

Grassland Bypass Project Water Quality Monitoring

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Central Valley Regional Water Quality Control Board

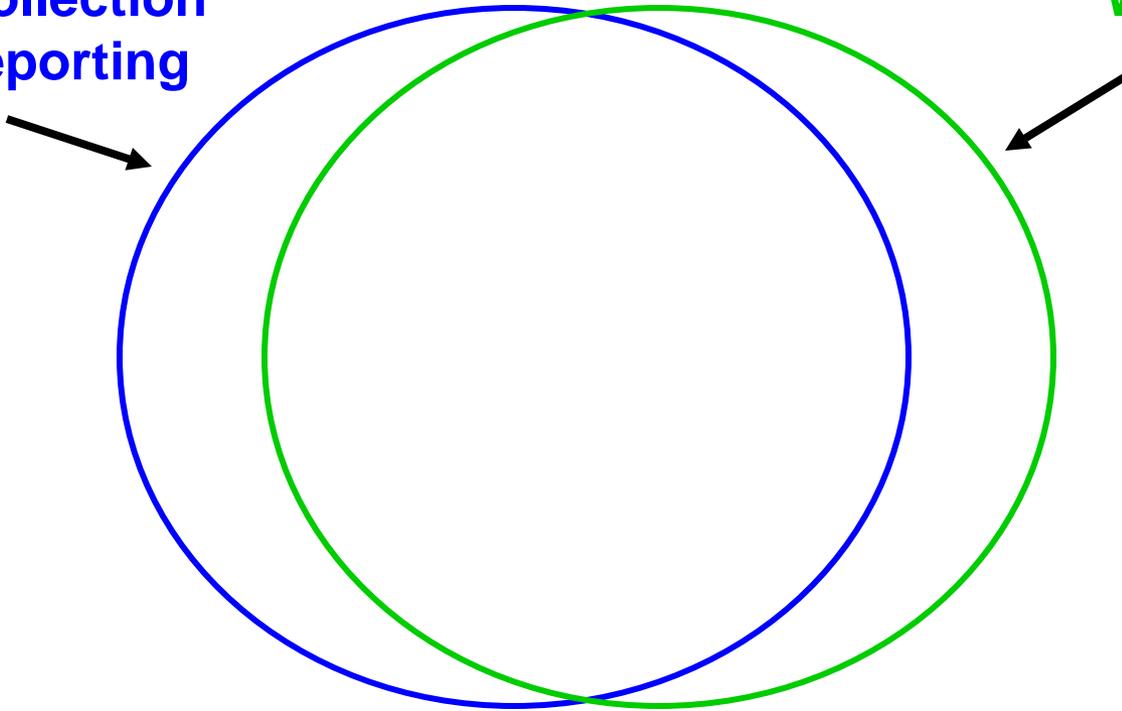
Terms

- WDRs – Waste Discharge Requirements
- Discharger – US Bureau of Reclamation and San Luis and Delta-Mendota Water Authority

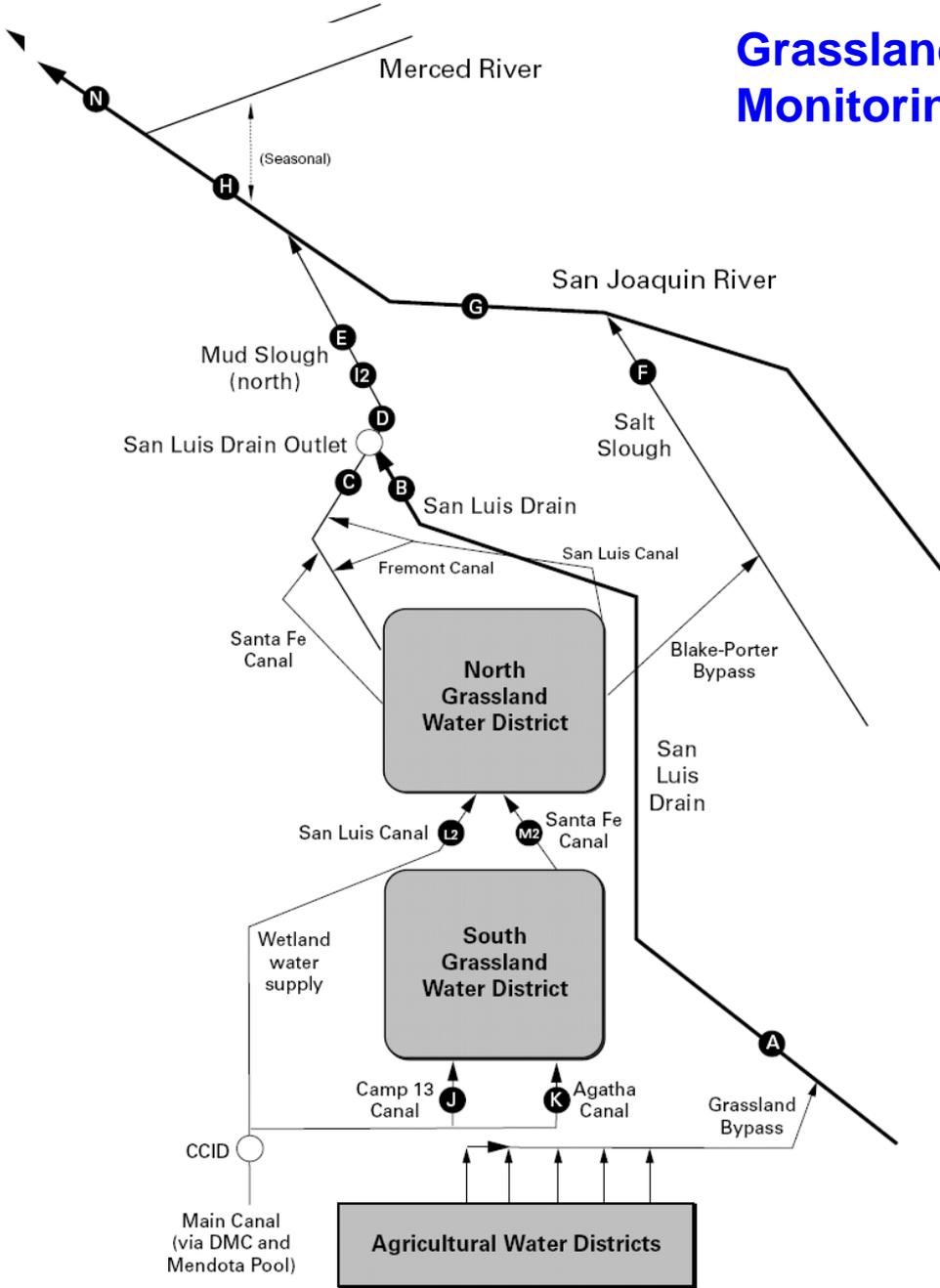
Two Monitoring Programs

Developed by
Data Collection
And Reporting
Team

Required by
WDRs



Grassland Bypass Project Monitoring Sites



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. 5-01-234
FOR
SAN LUIS & DELTA MENDOTA WATER AUTHORITY
AND
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GRASSLAND BYPASS PROJECT (PHASE II)
FRESNO AND MERCED COUNTIES

