Grassland Bypass Project
Interim Baseline Monitoring Program

Monthly Data Report

March 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

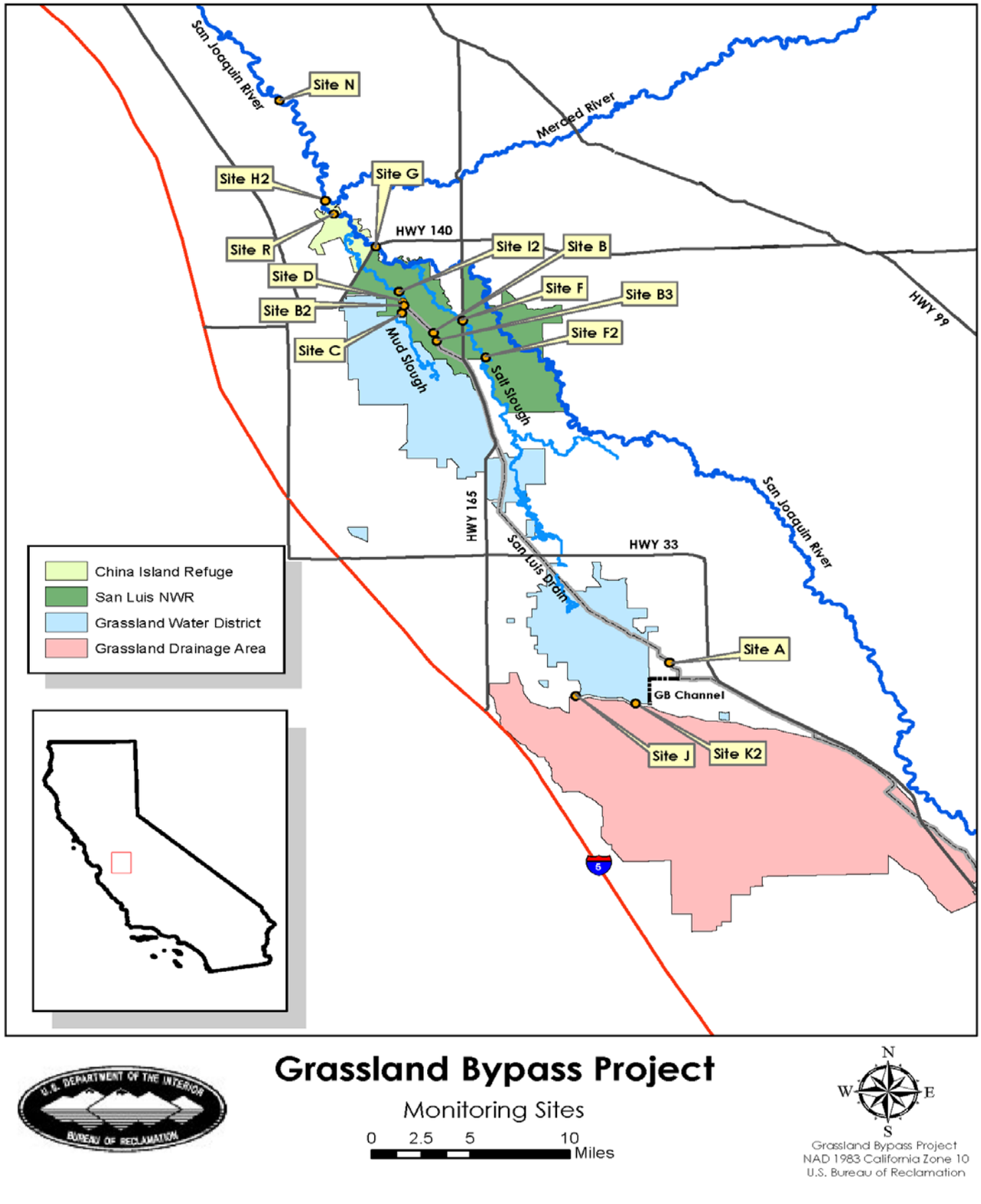
San Luis & Delta-Mendota Water Authority

