

**Grassland Bypass Project
Interim Baseline Monitoring Program**

Monthly Data Report

December 2013

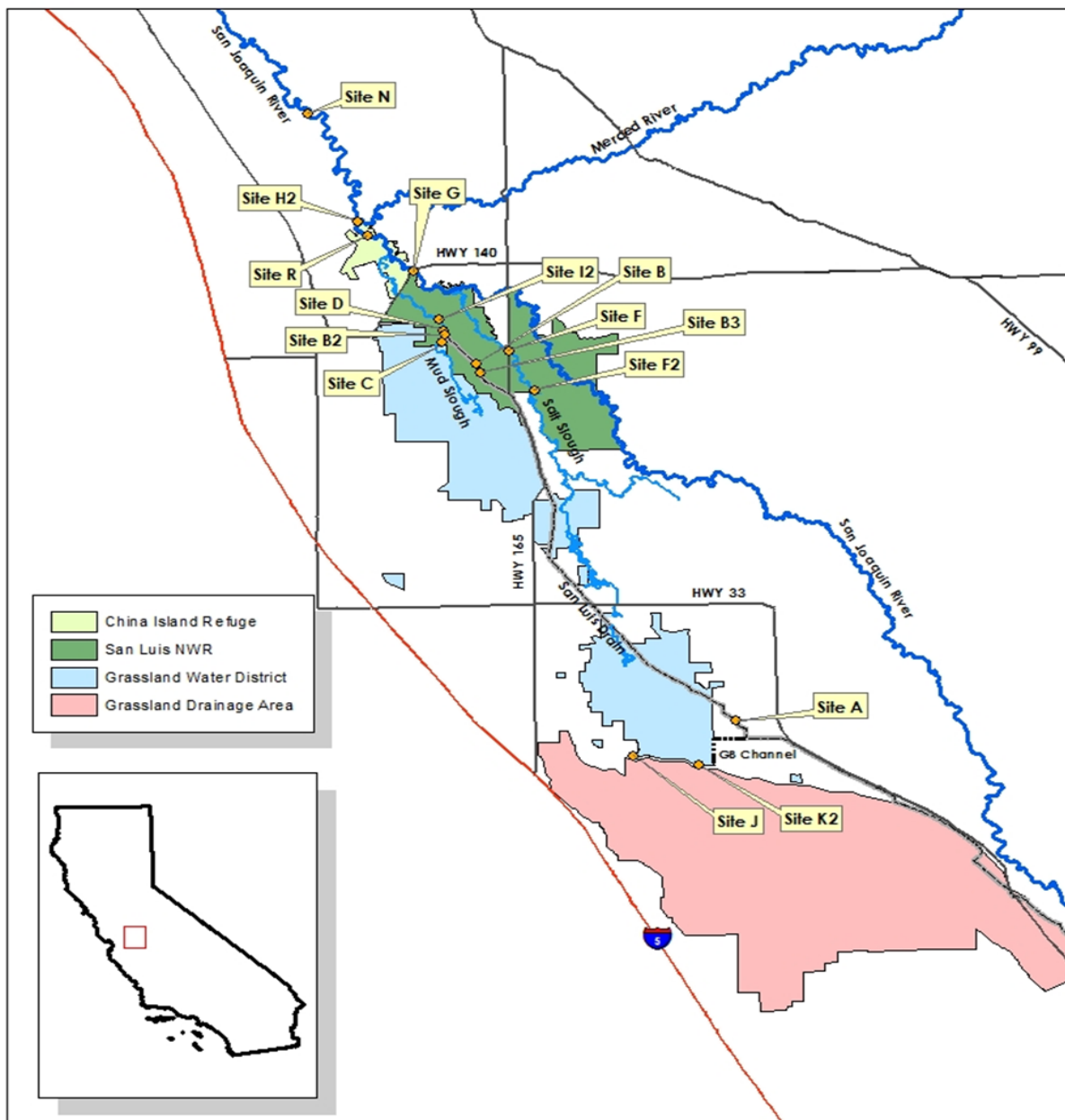


A Cooperative Effort Of:

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

2013 Monitoring Plan 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 1. Water monitoring of inflow to the San Luis Drain (Station A)