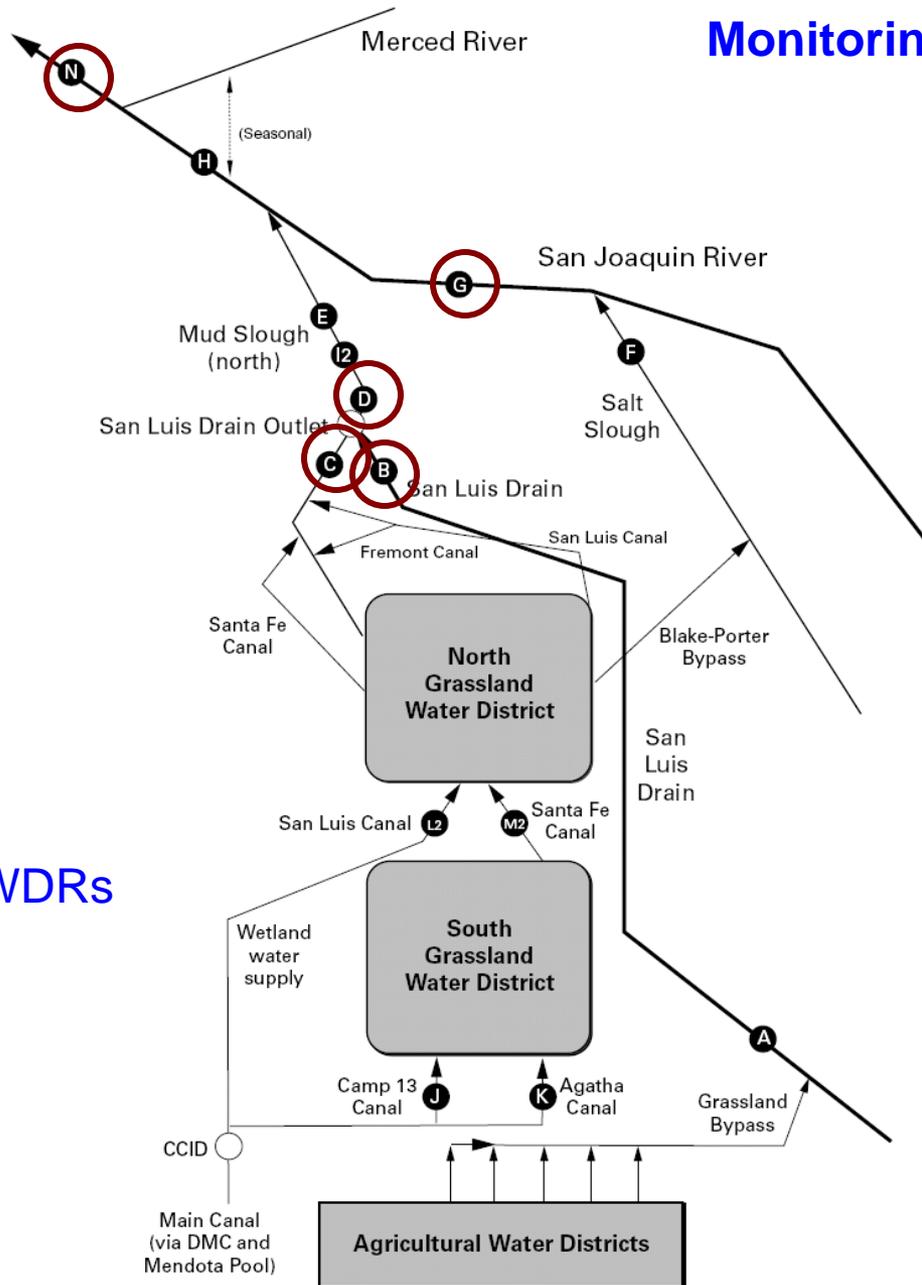
Numerous agencies are involved in conducting monitoring and special studies related to the Grassland Bypass Project. Where available, the Discharger may use data collected by other parties, **however the Discharger is ultimately responsible for compliance with the following monitoring and reporting program.** All data reported must meet the detection limits and recovery criteria for quality assurance samples specified in Attachment 1.

SAN LUIS DRAIN MONITORING

Samples representative of the discharge shall be collected from the San Luis Drain at the footbridge between Gun Club Road and the terminus (Site B). Flow shall be measured at the terminus of the drain. The time of collection of a grab sample shall be recorded. The following shall constitute the San Luis Drain discharge monitoring program:

<u>Constituent</u>	<u>Unit</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>
Flow	cfs	daily average	Daily
pH	pH units	grab	Weekly
Electrical Conductivity	µmhos/cm	grab	Weekly
Temperature	degrees C	grab	Weekly
Boron	mg/L	grab	Weekly
Molybdenum	µg/L	grab	Monthly
Nutrient Series			
Nitrate	mg/L as N	grab	Monthly ¹
Ammonia	mg/L	grab	Monthly ¹
Total Kjeldahl Nitrogen	mg/L	grab	Monthly ¹
Total Phosphorous	mg/L	grab	Monthly ¹
Ortho Phosphate	mg/L	grab	Monthly ¹
Selenium	µg/L	24-hour composite	Daily
Electrical Conductivity	µmhos/cm	24-hour composite	Daily
Boron	mg/L	24-hour composite	Daily
TSS (total susp. solids)	mg/L	grab	Weekly ²

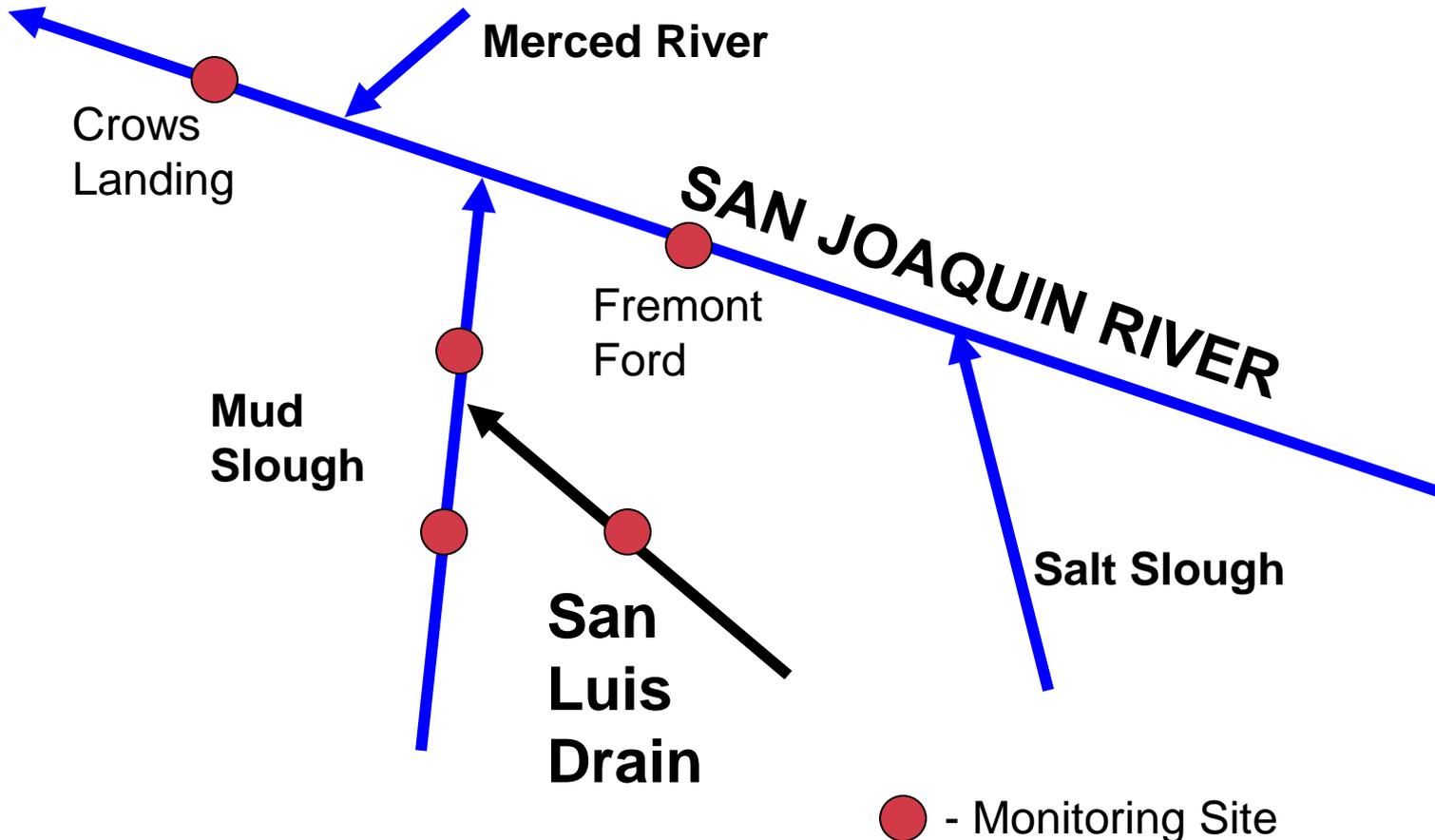
Grassland Bypass Project Monitoring Sites



○ = Required by WDRs

WDR Monitoring and Reporting Program

Surface Water Monitoring Sites



Constituents Monitored

- Selenium
 - Molybdenum
 - Boron

 - Flow
 - pH
 - Electrical Conductivity
 - Total suspended solids
 - Temperature
- Nutrient series
 - Nitrate
 - Ammonia
 - Total Kjeldahl Nitrogen
 - Total Phosphorus
 - Ortho Phosphate

 - 3 species chronic toxicity

 - Sediment
 - Quality
 - Quantity

Additional WDR Monitoring

- Stormwater
- Internal Wetland Water Supply Channels
(visual)