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
MONTHLY DATA REPORT

LIST OF TABLES FOR MONTHLY REPORT

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
Mar-01-2014	44	14.2	6,010	4,447		31	533
Mar-02-2014	29	14.4	6,280	4,647		33	367
Mar-03-2014	29	14.8	6,380	4,725		31	373
Mar-04-2014	30	16.6	5,980	4,425	106	31	359
Mar-05-2014	25	18.0	6,040	4,469		31	300
Mar-06-2014	15	18.8	6,160	4,556		31	189
Mar-07-2014	11	17.1	6,110	4,524		27	133
Mar-08-2014	10	17.2	6,230	4,609		26	121
Mar-09-2014	10	17.9	7,150	5,294		27	139
Mar-10-2014	10	17.6	7,250	5,362	101	23	150
Mar-11-2014	8	15.9	7,050	5,213		23	117
Mar-12-2014	7	16.4	7,190	5,318		22	103
Mar-13-2014	6	16.8	7,560	5,594		23	95
Mar-14-2014	5	16.7	7,610	5,633		23	70
Mar-15-2014	2	17.3	7,320	5,414		23	29
Mar-16-2014	3	19.1	7,290	5,396		23	45
Mar-17-2014	3	17.4	7,410	5,480	84	24	40
Mar-18-2014	4	15.8	7,560	5,594		29	53
Mar-19-2014	3	17.4	7,510	5,554		31	45
Mar-20-2014	2	18.4	7,610	5,629		29	36
Mar-21-2014	2	18.7	7,770	5,750		27	28
Mar-22-2014	2	18.1	7,890	5,841		28	28
Mar-23-2014	2	18.8	8,000	5,923		29	37
Mar-24-2014	3	19.3	7,930	5,868	77	30	41
Mar-25-2014	3	18.2	7,840	5,801		28	50
Mar-26-2014	2	16.5	7,720	5,712		25	29
Mar-27-2014	2	17.2	7,540	5,580		26	33
Mar-28-2014	4	18.1	7,720	5,715		28	65
Mar-29-2014	6	17.8	8,020	5,931		28	101
Mar-30-2014	10	17.7	7,620	5,636		28	149
Mar-31-2014	9	16.5	7,270	5,377	111	29	135

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

Table 1b. Monthly Averages and Totals

	Average Flow (A)	Average Temperature	Average Specific Conducantce	Average Total Dissolved Solids	Average Total Suspended Solids	Average Selenium	Salt Load	Salt Load Objective
	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	UA3
	cfs	°C	µS/cm	mg/L	mg/L	µg/L	tons	tons
Jan-2014	11	9.8	7,320	5,418	46	26	4,615	4,283
Feb-2014	19	13.6	6,860	5,074	136	31	6,930	6,779
Mar-2014	10	17.3	7,190	5,323	96	27	4,600	8,031
Cumulative Total							16,150	19,090

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
Mar-01-2014	51	10.1	6,240		14.0	24.0	6.6
Mar-02-2014	48	10.1	6,210		12.0	34.0	8.8
Mar-03-2014	35	10.1	5,660		12.0	33.0	6.2
Mar-04-2014	34	10.1	5,920	104	12.0	31.0	5.6
Mar-05-2014	35	10.1	5,800		12.0	31.0	5.9
Mar-06-2014	29	14.2	6,160		12.0	32.1	5.0
Mar-07-2014	20	13.0	6,160		12.0	31.9	3.5
Mar-08-2014	16	12.9	5,990		12.0	29.1	2.4
Mar-09-2014	14	16.6	5,790		12.0	28.2	2.1
Mar-10-2014	12	17.3	5,670	36	11.0	29.9	2.0
Mar-11-2014	13	17.9	5,560		11.0	27.3	1.9
Mar-12-2014	13	14.2	5,710		12.0	25.6	1.8
Mar-13-2014	11	15.6	5,830		12.0	24.9	1.5
Mar-14-2014	10	17.4	5,840		12.0	21.8	1.2
Mar-15-2014	9	15.7	5,910		12.0	20.4	0.9
Mar-16-2014	7	14.6	6,010		13.0	19.3	0.8
Mar-17-2014	6	15.2	6,100	42	14.0	19.5	0.7
Mar-18-2014	6	15.6	6,160		14.0	19.3	0.6
Mar-19-2014	6	14.6	6,380		14.0	18.9	0.7
Mar-20-2014	6	16.7	6,470		13.0	17.8	0.6
Mar-21-2014	6	18.9	6,400		13.0	16.7	0.5
Mar-22-2014	6	15.1	6,300		12.0	14.0	0.4
Mar-23-2014	6	15.3	6,190		12.0	14.7	0.4
Mar-24-2014	6	15.9	6,060	42	12.0	13.4	0.4
Mar-25-2014	6	18.1	5,940		12.0	11.8	0.4
Mar-26-2014	6	17.4	5,850		12.0	7.2	0.2
Mar-27-2014	6	16.3	5,890		12.0	12.2	0.4
Mar-28-2014	6	16.8	6,000		11.0	10.0	0.3
Mar-29-2014	6	18.3	6,000		11.0	8.6	0.3
Mar-30-2014	8	16.4	5,750		10.0	8.4	0.4
Mar-31-2014	11	13.4	5,440	27	11.0	8.4	0.5