PARAMETER	Flow	Temperature	Specific Conductance	Total Dissolved Solids	Salt Load	Total Suspended Solids	Total Selenium
DATA SOURCE	SLDMWA	SLDMWA	SLDMWA	Calculated	Calculated	SLDMWA	SLDMWA/USBR
UNITS	cfs	°C	µS/cm	mg/L	tons	mg/L	ug/L
Dec-01-2013	5	11.5	8,450	6,253	82		21
Dec-02-2013	6	11.5	9,310	6,889	112		21
Dec-03-2013	7	11.3	9,720	7,193	138		22
Dec-04-2013	6	8.2	9,440	6,986	118		26
Dec-05-2013	6	6.6	9,220	6,823	110		27
Dec-06-2013	6	6.1	9,720	7,193	110		23
Dec-07-2013	7	6.9	9,460	7,000	141		28
Dec-08-2013	14	6.6	8,530	6,312	231		29
Dec-09-2013	6	5.7	7,630	5,646	93	10	30
Dec-10-2013	5	5.3	7,770	5,750	73		26
Dec-11-2013	4	5.8	8,200	6,068	68		25
Dec-12-2013	4	5.9	9,150	6,771	78		24
Dec-13-2013	4	6.2	9,870	7,304	88		26
Dec-14-2013	5	6.4	10,070	7,452	93		26
Dec-15-2013	4	6.6	9,960	7,370	80		27
Dec-16-2013	4	7.0	9,890	7,319	78		27
Dec-17-2013	4	7.5	9,790	7,245	86		29
Dec-18-2013	5	9.1	9,580	7,089	92		29
Dec-19-2013	6	8.9	9,310	6,889	112		31
Dec-20-2013	5	7.5	9,120	6,749	96		33
Dec-21-2013	6	7.2	8,210	6,075	91		35
Dec-22-2013	8	7.5	7,100	5,254	107		38
Dec-23-2013	7	7.6	7,490	5,543	108		36
Dec-24-2013	5	8.3	7,440	5,506	77		38
Dec-25-2013	5	8.1	7,540	5,580	74		37
Dec-26-2013	4	8.0	7,270	5,380	58		38
Dec-27-2013	4	7.9	7,470	5,528	59		39
Dec-28-2013	4	8.3	7,720	5,713	61		39
Dec-29-2013	5	7.5	8,070	5,972	88		39
Dec-30-2013	4	7.7	8,140	6,024	64		NA
Dec-31-2013	4	7.8	8,540	6,320	63		NA
Mean	5	7.6	8,680	6,426	95		29
Total acre-feet	336						
Total (tons)					2,930		
Salt Load Objective (tons)					2,502		

Notes:

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

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)	Boron (B3)	Total Selenium (B3)	Total Selenium Load
DATA SOURCE	SLDMWA♦	SLDMWA	SLDMWA	USBR	USBR	Computed
UNITS	cfs	°C	µS/cm	mg/L	µg/L	lbs
Dec-01-2013	12	11.2	4,720	10.0	8.0	0.5
Dec-02-2013	12	10.9	4,730	9.3	7.7	0.5
Dec-03-2013	12	9.6	4,730	9.4	6.8	0.4
Dec-04-2013	13	4.8	4,890	10.0	7.0	0.5
Dec-05-2013	13	2.3	5,330	12.0	8.1	0.6
Dec-06-2013	13	3.6	5,600	11.0	9.7	0.7
Dec-07-2013	13	6.2	5,230	11.0	8.6	0.6
Dec-08-2013	14	1.6	5,220	11.0	8.3	0.6
Dec-09-2013	19	2.3	5,600	NA	8.6	0.9
Dec-10-2013	14	3.0	6,290	NA	11.0	0.8
Dec-11-2013	12	4.9	6,250	14.0	13.0	0.8
Dec-12-2013	11	4.8	6,120	13.0	12.0	0.7
Dec-13-2013	11	5.7	5,960	13.0	12.0	0.7
Dec-14-2013	11	5.8	5,990	13.0	11.0	0.7
Dec-15-2013	11	6.6	6,160	14 T	18.0	1.1
Dec-16-2013	11	7.7	6,430	11.0	16.0	1.0
Dec-17-2013	11	7.7	6,350	9.5	13.0	0.8
Dec-18-2013	11	11.2	5,920	9.8	11.0	0.7
Dec-19-2013	11	10.1	4,810	9.2	9.8	0.6
Dec-20-2013	12	8.5	4,690	9.4	9.4	0.6
Dec-21-2013	12	6.8	4,930	11.0	10.0	0.7
Dec-22-2013	12	7.7	5,340	11.0	10.0	0.6
Dec-23-2013	14	8.2	5,480	11.0	9.9	0.7
Dec-24-2013	13	9.1	5,350	11.0	10.0	0.7
Dec-25-2013	12	8.0	5,420	12.0	11.0	0.7
Dec-26-2013	11	8.6	5,560	12.0	12.0	0.7
Dec-27-2013	11	7.1	5,720	12.0	13.0	0.8
Dec-28-2013	11	7.9	5,850	12.0	12.0	0.7
Dec-29-2013	11	7.2	5,530	11.0	17.0	1.0
Dec-30-2013	11	7.4	5,390	11.0	17.0	1.0
Dec-31-2013	11	7.7	5,180	10.0	19.0	1.1
Mean	12	6.9	5,510	11.0	11.1	0.8
Total Acre-feet	748					
Total (lbs)						23
Selenium Load Value (lbs)						152

