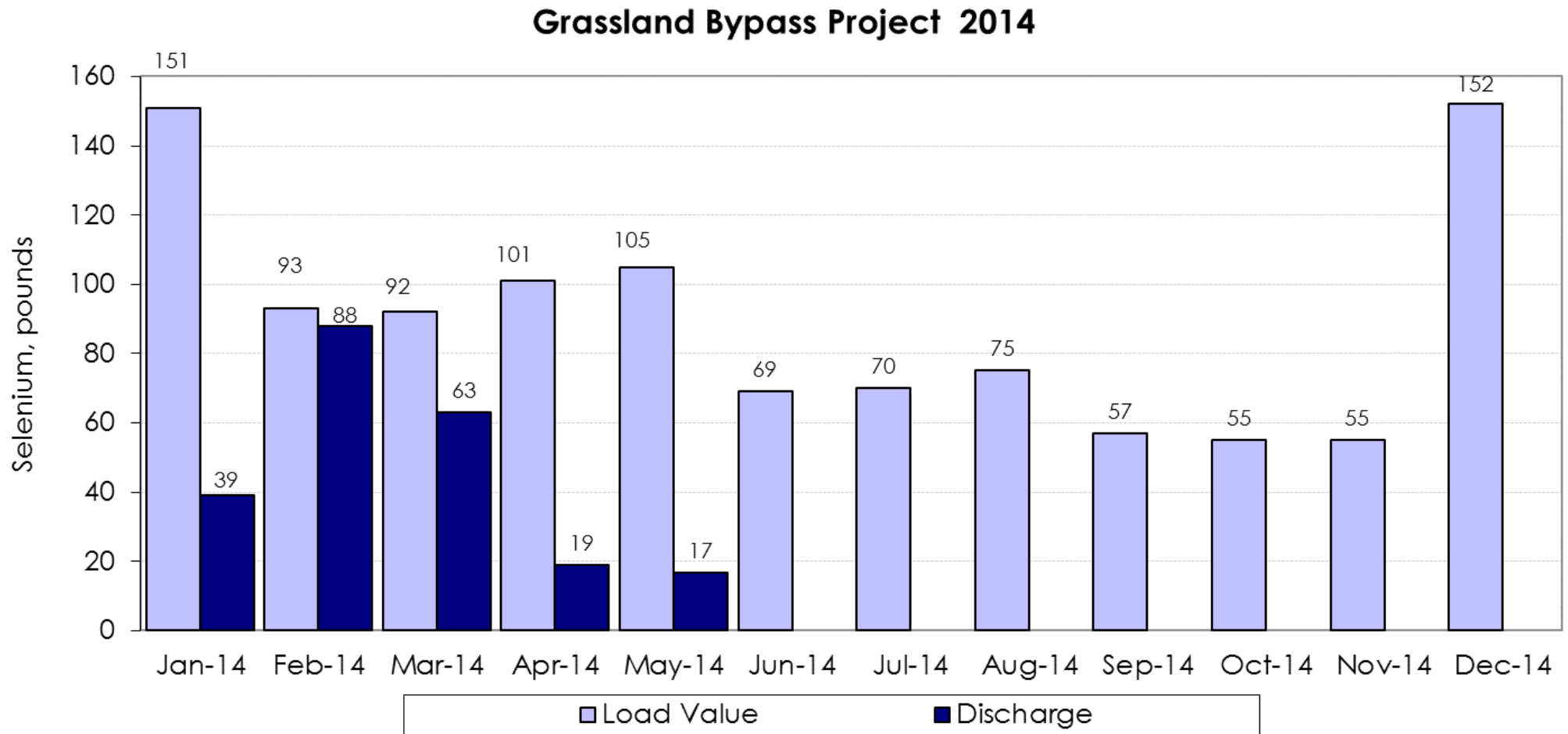


Table 3a. Water monitoring in Mud Slough (north) below San Luis Drain Discharge Station D