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

Table 2b. Monthly Averages and Totals

	Average Flow (B2)	Average Temperature (B2)	Average Specific Conducantce (B2)	Average Total Supspended Solids	Average Boron (B3)	Average Selenium	Selenium Load	Selenium Load Objective
	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	UA3
	cfs	°C	µS/cm	mg/L	mg/L	µg/L	lbs	lbs
Jan-2014	16	10.1	5,290	13	10.2	14.0	39	151
Feb-2014	23	12.6	6,100	139	12.6	26.0	88	93
Mar-2014	15	15.0	5,980	50	11.8	20.8	63	92
Cumulative Load Totals							190	336

Notes:
Selenium load objective based on 2014 critical year type

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

	Physicals					Total Selenium	Total Boron	Total Molybdenum
PARAMETER	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
Jan-03-2014	14.5	7.5	4,390	8.1	13.4	12		
Jan-09-2014	14.4	7.6	4,630	10.0	13.7	10		
Jan-14-2014	18.5	7.8	4,860	8.3	12.9	11		
Jan-23-2014	15.8	7.9	5,700	9.0	14.8	16		
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	

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	0.5	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

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	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
	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	5.5	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.

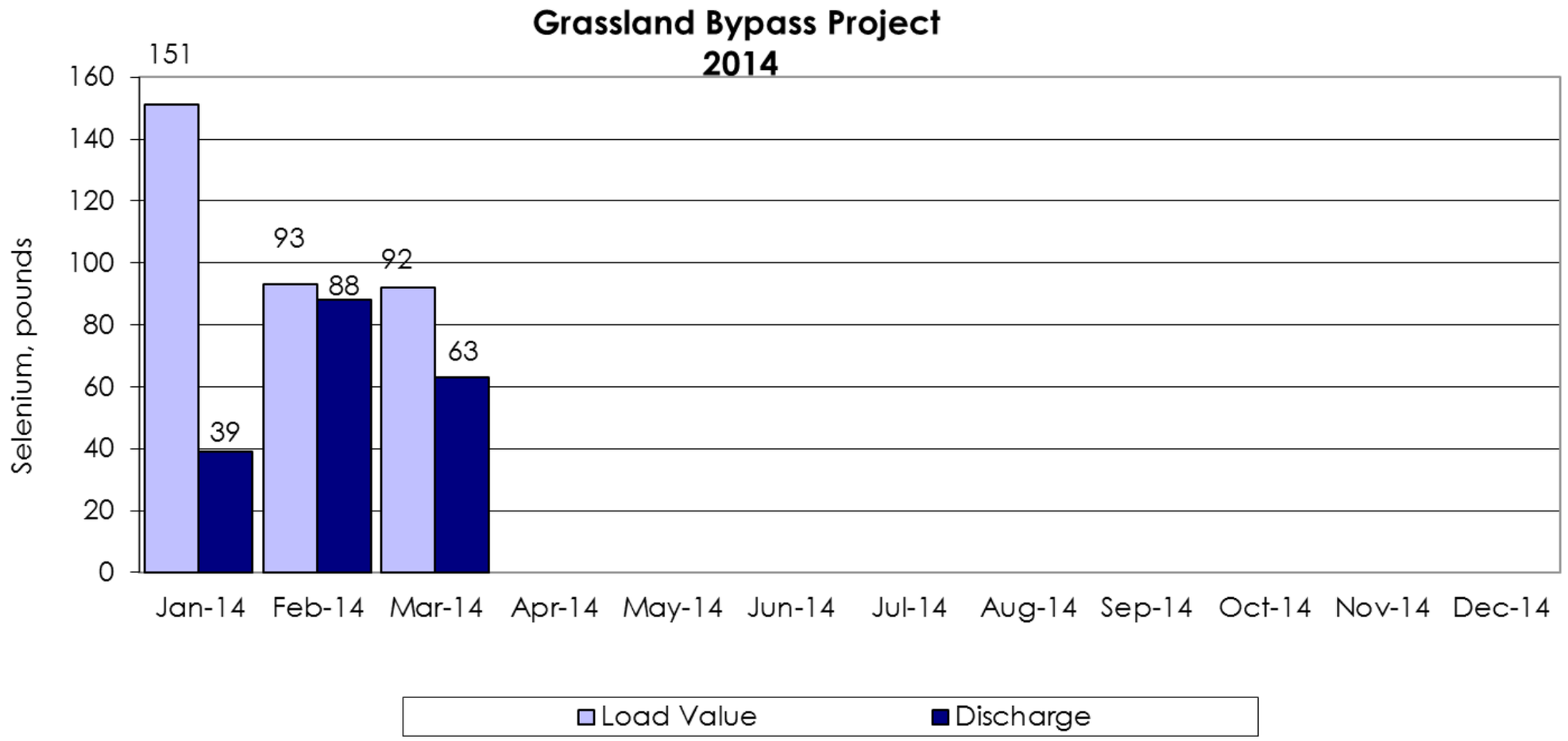


Table 3a. Water monitoring in Mud Slough (north) below San Luis Drain Discharge Station D

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Mar-01-2014	131	14.5	4,110
Mar-02-2014	128	14.5	4,100
Mar-03-2014	113	14.0	3,680
Mar-04-2014	115	15.8	3,610
Mar-05-2014	120	17.1	3,630
Mar-06-2014	105	17.8	3,740
Mar-07-2014	95	16.6	3,480
Mar-08-2014	93	17.1	3,240
Mar-09-2014	91	17.9	3,150
Mar-10-2014	87	18.0	3,090
Mar-11-2014	86	15.7	3,030
Mar-12-2014	104	16.0	2,900
Mar-13-2014	123	16.5	2,760
Mar-14-2014	126	16.7	2,800
Mar-15-2014	119	17.6	2,790