Notes:

No Boron results for 12/9 and 12/10 not available due to auto-sampler malfunction.
See Table 19 for explanation of footnotes and agency abbreviations.
Preliminary Data

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

PARAMETER	Physicals					Total Selenium	Total Suspended Solids (Site B2)
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity		
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	mg/L
Oct-01-2013	NA	NA	NA	NA	NA	NA	NA
Oct-08-2013	NA	NA	NA	NA	NA	NA	42
Oct-15-2013	NA	NA	NA	NA	NA	NA	29
Oct-21-2013	10.3	7.5	5,200	18.2	10.3	9.9	31
Oct-28-2013	11.8	7.7	6,560	15.3	11.8	8.9	45
Nov-04-2013	14.0	8.2	5,880	11.5	14.0	5.5	67
Nov-15-2013	11.3	7.7	4,710	15.7	11.3	4.9	34
Nov-22-2013	12.1	7.9	4,620	11.1	12.1	6.2	34
Nov-25-2013	18.6	8.2	5,000	10.4	18.6	6.0	NA
Dec-06-2013	16.0	7.9	4,940	7.0	16.0	10	10
Dec-10-2013	16.8	7.9	6,650	5.1	16.8	9.8	NA
Dec-17-2013	21.8	7.9	4,620	7.8	21.8	12	NA
Dec-27-2013	13.7	7.6	5,540	8.5	13.7	13	NA

Notes:

No samples collected early October due to federal furlough
 TSS samples collected once a month starting in December

	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	mg/L	mg/L
October 2013	NA	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	340	150	<10	970	900	1,600	11	NA
Dec-10-2013	280	120	5.0	930	960	1,800	9.4	NA

Notes:

No samples collected in October due to federal furlough

	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
October 2013	NA	NA	NA	NA	NA
Nov-04-2013	0.2	0.1	<0.2	0.2	<0.010
Dec-10-2013	0.3	0.1	1.4	0.1	<0.010

Notes:

No samples collected in October due to federal furlough

	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
October 2013	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	6.4	14,000	<1.0	26	<2.5	<100	21.0	11.0	6.2
Dec-1-2013	3.3	12,000	<0.2	1.0	<0.2	<200	22.0	3.60	<20

Notes:

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

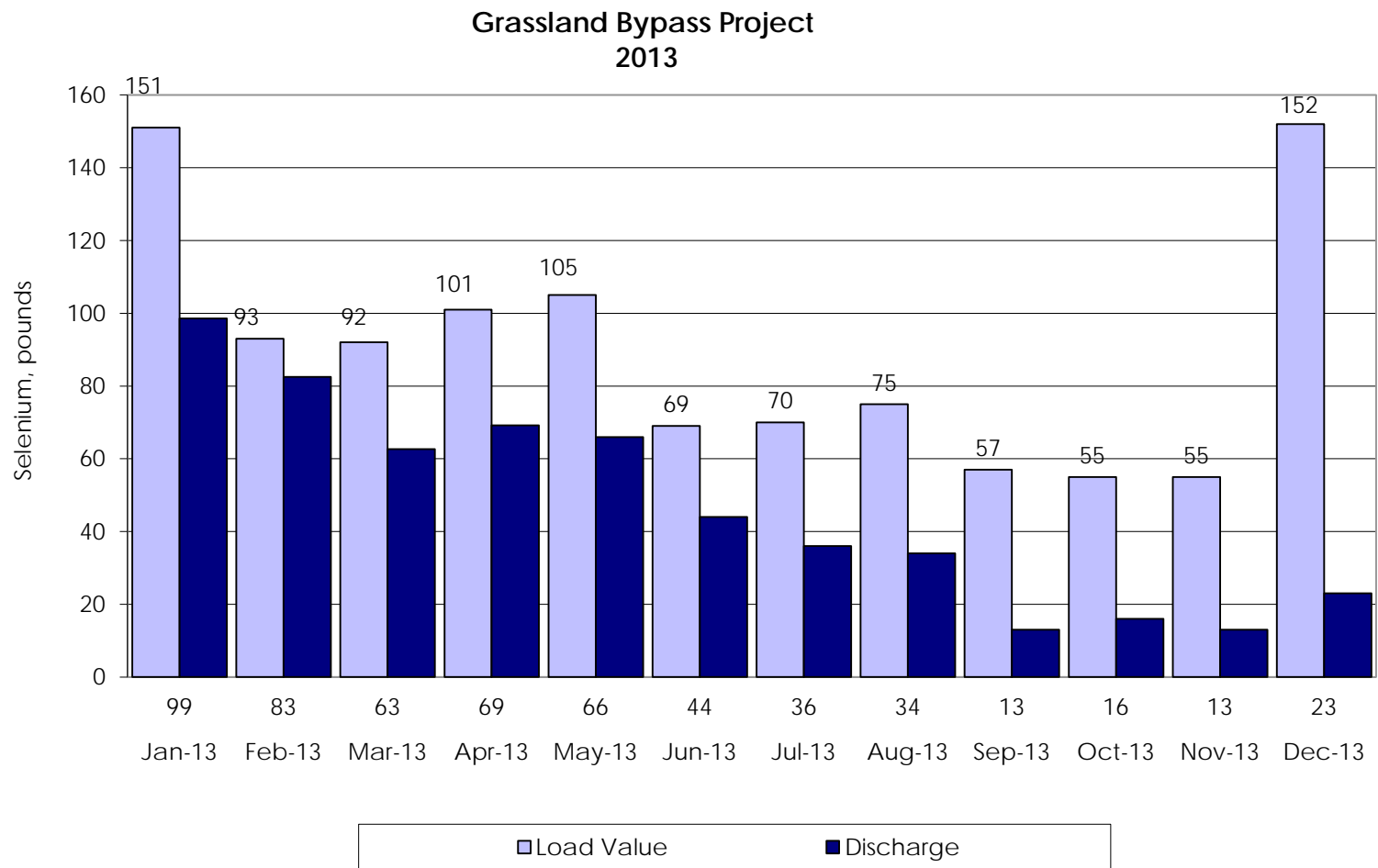


Table 3a. Water monitoring in Mud Slough (north) below San Luis Drain Discharge Station D

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Dec-01-2013	101	12.4	2,120
Dec-02-2013	98	12.3	2,150
Dec-03-2013	94	12.1	2,210
Dec-04-2013	90	9.3	2,290
Dec-05-2013	88	7.7	2,350
Dec-06-2013	86	7.1	2,390
Dec-07-2013	86	7.6	2,380
Dec-08-2013	87	6.9	2,380
Dec-09-2013	94	6.2	2,590
Dec-10-2013	92	6.1	2,510
Dec-11-2013	89	6.5	2,440
Dec-12-2013	89	6.7	2,370
Dec-13-2013	86	7.2	2,340
Dec-14-2013	84	7.5	2,320
Dec-15-2013	86	7.7	2,330
Dec-16-2013	83	8.3	2,320
Dec-17-2013	80	8.6	2,360
Dec-18-2013	80	9.7	2,400
Dec-19-2013	74	9.9	2,440
Dec-20-2013	71	8.4	2,510
Dec-21-2013	78	8.3	2,430
Dec-22-2013	70	8.5	2,600
Dec-23-2013	69	8.8	2,740
Dec-24-2013	68	9.2	2,680
Dec-25-2013	67	9.3	2,590
Dec-26-2013	67	9.4	2,610
Dec-27-2013	63	9.3	2,660
Dec-28-2013	62	9.4	2,750
Dec-29-2013	59	9.2	2,710
Dec-30-2013	59	9.1	2,710
Dec-31-2013	54	9.3	2,800
Mean	80	8.6	2,460
Total Acre-feet	4,760		

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

Preliminary Data

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

PARAMETER	Physicals					Total Selenium	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity		
	USBR	USBR	USBR	USBR	USBR		
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	ug/L
Oct-01-2013	NA	NA	NA	NA	NA	NA	NA
Oct-08-2013	NA	NA	NA	NA	NA	NA	NA
Oct-15-2013	NA	NA	NA	NA	NA	NA	NA
Oct-21-2013	6.2	8.0	1,600	17.6	16.8	1.3	NA
Oct-28-2013	8.3	7.9	1,750	15.0	14.8	0.8	NA
Nov-04-2013	10.7	7.9	2,060	12.0	10.4	1.1	NA
Nov-15-2013	8.7	7.8	2,010	13.7	25.4	0.8	NA
Nov-22-2013	9.3	7.4	2,040	11.2	12.3	1.0	NA
Nov-25-2013	9.8	7.9	2,070	11.2	11.5	0.9	NA
Dec-06-2013	14.0	8.0	2,450	6.2	9.5	1.2	NA
Dec-10-2013	12.6	7.8	2,650	5.1	7.4	1.5	NA
Dec-17-2013	12.3	8.0	2,460	7.7	7.0	1.9	NA
Dec-27-2013	11.2	7.8	2,780	8.2	9.2	1.9	NA