Irrigated Lands Regulatory Program Monitoring Requirements (customized by area monitored)

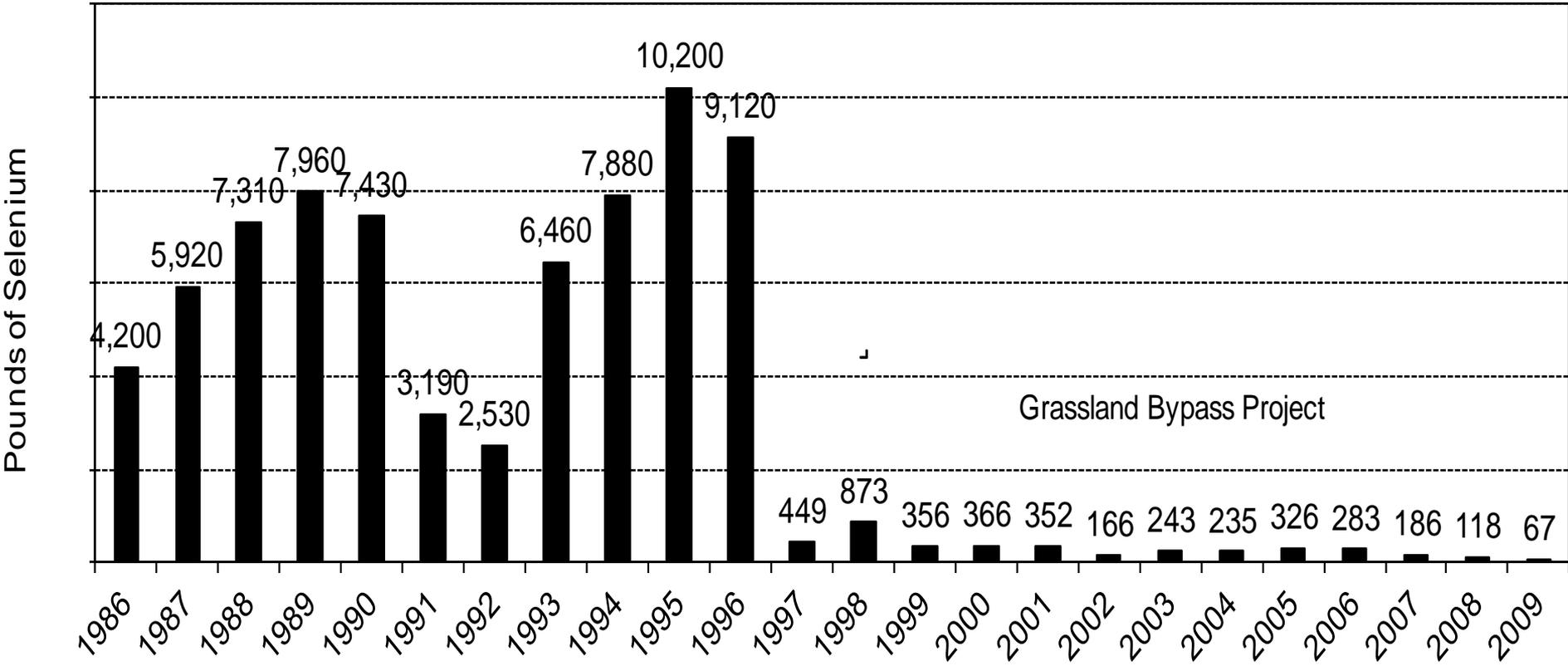
- E. Coli bacteria
- Additional Metals
- Additional Nutrients
- Pesticides
- 303(d) listed constituents
- Sediment
 - Toxicity
 - Pesticides
 - Other characteristics

Questions

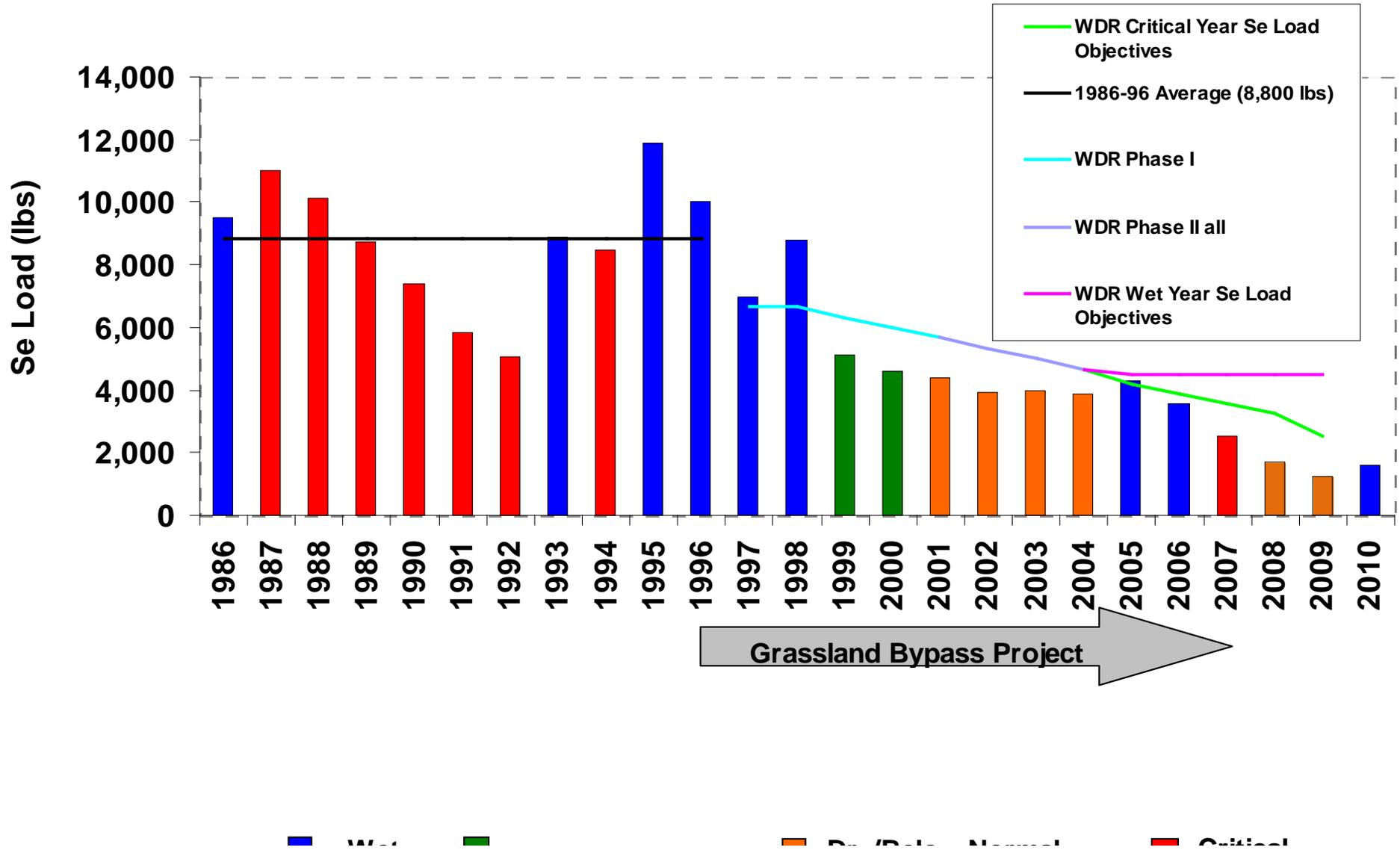
- What adjustments are needed in
 - Location
 - Frequency
 - Constituents
 - Types of analyses
- Does the water quality sampling support evaluation of other monitoring efforts?
- How should the GBP Monitoring coordinate with San Joaquin River Restoration Program and Irrigated lands Regulatory Program monitoring?