Mar-16-2014	114	18.6	2,890
Mar-17-2014	107	18.6	2,930
Mar-18-2014	93	16.4	2,950
Mar-19-2014	87	16.7	2,990
Mar-20-2014	84	18.1	2,900
Mar-21-2014	74	18.9	3,010
Mar-22-2014	65	18.8	3,100
Mar-23-2014	57	18.9	3,100
Mar-24-2014	48	19.2	3,230
Mar-25-2014	41	18.4	3,480
Mar-26-2014	40	17.3	3,500
Mar-27-2014	49	17.0	3,230
Mar-28-2014	58	18.1	2,970
Mar-29-2014	55	18.0	2,970
Mar-30-2014	55	17.2	3,340
Mar-31-2014	56	16.4	3,490

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

Table 3b. Monthly Averages

PARAMETER	Average Flow (D)	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
January	55	11	3,120
February	76	14	3,600
March	88	17	3,230
April			
May			
June			
July			
August			
September			
October			
November			
December			

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

	Physicals					Total Selenium	Total Boron	Total Molybdenum
PARAMETER	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
Jan-03-2014	12.1	7.8	3,180	9.0	10.7	3.2		
Jan-09-2014	11.2	7.8	3,080	9.5	12.9	2.4	3.4 H	16
Jan-14-2014	15.2	7.8	3,180	8.2	10.7	2.7		
Jan-23-2014	12.4	7.8	3,460	9.2	16.1	4.4		
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	

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

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**
DATA SOURCE	**WSJRWC**	**WSJRWC**	**WSJRWC**	**USBR**	**WSJRWC**	**WSJRWC**
UNITS	**mg/L**	**µS/cm**	**NTU**	**units**	**mg/L**	**µg/L**
Jan-14-2014	10.2*	2,480	7.6			
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

Notes:

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

	Physicals					
PARAMETER	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity	Total Selenium
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	µg/L
Jan-03-2014						
Jan-09-2014						
Jan-14-2014						
Jan-23-2014						
Feb-07-2014						
Feb-14-2014						
Feb-21-2014						
Feb-27-2014						
Mar-06-2014						
Mar-14-2014						
Mar-21-2014						
Mar-26-2014						