Notes:

No samples collected early October due to federal furlough
Weekly Molybdenum sampling started in February 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	mg/L	mg/L
October 2013	NA	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	85.0	53.0	7.0	290	300	310	16.0	NA
Dec-10-2013	97.0	62.0	6.1	360	380	500	12.0	NA

Notes:

No samples collected in October due to federal furlough

	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
October 2013	NA	NA	NA	NA	NA
Nov-04-2013	0.2	0.2	1.5	0.2	0.2
Dec-10-2013	0.1	0.2	1.2	0.2	0.1

Notes:

No samples collected in October due to federal furlough

	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
October 2013	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	5.7	2500	<1.0	8.3	<2.5	<100	NA	<10	<5.0
Dec-10-2013	3.5	2300	<0.2	1.1	<0.1	<200	8.70	3.30	<20

Notes:

No samples collected in October due to federal furlough

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

PARAMETER	Physicals		
	Dissolved Oxygen	Specific Conductance	Turbidity
DATA SOURCE	WSJRW	WSJRW	WSJRW
UNITS	mg/L	µS/cm	NTU
Oct-08-2013	6.2	1,157	10
Oct-28-2013	NA	1,310	NA
Nov-12-2013	6.9	1,625	11
Nov-25-2013	NA	1,600	NA
Dec-10-2013	7.2	1,803	27
Dec-20-2013	NA	2,180	NA

Notes:

Samples collected by GWD and Summers Engineering

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
Oct-01-2013	NA	NA	NA	NA	NA	NA
Oct-08-2013	NA	NA	NA	NA	NA	NA
Oct-15-2013	NA	NA	NA	NA	NA	NA
Oct-21-2013	NA	NA	NA	NA	NA	NA
Oct-28-2013	7.1	8.0	2,050	14.1	14.3	0.9
Nov-04-2013	10.5	8.2	2,360	12.6	19.0	1.0
Nov-15-2013	8.7	8.0	2,640	12.8	10.0	0.9
Nov-22-2013	10.2	7.9	2,120	10.8	9.5	1.0
Nov-25-2013	9.8	8.0	2,760	11.0	16.7	1.2
Dec-06-2013	13.3	8.2	2,570	6.0	5.3	1.2
Dec-10-2013	10.4	7.8	4,490	4.8	7.4	1.7
Dec-17-2013	11.1	7.8	5,630	8.2	6.0	2.2
Dec-27-2013	8.6	7.3	11,500	7.5	19.8	2.3

Notes:

Samples collected only when site is flooded

No samples collected in early October due to federal furlough

**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
Dec-01-2013	122	12.0	1,450
Dec-02-2013	131	11.8	1,440
Dec-03-2013	143	11.5	1,310
Dec-04-2013	133	9.1	1,430
Dec-05-2013	121	7.7	1,480
Dec-06-2013	113	7.2	1,490
Dec-07-2013	114	7.9	1,500
Dec-08-2013	116	7.3	1,470
Dec-09-2013	110	6.7	1,490
Dec-10-2013	104	6.6	1,510
Dec-11-2013	106	7.0	1,520
Dec-12-2013	114	7.2	1,540
Dec-13-2013	113	7.4	1,490
Dec-14-2013	109	7.8	1,540
Dec-15-2013	104	8.0	1,580
Dec-16-2013	105	8.4	1,570
Dec-17-2013	108	8.7	1,560
Dec-18-2013	107	9.9	1,540
Dec-19-2013	105	10.0	1,560
Dec-20-2013	100	8.7	1,590
Dec-21-2013	97	8.5	1,610
Dec-22-2013	96	8.7	1,620
Dec-23-2013	100	9.0	1,590
Dec-24-2013	98	9.3	1,550
Dec-25-2013	99	9.5	1,560
Dec-26-2013	101	9.5	1,560
Dec-27-2013	101	9.2	1,530
Dec-28-2013	92	9.3	1,640
Dec-29-2013	90	9.3	1,700
Dec-30-2013	89	9.1	1,690
Dec-31-2013	86	9.2	1,690
Mean	107	8.8	1,540
Total Acre-feet	6,429		