Monitoring Results

Concentration versus Load



GBP Annual Selenium Discharge



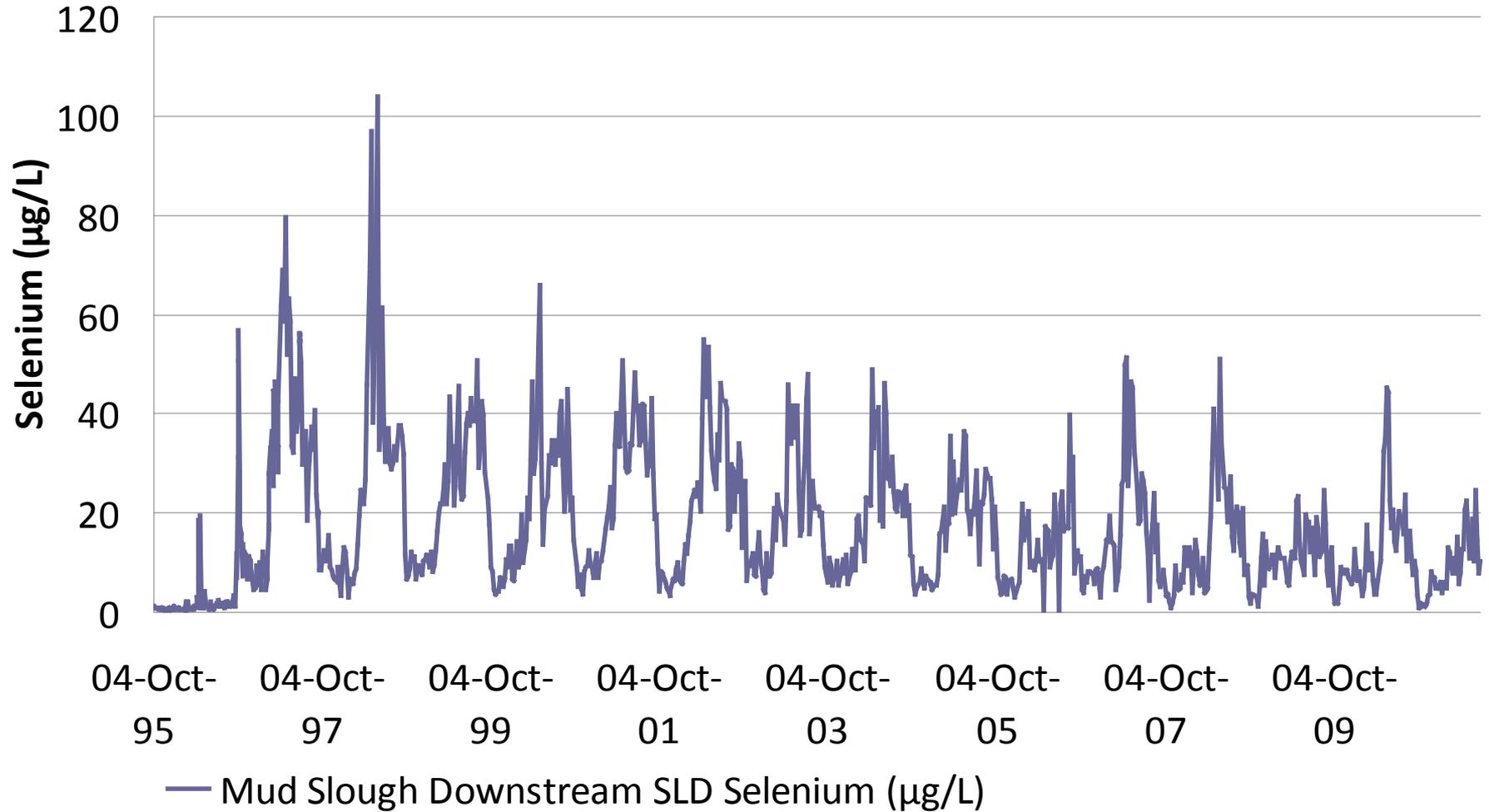
Applicable Water Quality Objectives

Water Body	Boron (mg/L)		Selenium (ug/L)		Molybdenum (ug/L)	
	Continuous	Max	Continuous	Max	Continuous	Max
Wetland Channels	--	--	2	20	--	--
Salt Slough	2.0*	5.8	2	20	19	50
Mud Slough (north)	2.0*	5.8	5 (4-day ave.)	20	19	50
San Joaquin River upstream of Merced River	2.0*	5.8	5 (4-day ave.)	20	19	50
San Joaquin River btwn Merced River and Vernalis	0.8* 1.0**	2.0* 2.6**	5 (4-day ave.)	12	10	15

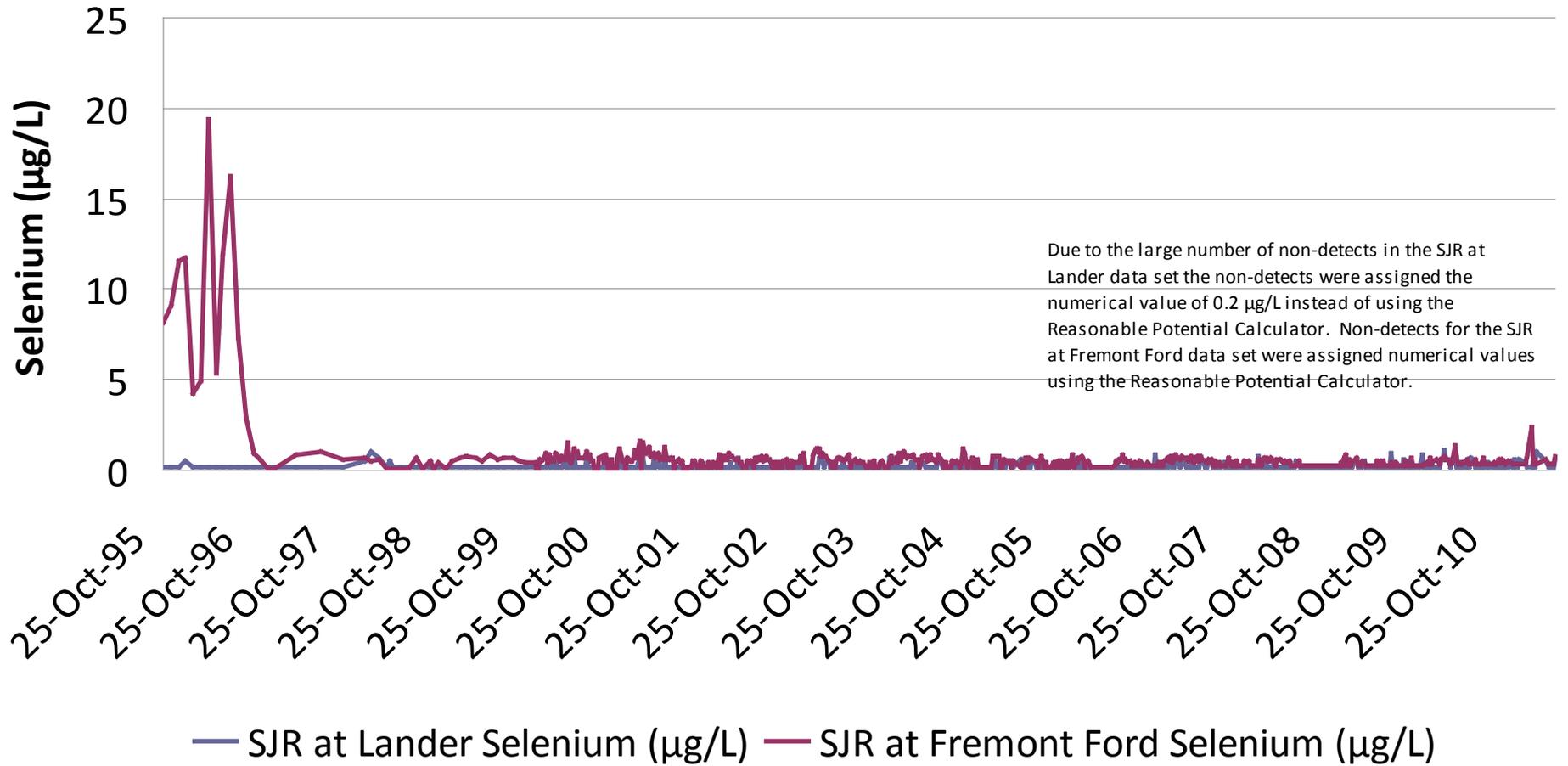
Continuous objectives are monthly means unless otherwise noted.