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
Mar-01-2014	107	14.6	1,910
Mar-02-2014	112	14.4	1,900
Mar-03-2014	84	14.5	2,140
Mar-04-2014	82	16.3	2,230
Mar-05-2014	80	17.4	2,260
Mar-06-2014	71	18.1	2,210
Mar-07-2014	79	16.6	2,120
Mar-08-2014	66	17.0	2,140
Mar-09-2014	66	17.8	2,200
Mar-10-2014	71	17.6	2,120
Mar-11-2014	63	15.5	2,130
Mar-12-2014	66	16.2	2,160
Mar-13-2014	68	16.4	2,180
Mar-14-2014	71	16.6	2,140
Mar-15-2014	75	17.4	2,160
Mar-16-2014	59	18.6	2,280
Mar-17-2014	74	18.2	2,190
Mar-18-2014	68	16.2	2,120
Mar-19-2014	66	16.9	2,180
Mar-20-2014	57	18.3	2,220
Mar-21-2014	62	19.1	2,240
Mar-22-2014	66	18.5	2,360
Mar-23-2014	60	18.6	2,380
Mar-24-2014	63	19.0	2,310
Mar-25-2014	66	18.5	2,190
Mar-26-2014	69	17.2	2,180
Mar-27-2014	69	16.3	2,270
Mar-28-2014	81	17.9	2,240
Mar-29-2014	88	17.9	2,060
Mar-30-2014	99	17.3	1,990
Mar-31-2014	112	16.6	1,950

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

Table 6b. Monthly Averages

PARAMETER	Average Flow (G)	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
January	74	17	1,760
February	69	14	1,960
March	75	17	2,170
April			
May			
June			
July			
August			
September			
October			
November			
December			

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

	Physicals					Total Selenium	Total Boron	Total Molybdenum
PARAMETER	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
Jan-03-2014	11.4	7.1	1,660	7.9	22.1	<0.4		
Jan-09-2014	10.8	6.9	1,690	10.4	25.0	<0.4	0.96	
Jan-14-2014	14.4	6.6	1,710	7.6	17.2	<0.4		
Jan-23-2014	12.8	7.3	1,770	8.9	21.8	<0.4		
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	

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

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
Jan-06-2014	17	504	8.4	0.8
Jan-13-2014	14	467	9.1	1.0
Jan-21-2014	39	510	9.6	1.0
Jan-27-2014	23	434	10.5	1.0
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
March				

Notes:
Samples only collected when flow is passing site
March: 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
Jan-06-2014	53	496	8.3	0.8
Jan-13-2014	42	467	9.0	0.9
Jan-21-2014	41	514	9.6	0.9
Jan-27-2014	40	463	10.5	1.0
Feb-03-2014				
Feb-10-2014				
Feb-18-2014				
Feb-24-2014				
March				

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
Mar-01-2014	257	14.4	2,550
Mar-02-2014	270	14.7	2,680
Mar-03-2014	268	14.3	2,620
Mar-04-2014	251		
Mar-05-2014	243	16.5	2,700
Mar-06-2014	240	17.5	2,810
Mar-07-2014	229	16.7	2,860
Mar-08-2014	226	17.3	2,740
Mar-09-2014	221	17.2	2,750
Mar-10-2014	216	17.6	2,770
Mar-11-2014	214	16.1	2,770
Mar-12-2014	211	15.7	2,710
Mar-13-2014	215	16.6	2,560
Mar-14-2014	229	16.5	2,360
Mar-15-2014	235	17.7	2,380
Mar-16-2014	231	18.6	2,440
Mar-17-2014	219	18.3	2,600
Mar-18-2014	219	16.5	2,580
Mar-19-2014	206	16.9	2,500
Mar-20-2014	189	17.4	2,550
Mar-21-2014	185	18.6	2,730
Mar-22-2014	180	18.8	2,730
Mar-23-2014	173	18.8	2,850
Mar-24-2014	168	19.4	
Mar-25-2014	162	18.8	3,000
Mar-26-2014	164	17.8	2,910
Mar-27-2014	163	16.9	2,760
Mar-28-2014	180	16.6	2,760
Mar-29-2014	191	17.9	2,730
Mar-30-2014	206		
Mar-31-2014	215	16.5	2,760

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

Table 8b. Monthly Averages

PARAMETER	Average Flow (H2)	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
January	209	13	2,600
February	218	14	2,580
March	212	17	2,680
April			
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

	Physicals					Total Selenium	Total Boron	Total Molybdenum
PARAMETER	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
Jan-03-2014	12.2	8.0	2,340	8.3	17.0	0.9	1.8	
Jan-09-2014	14.0	7.9	2,510	9.8	17.7	0.8		
Jan-14-2014	16.0	7.9	2,500	8.5	15.5	0.9		
Jan-23-2014	13.0	8.0	2,870	8.7	19.9	1.4		
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	