Notes:

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

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

PARAMETER	Physicals					Total Selenium	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity		
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	USBR
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	ug/L
Oct-01-2013	NA	NA	NA	NA	NA	NA	NA
Oct-08-2013	NA	NA	NA	NA	NA	NA	NA
Oct-15-2013	NA	NA	NA	NA	NA	NA	NA
Oct-21-2013	9.1	6.8	1,160	16.7	75.5	<0.4	NA
Oct-28-2013	10.5	7.5	1,470	13.7	64.3	<0.4	NA
Nov-04-2013	10.4	7.4	1,440	11.9	36.9	<0.4	NA
Nov-15-2013	9.6	6.9	1,240	14.5	49.3	<0.4	NA
Nov-22-2013	11.3	8.0	1,310	11.0	81.3	<0.4	NA
Nov-25-2013	12.7	7.1	1,430	11.0	39.9	<0.4	NA
Dec-06-2013	12.3	7.3	1,520	6.7	25.7	<0.4	NA
Dec-10-2013	NA	NA	NA	NA	NA	NA	NA
Dec-17-2013	12.2	7.0	1,610	7.3	35.0	<0.4	NA
Dec-27-2013	11.9	7.5	1,570	7.9	39.4	<0.4	NA

Notes:

No samples collected in early October due to federal furlough
 Site F Inaccessible 12/10/2013 (No samples collected)
 Weekly Molybdenum sampling starting in February 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
October 2013	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	59	36	4.6	190	220	170	5.8
Dec-10-2013	NA	NA	NA	NA	NA	NA	NA

Notes:

No samples collected in October due to federal furlough
 Site F Inaccessible 12/10/2013 (No samples collected)

	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
October 2013	NA	NA	NA	NA	NA
Nov-04-2013	0.5	0.2	0.8	0.1	0.1
Dec-10-2013	NA	NA	NA	NA	NA

Notes:

No samples collected in October due to federal furlough
 Site F Inaccessible 12/10/2013 (No samples collected)

	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
October 2013	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	<0.5	720	<1.0	7.6	<2.5	<100	7.9	<10	9.9
Dec-10-2013	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

No samples collected in October due to federal furlough
 Site F inaccessible 12/10/2013 (No samples collected)

**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	Grasslands WD		Grasslands WD	Grasslands WD	USBR
UNITS	cfs		µS/cm	°C	µg/L
Oct-01-2013	175		770	18.9	NA
Oct-08-2013	132		773	18.6	NA
Oct-15-2013	94		777	18.2	NA
Oct-21-2013	62		774	18.2	0.6
Oct-28-2013	57		821	16.9	0.5
Nov-04-2013	65		1,020	14.1	2.4
Nov-11-2013	59		594	14.1	< 0.4
Nov-18-2013	61		722	13.7	< 0.4
Nov-25-2013	46		663	12.1	0.7
Dec-02-2013	45		738	12.1	0.9
Dec-09-2013	66		699	6.6	0.6
Dec-16-2013	56		733	7.3	0.7
Dec-23-2013	39		949	7.8	1.0
Dec-30-2013	39		963	8.0	0.8

Notes:

Samples only collected when flow is passing site

No samples collected in early October due to federal furlough

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

PARAMETER	Flow *	pH	Specific Conductance	Temperature	Total Selenium
DATA SOURCE	Grasslands WD	Grasslands WD	Grasslands WD	Grasslands WD	USBR
UNITS	cfs	units	µS/cm	°C	µg/L
Oct-01-2013	240	8.1	540	18.8	NA
Oct-08-2013	204	8.2	545	18.3	NA
Oct-15-2013	169	8.3	550	17.7	NA
Oct-21-2013	153	8.3	568	17.9	0.5
Oct-28-2013	99	8.4	551	16.6	<0.8
Nov-04-2013	123	8.4	394	13.5	0.6
Nov-11-2013	99	8.1	300	14.1	<0.4
Nov-18-2013	89	8.1	543	13.7	0.7
Nov-25-2013	70	7.9	479	12.1	0.6
Dec-02-2013	70	8.0	505	12.1	0.8
Dec-09-2013	69	8.6	418	6.3	0.6
Dec-16-2013	68	8.9	436	7.1	0.7
Dec-23-2013	55	9.0	450	7.3	0.9
Dec-30-2013	67	9.5	413	7.7	0.8

Notes:

Samples only collected when flow is passing site

No samples collected in early October due to federal furlough

Table 8. 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
Dec-01-2013	256	11.7	2,020
Dec-02-2013	261	11.7	2,020
Dec-03-2013	267	11.4	2,020
Dec-04-2013	271	9.1	1,910
Dec-05-2013	267	7.2	1,930
Dec-06-2013	254	6.5	1,990
Dec-07-2013	261	7.3	2,020
Dec-08-2013	262	6.7	2,000
Dec-09-2013	261	5.8	2,020
Dec-10-2013	259	5.7	2,110
Dec-11-2013	255	6.1	2,110
Dec-12-2013	257	6.3	2,060
Dec-13-2013	260	6.7	2,050
Dec-14-2013	258	7.0	2,070
Dec-15-2013	257	7.2	2,100
Dec-16-2013	255	7.7	2,080
Dec-17-2013	248	8.1	2,020
Dec-18-2013	244	9.1	2,010
Dec-19-2013	246	9.5	2,010
Dec-20-2013	241	8.2	2,020
Dec-21-2013	231	7.9	2,090
Dec-22-2013	229	8.1	2,200
Dec-23-2013	225	8.4	2,230
Dec-24-2013	217	8.8	2,330
Dec-25-2013	222	8.9	2,320
Dec-26-2013	229	8.9	2,180
Dec-27-2013	222	8.8	2,240
Dec-28-2013	217	8.9	2,300
Dec-29-2013	214	8.6	2,330
Dec-30-2013	210	8.5	2,350
Dec-31-2013	208	8.6	2,410
Mean	244	8.2	2,120
Total Acre-feet	15,000		

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

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

PARAMETER	Physicals					Total Selenium	Total Molybdenum
	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity		
	USBR	USBR	USBR	USBR	USBR		
DATA SOURCE	USBR	USBR	USBR	USBR	USBR	USBR	
UNITS	mg/L	units	µS/cm	°C	NTU	ug/L	ug/L
Oct-02-2013	NA	NA	1,700	NA	NA	0.9	NA
Oct-09-2013	NA	NA	NA	NA	NA	NA	NA
Oct-16-2013	NA	NA	NA	NA	NA	NA	NA
Oct-23-2013	NA	NA	1,650	NA	NA	< 0.8	NA
Oct-29-2013	NA	NA	1,760	NA	NA	< 0.8	NA
Nov-04-2013	11.9	8.0	1,900	12.0	23.1	< 0.8	NA
Nov-15-2013	11.1	8.0	1,700	13.2	36.9	0.5	NA
Nov-22-2013	10.4	7.9	1,700	11.3	29.0	0.5	NA
Nov-25-2013	11.4	8.0	1,740	10.9	41.6	0.4	NA
Dec-06-2013	12.8	8.1	2,000	6.0	15.1	0.6	NA
Dec-10-2013	13.0	8.0	2,200	5.2	14.5	0.8	NA
Dec-17-2013	12.7	8.0	2,150	8.0	19.4	0.9	NA
Dec-27-2013	12.3	8.6	2,590	8.6	15.3	0.8	NA

Notes:

No samples collected mid October due to federal furlough
 Reclamation sampling this site starting 11/04/2013
 Weekly molybdenum sampling starting in February 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
Oct-01-2013	NA	NA	NA	NA	NA	NA	NA	NA
Nov-04-2013	76.0	47.0	5.6	260	280	250	NA	NA
Dec-01-2013	78.0	50.0	4.8	290	340	360	8.8	NA

Notes:

No samples collected in October due to federal furlough

	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
Oct-01-2013	NA	NA	NA	NA	NA
Nov-04-2013	0.3	0.1	1.2	0.2	0.1
Dec-01-2013	0.2	0.1	0.9	0.2	0.1

Notes:

No samples collected in October due to federal furlough

	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
Oct-01-2013	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov-01-2013	<5.0	1500	<1.0	9.4	<2.5	<100	9.2	<10	8.7
Dec-01-2013	3.1	1400	<0.2	1.4	0.3	<200	8.7	2.9	<20

Notes:

No samples collected in October due to federal furlough

Table 10. Water monitoring in the San Joaquin River at Fremont Ford (Station G)