- *WQO applies from 15 March through 15 September
- ** WQO applies from 16 September through 14 March

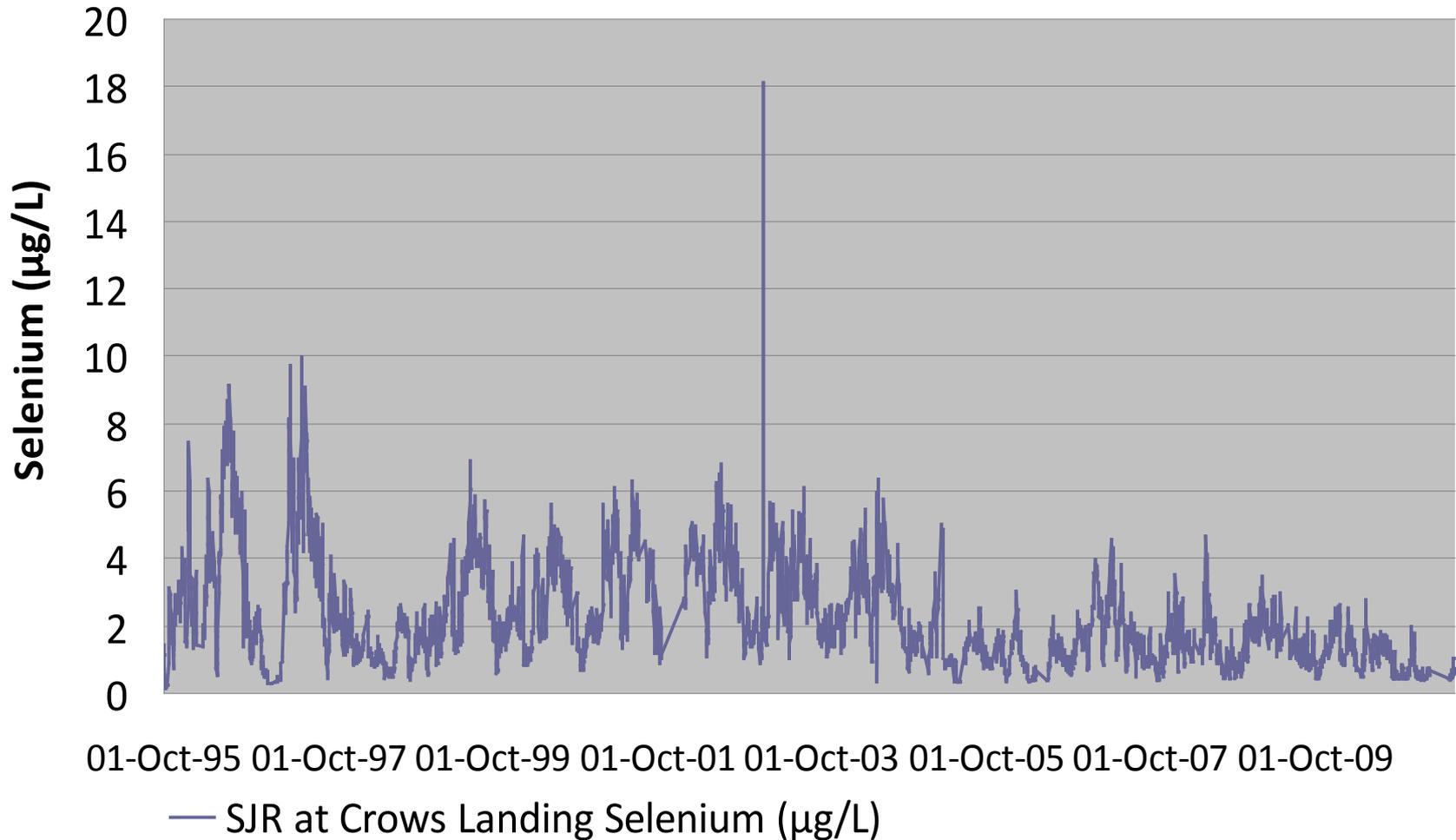
Mud Slough Downstream SLD Selenium ($\mu\text{g/L}$)



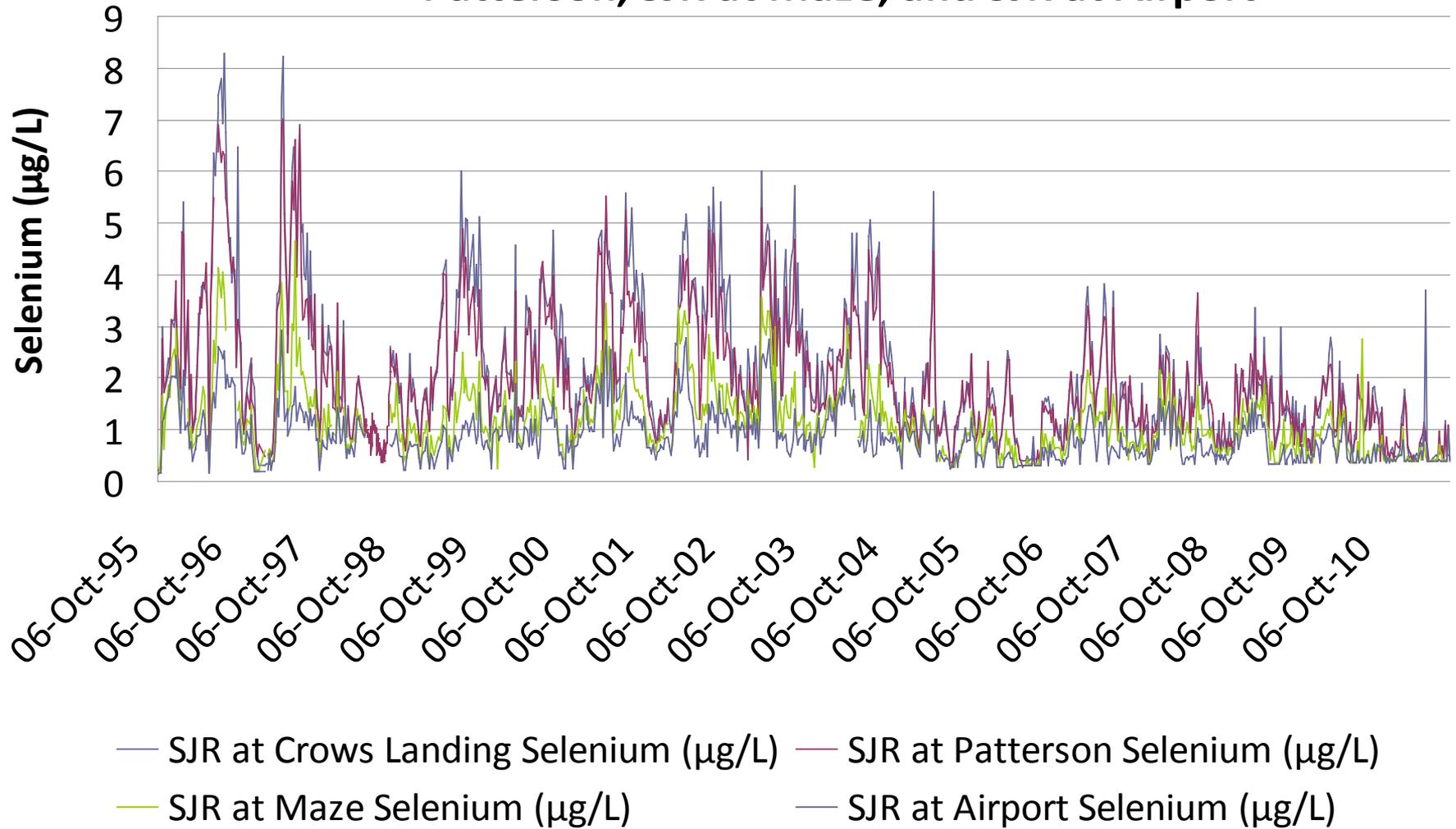
Selenium in SJR at Lander and SJR at Fremont Ford (above project area)