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
May-01-2014	18	23.9	6,340
May-02-2014	15	23.3	5,860
May-03-2014	14	22.2	5,860
May-04-2014	13	21.7	6,090
May-05-2014	13	21.3	6,120
May-06-2014	13	20.6	6,000
May-07-2014	12	20.7	5,910
May-08-2014	10	20.9	5,980
May-09-2014	10	22.1	5,800
May-10-2014	8	20.0	6,160
May-11-2014	0	18.0	6,130
May-12-2014	9	19.4	6,090
May-13-2014	9	22.9	6,120
May-14-2014	9	23.1	6,000
May-15-2014	7	23.2	6,430
May-16-2014	0	22.7	6,810
May-17-2014	0	22.5	6,900
May-18-2014	0	21.9	6,840
May-19-2014	0	21.9	6,840
May-20-2014	0	20.9	6,640
May-21-2014	7	21.7	6,560
May-22-2014	8	23.2	6,570
May-23-2014	8	23.9	6,700
May-24-2014	7	24.5	6,790
May-25-2014	8	24.8	6,730
May-26-2014	7	24.9	6,930
May-27-2014	8	24.2	7,170
May-28-2014	8	22.3	7,430
May-29-2014	0	21.3	7,440
May-30-2014	0	22.4	7,440
May-31-2014	0	22.4	7,620

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	270	22	6,530
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			
	USBR	USBR	USBR	USBR	USBR			
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
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	
May-08-2014	16.4	8.5	6,040	22.6	22.5	14.3 U	8.2	24 U
May-16-2014	17.3	8.4	6,780	24.8	29.8	6.9	8.3	
May-23-2014	11.4	8.7	6,760	25.8	28.2	7.6	11.0	
May-30-2014	23.8	8.8	7,600	26.5		9.7	13.0	

Notes:

	Nutrients				
	Nitrates as N (dissolved)	Ammonia as N	Total Kjeldahl Nitrogen	Total phosphorous as P	Ortho-phosphate as P
	USBR	USBR	USBR	USBR	USBR
	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					
May-08-2014	0.31	0.3	2.5	0.28 T	<0.010

Notes:

Results of the Interim Monitoring Program Oct 2013 - Feb 2014

	General Minerals						
	Calcium	Magnesium	Potassium	Sodium	Chloride (dissolved)	Sulfate (dissolved)	Total Organic Carbon
	USBR	USBR	USBR	USBR	USBR	USBR	USBR
	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
	USBR	USBR	USBR	USBR	USBR	USBR	USBR
	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)

	Physicals						
PARAMETER	Dissolved Oxygen	Specific Conductance	Turbidity	pH	Boron	Total Selenium	Molybdenum
DATA SOURCE	WSJRW	WSJRW	WSJRW	USBR	WSJRW	WSJRW	USBR
UNITS	mg/L	µS/cm	NTU	units	mg/L	µg/L	µg/L
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	9.9
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	7.5
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	
May-08-2014							
May-16-2014							
May-23-2014							
May-30-2014	26.0	5,530		8.3	4.7 U		

Notes:

- > No samples collected May 8-23 due to lack of sufficient flow
- > May 30 very little flow during sample collection

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
Mar-06-2014						
Mar-14-2014						
Mar-21-2014						
Mar-26-2014						
Apr-04-2014						
Apr-11-2014						
Apr-18-2014						
Apr-30-2014						
May-08-2014						
May-16-2014						
May-23-2014						
May-30-2014						

Notes:

Samples collected only when site is flooded

Site was dry from January through May (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
May-01-2014	60	24.8	1,630
May-02-2014	54	24.5	1,640
May-03-2014	52	22.8	1,630
May-04-2014	53	21.5	1,670
May-05-2014	52	20.9	1,600
May-06-2014	51	19.9	1,650
May-07-2014	50	20.1	1,670
May-08-2014	47	20.3	1,710
May-09-2014	47	21.4	1,680
May-10-2014	51	20.3	1,610
May-11-2014	46	18.4	1,610
May-12-2014	47	19.9	1,720
May-13-2014	43	22.5	1,740
May-14-2014	40	25.0	1,730
May-15-2014	42	25.2	1,900
May-16-2014	40	24.5	1,700
May-17-2014	43	24.0	1,670
May-18-2014	38	23.3	1,600
May-19-2014	41	22.5	1,660
May-20-2014	39	21.4	1,560
May-21-2014	43	21.5	1,670
May-22-2014	43	23.8	1,710
May-23-2014	40	25.1	1,730
May-24-2014	39	25.1	1,800
May-25-2014	40	25.1	1,750
May-26-2014	48	25.6	1,770
May-27-2014	52	24.7	1,290
May-28-2014	42	21.9	1,410
May-29-2014	39	20.4	1,480
May-30-2014	45	23.4	1,500
May-31-2014	51	23.2	1,250

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	2,810	23	1,640
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	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
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	
May-08-2014	12.1	7.8	1,930	11.0	25.3	< 0.4	0.8	12
May-16-2014	10.9	7.1	1,808	22.5	31.6	< 0.4	0.7	
May-23-2014	11.0	8.3	1,770	27.2	23.8	< 0.4	0.7	
May-30-2014	10.8	7.6	1,580	24.9		< 0.4	0.6	

Notes:

	Nutrients				
	Nitrates as N (dissolved)	Ammonia as N	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	<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					
May-08-2014	0.5	0.1	0.7	0.210 T	0.072

Notes:

Results of the Interim Monitoring Program Oct 2013 - Feb 2014

	General Minerals						
	Calcium	Magnesium	Potassium	Sodium	Chloride (dissolved)	Sulfate (dissolved)	Total Organic Carbon
	USBR	USBR	USBR	USBR	USBR	USBR	USBR
	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
	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR
	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
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			
May-08-2014	<20			
May-16-2014	<20			
May-23-2014	<20			
May-30-2014	<20			

Notes:

Samples only collected when flow is passing site
 March, April and May: 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
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			
May-08-2014	<20			
May-16-2014	<20			
May-23-2014	<20			
May-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
May-01-2014	107		
May-02-2014	89		
May-03-2014	82	21.9	3,050
May-04-2014	81	21.7	3,100
May-05-2014	80	20.6	2,860
May-06-2014	71	19.4	3,090
May-07-2014	67	20.7	3,260
May-08-2014	69		
May-09-2014	67	22.4	3,320
May-10-2014	68	20.5	3,430
May-11-2014	72	18.7	3,120
May-12-2014	74	22.6	3,190
May-13-2014	74	23.1	3,150
May-14-2014	73	26.4	3,180
May-15-2014	67	25.3	3,610
May-16-2014	66	24.4	3,630
May-17-2014	65	24.0	3,570
May-18-2014	66	23.4	3,030
May-19-2014	64	22.6	3,160
May-20-2014	61	22.0	3,380
May-21-2014	58	21.2	3,140
May-22-2014	59	24.6	2,950
May-23-2014	57	25.4	2,960
May-24-2014	54	25.4	3,030
May-25-2014	53	25.4	3,250
May-26-2014	54	25.6	3,140
May-27-2014	58	24.6	2,910
May-28-2014	57	22.1	2,630
May-29-2014	54	20.7	3,330
May-30-2014	49	23.6	3,430
May-31-2014	50	23.5	2,980

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	4,100	23	3,170
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	DATA SOURCE	DATA SOURCE	DATA SOURCE	DATA SOURCE			
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L	ug/L
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	
May-08-2014	16.7	8.3	3,620	21.9	14.9	2.7 U	2.4	16
May-16-2014	16.6	8.2	3,610	24.6	27.8	0.9	2.1	
May-23-2014	11.6	8.5	3,340	27.1	24.9	0.9	2.2	
May-30-2014	13.2	8.5	3,580	27.2		1.0	2.4	