PARAMETER	Flow	Temperature	Specific Conductance
DATA SOURCE	USGS	USGS	USGS
UNITS	cfs	°C	µS/cm
Dec-01-2013	143	11.6	1,460
Dec-02-2013	146	11.6	1,480
Dec-03-2013	154	11.2	1,460
Dec-04-2013	158	8.8	1,390
Dec-05-2013	149	7.1	1,490
Dec-06-2013	139	6.7	1,560
Dec-07-2013	134	7.3	1,590
Dec-08-2013	129	6.7	1,600
Dec-09-2013	126	6.0	1,600
Dec-10-2013	120	6.0	1,680
Dec-11-2013	120	6.3	1,700
Dec-12-2013	128	6.4	1,700
Dec-13-2013	132	6.6	1,660
Dec-14-2013	131	6.9	1,660
Dec-15-2013	131	7.1	1,700
Dec-16-2013	133	7.5	1,700
Dec-17-2013	136	7.8	1,670
Dec-18-2013	140	8.8	1,640
Dec-19-2013	140	9.2	1,620
Dec-20-2013	136	8.0	1,650
Dec-21-2013	129	7.6	1,720
Dec-22-2013	124	7.9	1,740
Dec-23-2013	122	8.2	1,750
Dec-24-2013	115	8.6	1,840
Dec-25-2013	116	8.8	1,810
Dec-26-2013	122	8.7	1,720
Dec-27-2013	117	8.7	1,790
Dec-28-2013	115	8.6	1,730
Dec-29-2013	110	8.3	1,810
Dec-30-2013	110	8.2	1,870
Dec-31-2013	109	8.3	1,870
Mean	129	8.0	1,666
Total Acre-feet	7,962		

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

Preliminary Data

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
Dec-01-2013	481	11.7	1,200	0.4
Dec-02-2013	482	11.6	1,200	< 0.4
Dec-03-2013	484	11.5	1,200	< 0.4
Dec-04-2013	484	9.2	1,190	< 0.4
Dec-05-2013	471	7.5	1,190	< 0.4
Dec-06-2013	456	6.7	1,240	< 0.4
Dec-07-2013	465	7.3	1,280	< 0.4
Dec-08-2013	474	6.9	1,270	0.4
Dec-09-2013	473	6.1	1,260	< 0.4
Dec-10-2013	470	5.7	1,290	< 0.4
Dec-11-2013	470	6.1	1,320	0.4
Dec-12-2013	468	6.3	1,310	0.6
Dec-13-2013	468	6.6	1,320	0.5
Dec-14-2013	465	6.8	1,310	0.4
Dec-15-2013	466	7.0	1,300	0.4
Dec-16-2013	468	7.4	1,320	< 0.4
Dec-17-2013	458	7.8	1,360	0.4
Dec-18-2013	448	8.8	1,350	0.6
Dec-19-2013	449	9.3	1,360	0.5
Dec-20-2013	443	8.0	1,340	0.5
Dec-21-2013	429	7.9	1,340	0.4
Dec-22-2013	426	8.0	1,370	0.5
Dec-23-2013	420	8.3	1,370	0.4
Dec-24-2013	411	8.6	1,390	0.5
Dec-25-2013	414	8.6	1,430	0.5
Dec-26-2013	433	8.6	1,420	0.4
Dec-27-2013	422	8.4	1,360	0.5
Dec-28-2013	419	8.4	1,370	0.5
Dec-29-2013	409	8.2	1,390	0.5
Dec-30-2013	406	8.1	1,400	0.5
Dec-31-2013	400	8.2	1,410	0.5
Mean	449	8.0	1,320	0.5
Total Acre-feet	27,630			

Notes:

See Table 19 for explanation of footnotes and agency abbreviations.

Preliminary Data

Table 11b. 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	µg/L
Oct-01-2013	NA	NA	NA	NA	NA	NA	NA
Oct-08-2013	NA	NA	NA	NA	NA	NA	NA
Oct-15-2013	NA	NA	NA	NA	NA	NA	NA
Oct-21-2013	9.3	7.9	940	16.2	20.0	0.5	720
Oct-28-2013	10.0	8.1	517	14.2	18.0	< 0.4	330
Nov-04-2013	11.3	8.1	1,040	11.9	16.5	< 0.4	650
Nov-15-2013	11.0	8.1	1,100	13.0	12.7	< 0.4	730
Nov-22-2013	10.6	8.0	1,060	11.8	13.1	< 0.4	720
Nov-25-2013	11.4	8.2	1,180	11.2	14.8	< 0.4	780
Dec-06-2013	13.4	8.2	1,340	5.9	8.6	< 0.4	880
Dec-10-2013	14.1	8.2	1,400	5.2	8.3	0.4	980
Dec-17-2013	13.1	8.1	1,440	7.0	9.8	0.5	910
Dec-27-2013	13.3	7.8	1,450	7.8	9.9	0.5	860

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						
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						
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						
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
Nov-2013						
Mar-2014						
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
Nov-2013						
Mar-2014						
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
Mar-2014					
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
Mar-2014					
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
NA	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
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