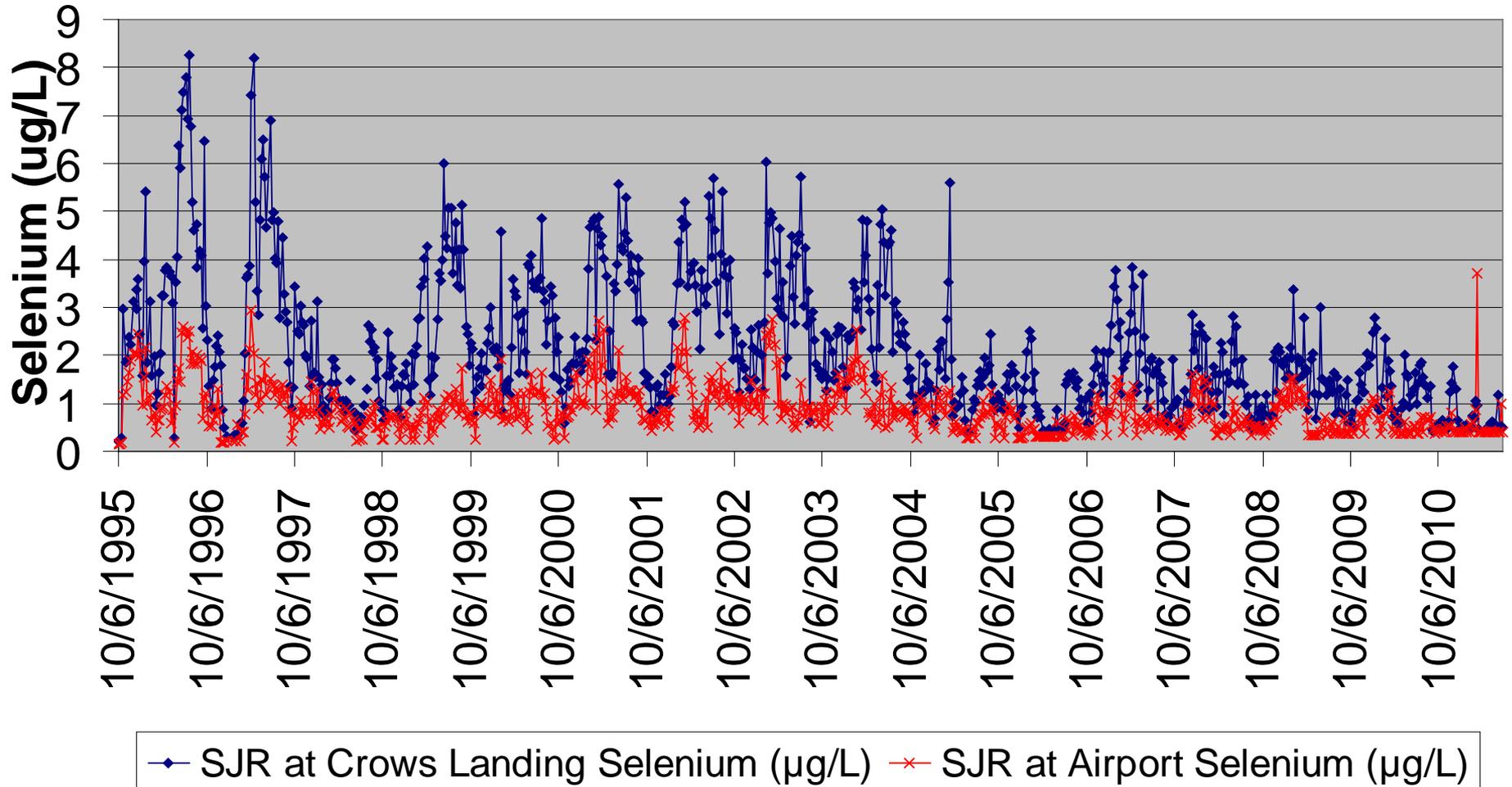
SJR at Crows Landing Selenium ($\mu\text{g/L}$)



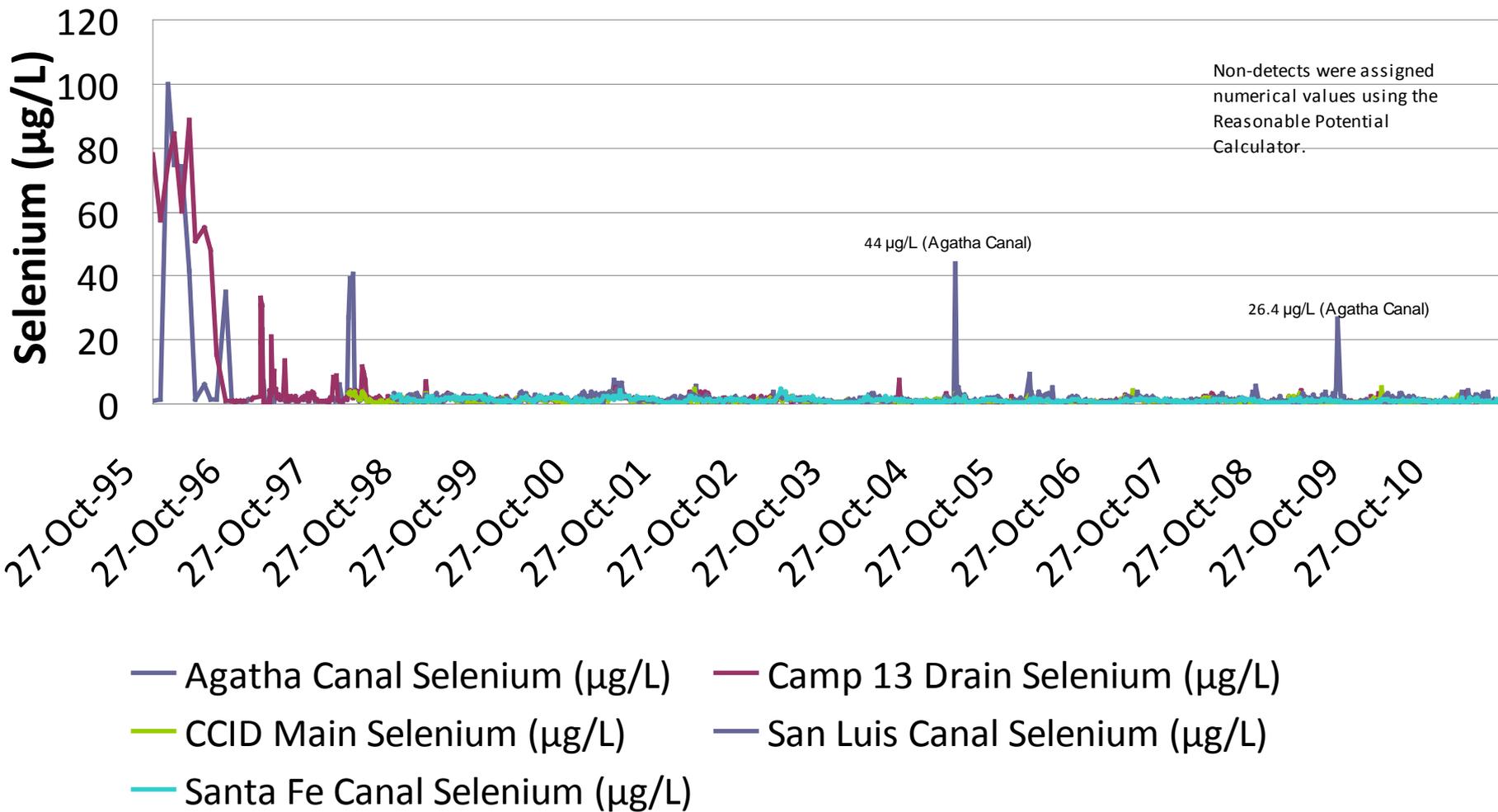
Selenium in SJR at Crows Landing (grab samples), SJR at Patterson, SJR at Maze, and SJR at Airport