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

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 ginerals 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
Mar-01-2014	140	14.7	2,010
Mar-02-2014	155	14.6	1,890
Mar-03-2014	152	14.1	1,960
Mar-04-2014	144	15.8	2,100
Mar-05-2014	135	17.0	2,220
Mar-06-2014	132	17.9	2,250
Mar-07-2014	125	16.6	2,220
Mar-08-2014	121	16.9	2,150
Mar-09-2014	117	17.8	2,200
Mar-10-2014	114	17.8	2,300
Mar-11-2014	114	15.9	2,310
Mar-12-2014	112	16.1	2,300
Mar-13-2014	107	16.6	2,350
Mar-14-2014	112	16.5	2,200
Mar-15-2014	113	17.4	2,210
Mar-16-2014	109	18.4	2,260
Mar-17-2014	105	18.3	2,340
Mar-18-2014	106	16.3	2,250
Mar-19-2014	106	16.8	2,280
Mar-20-2014	91	18.3	2,490
Mar-21-2014	93	18.8	2,430
Mar-22-2014	85	18.7	2,430
Mar-23-2014	80	18.7	2,470
Mar-24-2014	79	18.9	2,490
Mar-25-2014	80	18.6	2,490
Mar-26-2014	85	17.8	2,330
Mar-27-2014	85	16.6	2,390
Mar-28-2014	93	17.6	2,330
Mar-29-2014	100	18.1	2,240
Mar-30-2014	121	17.4	2,110
Mar-31-2014	127	16.7	2,140

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

Table 10b. Monthly Averages

PARAMETER	Average Flow (G)	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
January	105	10	1,990
February	109	14	2,150
March	110	17	2,270
April			
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
Mar-01-2014	423	14.9	1,940	1.2
Mar-02-2014	451	15.1	2,030	1.8
Mar-03-2014	460	14.5	2,120	2.4
Mar-04-2014	454	15.5	2,100	3.0
Mar-05-2014	434	17.0	2,130	2.5
Mar-06-2014	429	18.1	2,170	
Mar-07-2014	417	17.0	2,230	
Mar-08-2014	408	16.9	2,250	
Mar-09-2014	403	17.7	2,150	
Mar-10-2014	399	18.0	2,130	
Mar-11-2014	389	16.1	2,140	
Mar-12-2014	382	16.2	2,120	
Mar-13-2014	382	16.7	2,140	
Mar-14-2014	390	16.8	2,160	
Mar-15-2014	401	17.5	2,180	
Mar-16-2014	400	18.4	2,210	
Mar-17-2014	380	18.5	2,220	
Mar-18-2014	361	16.5	2,260	
Mar-19-2014	349	16.9	2,270	
Mar-20-2014	324	18.2	2,320	
Mar-21-2014	304	18.9	2,540	
Mar-22-2014	298	18.7	2,540	0.7
Mar-23-2014	293	18.6	2,420	0.7
Mar-24-2014	286	19.1	2,300	0.6
Mar-25-2014	278	18.3	2,200	0.6
Mar-26-2014	267	17.8	2,210	0.5
Mar-27-2014	260	17.4	2,160	0.5
Mar-28-2014	272	18.0	2,160	0.5
Mar-29-2014	314	18.0	2,040	0.5
Mar-30-2014	351	17.5	1,910	0.5
Mar-31-2014	373	16.7	1,870	0.5

Notes:
Preliminary Data
March 6 -21 Autosampler Malfunction (no samples collected)

11b. Monthly Averages

PARAMETER	Average Flow (N)	Temperature	Specific Conductance	Selenium
DATA SOURCE	Calculated	Calculated	Calculated	Calculated
UNITS	cfs	°C	µS/cm	µg/L
January	361	10	1,620	0.7
February	404	13	1,760	1.3
March	412	17	2,180	1.1
April				
May				
June				
July				
August				
September				
October				
November				
December				

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

	Physicals					Selenium	Boron
PARAMETER	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
Jan-03-2014	12.7	8.1	1,500	7.6	11.3	0.6	
Jan-09-2014	12.1	8.0	1,610	9.4	11.9	0.5	
Jan-14-2014	15.9	8.0	1,640	7.8	9.0	0.4	
Jan-23-2014	13.4	8.0	1,840	8.5	12.1	0.8	
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

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 (10^6cell/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