Notes:

	Nutrients				
	Nitrates as N (Dissolved)	Total ammonia	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	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					
May-08-2014	<0.01	0.051	1.00	0.20 T	<0.010

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
	DATA SOURCE	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	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	
	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	<5.0	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
May-01-2014	73	24.8	2,320
May-02-2014	66	24.4	2,440
May-03-2014	66	22.5	2,470
May-04-2014	67	21.3	2,490
May-05-2014	64	20.9	2,540
May-06-2014	57	20.1	2,600
May-07-2014	59	20.6	2,570
May-08-2014	59	21.4	2,590
May-09-2014	58	22.3	2,520
May-10-2014	62	20.6	2,360
May-11-2014	62	18.9	2,340
May-12-2014	63	20.2	2,240
May-13-2014	59	22.7	2,280
May-14-2014	55	24.9	2,400
May-15-2014	0	24.9	2,610
May-16-2014	0	24.1	2,660
May-17-2014	56	23.8	2,280
May-18-2014	56	23.3	2,350
May-19-2014	0	22.6	2,310
May-20-2014	52	22.0	2,100
May-21-2014	53	22.7	1,960
May-22-2014	55	23.9	2,000
May-23-2014	52	25.2	2,260
May-24-2014	0	25.5	2,450
May-25-2014	51	25.6	2,430
May-26-2014	53	25.7	2,370
May-27-2014	61	24.9	1,880
May-28-2014	53	22.3	1,820
May-29-2014	0	21.3	2,130
May-30-2014	0	23.6	2,180
May-31-2014	56	23.5	1,750

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	2,770	23	2,310
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
May-01-2014	365	23.0	1,460	< 0.4
May-02-2014	305	23.3	1,620	0.9
May-03-2014	268	21.9	1,700	0.9
May-04-2014	262	20.9	1,720	0.9
May-05-2014	272	21.1	1,720	0.8
May-06-2014	255	19.9	1,770	
May-07-2014	226	20.7	1,900	0.8
May-08-2014	202	22.0	2,150	1.1
May-09-2014	183	22.4	2,290	1.2
May-10-2014	174	21.2	2,280	1.0
May-11-2014	183	19.6	2,390	0.9
May-12-2014	170	20.1	2,060	0.6
May-13-2014	164	22.7	2,060	0.6
May-14-2014	159	24.9		0.6
May-15-2014	153	25.4	1,980	0.7
May-16-2014	156	24.4	1,990	0.7
May-17-2014	153	23.9	1,720	0.6
May-18-2014	148	23.2	1,760	0.5
May-19-2014	151	22.4	1,810	0.5
May-20-2014	145	22.0	1,690	0.4
May-21-2014	138	22.6	1,700	< 0.4
May-22-2014	139	24.1	1,760	0.5
May-23-2014	135	25.1	1,770	0.5
May-24-2014	129	25.2	1,830	0.6
May-25-2014	132	25.0	1,850	0.7
May-26-2014	136	25.5	1,940	0.6
May-27-2014	148	24.5	1,820	0.8
May-28-2014	147	22.4	1,590	0.5
May-29-2014	139	21.3	1,500	0.5
May-30-2014	122	23.3	1,660	0.6
May-31-2014	116	23.0	2,050	0.7

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	21,700	17	2,110	1.1
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	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	µg/L	mg/L	mg/L
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	8.8
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	5.9
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	
May-08-2014	12.6	8.1	2,030	20.0	16.2	1.2	1.2	7.5
May-16-2014	13.2	8.1	2,110	21.8	14.7	0.7	1.1	
May-23-2014	11.7	8.5	1,800	25.7	20.6	0.5	0.8	
May-30-2014	15.6	8.2	1,740	23.9		0.5	1.1	

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 µg/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