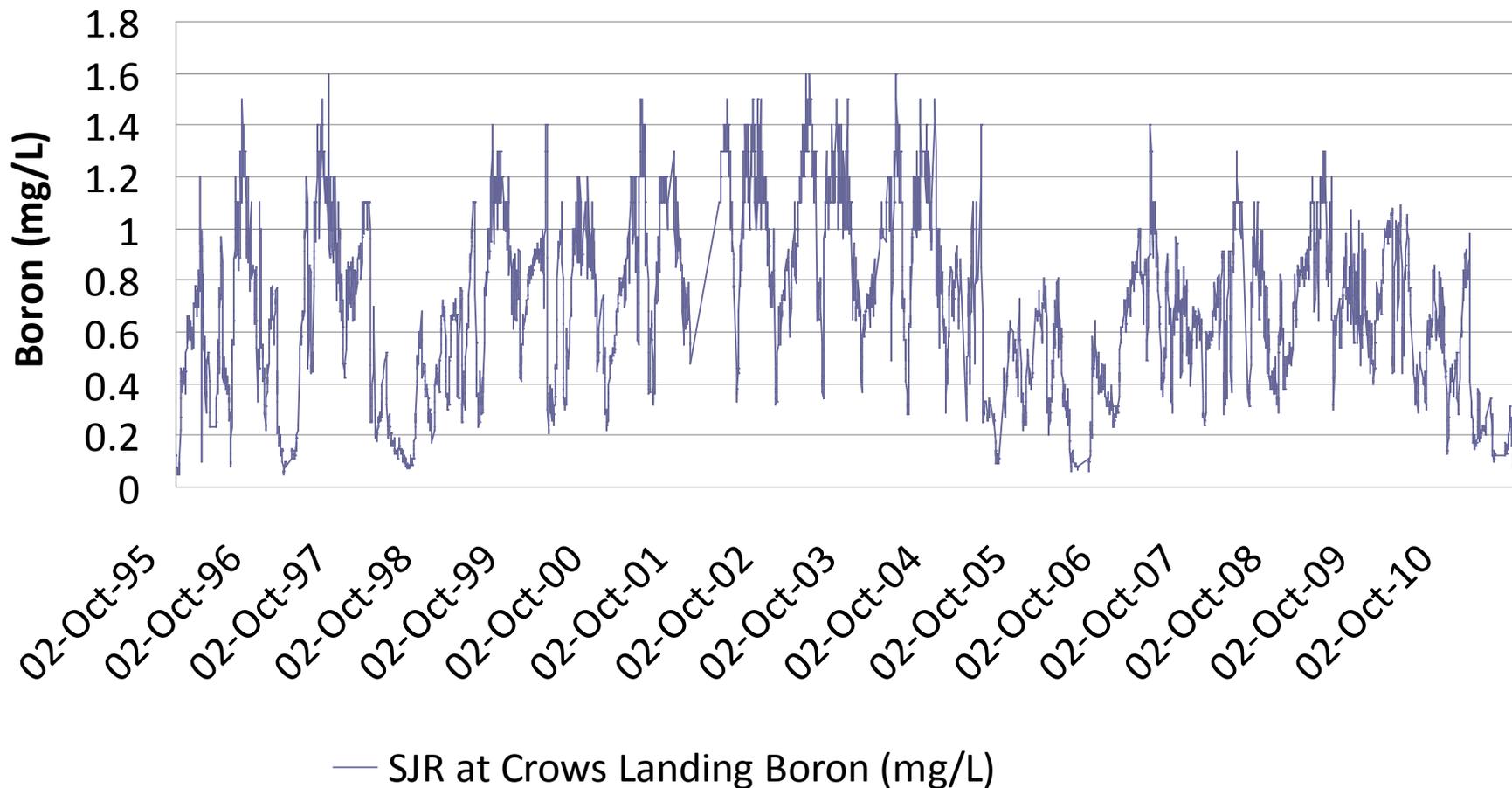
Selenium in SJR at Crows Landing and at Airport Way



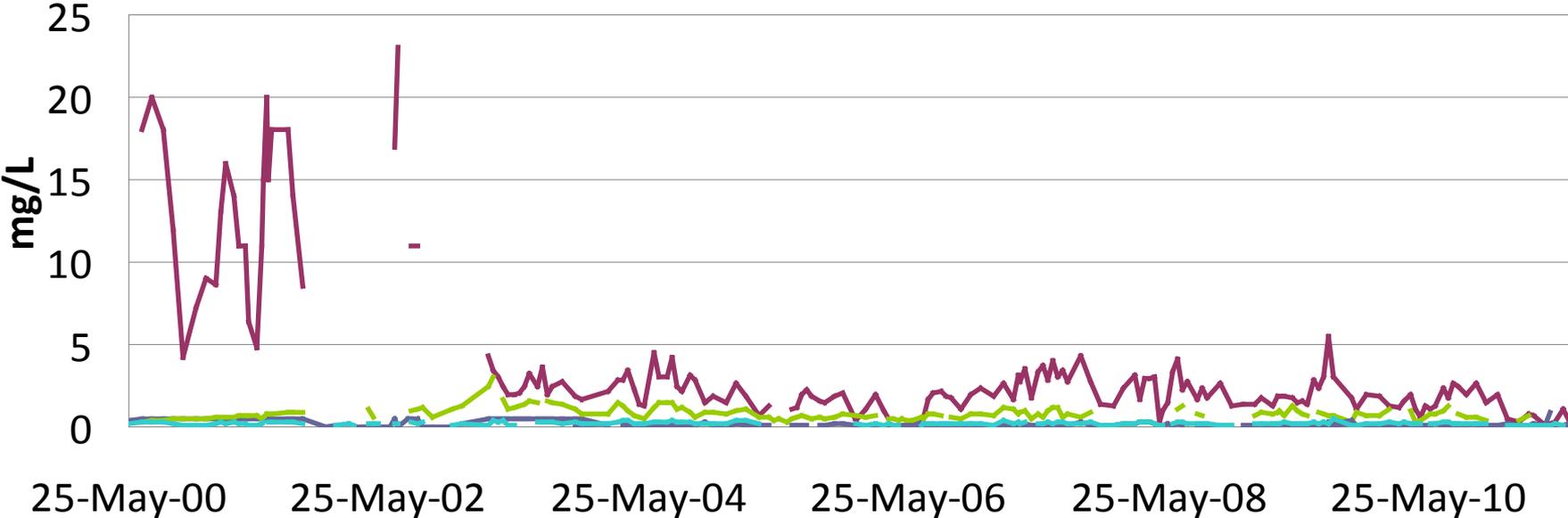
Selenium at Agatha Canal, Camp 13 Drain, CCID Main, San Luis Canal, and Santa Fe Canal



Boron in SJR at Crows Landing (samples collected with an autosampler)

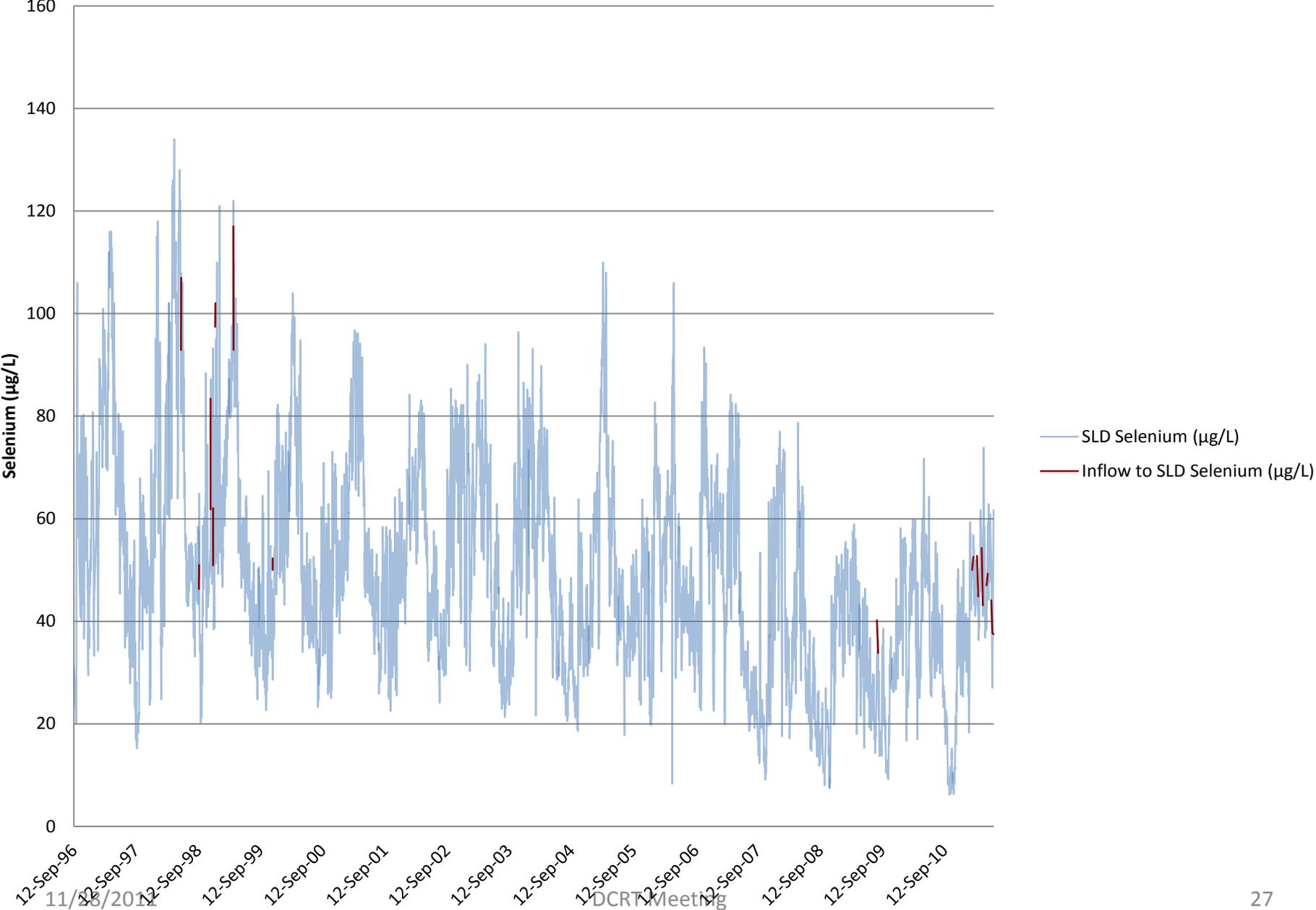


Nutrients in SJR at Crows Landing

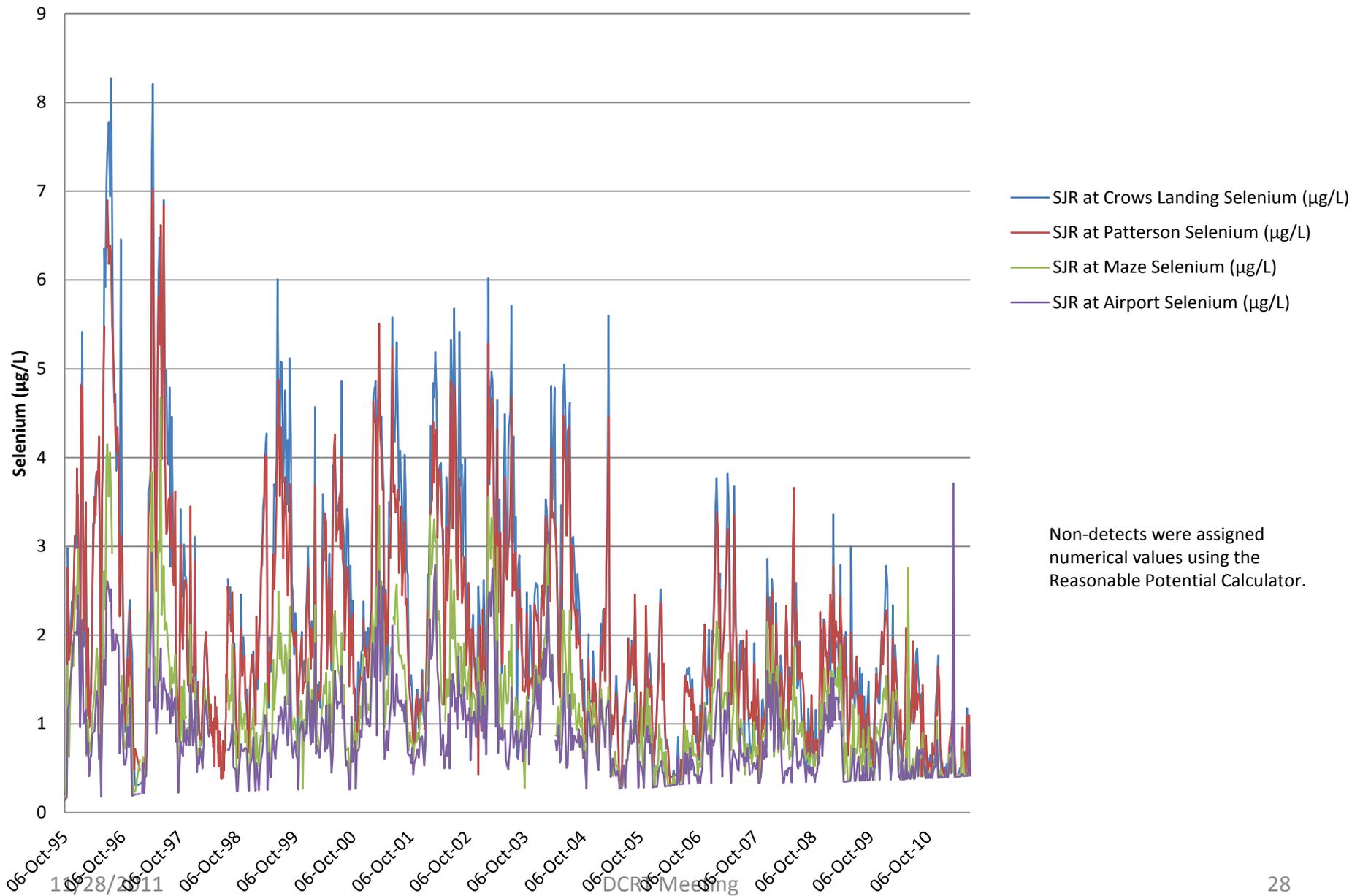


- SJR at Crows Landing Ammonia (mg/L)
- SJR at Crows Landing Nitrate (mg/L)
- SJR at Crows Landing TKN (mg/L)
- SJR at Crows Landing Orthophosphate (mg/L)
- SJR at Crows Landing Phosphorous (mg/L)

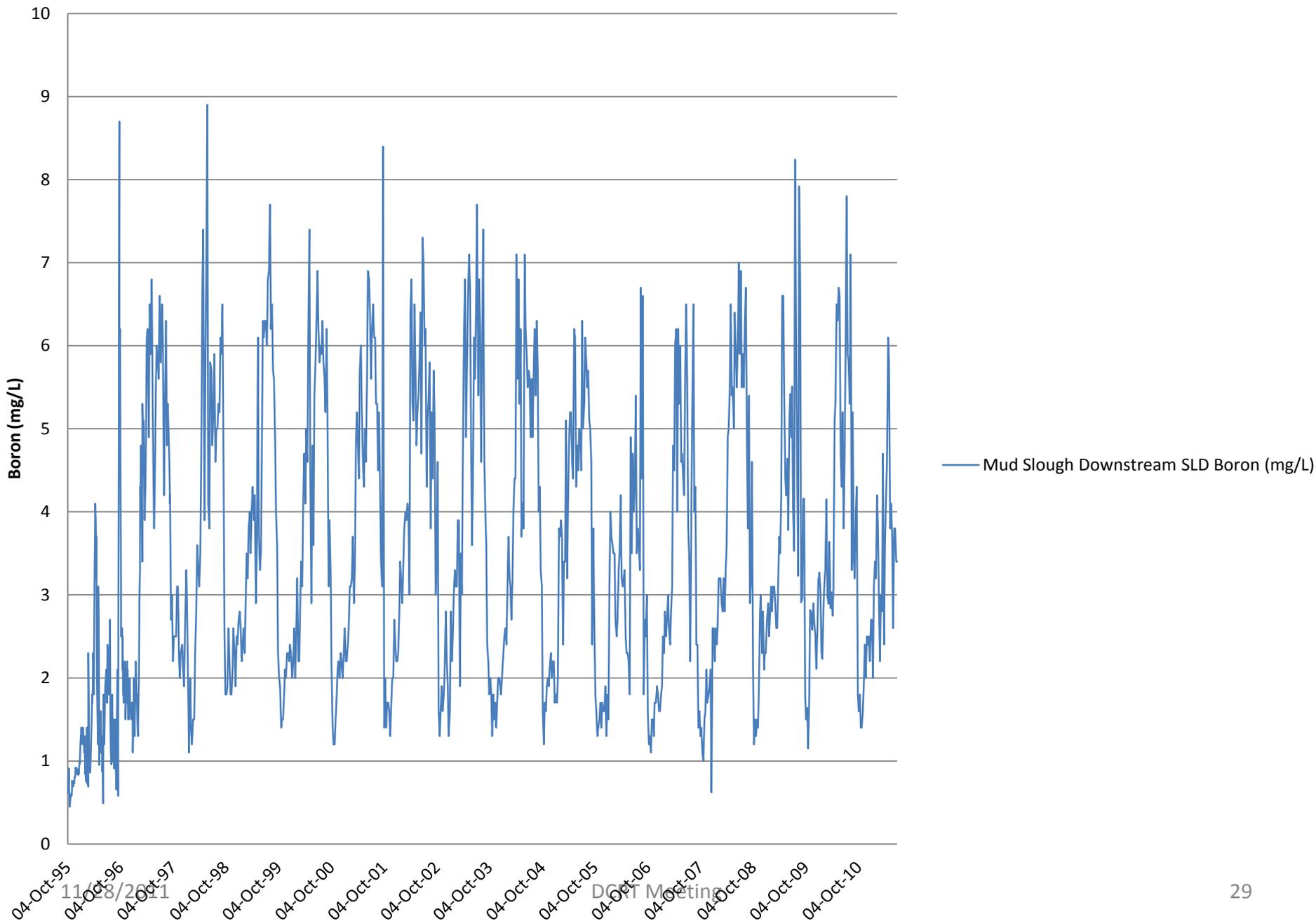
Selenium in SLD at Inflow and Terminous



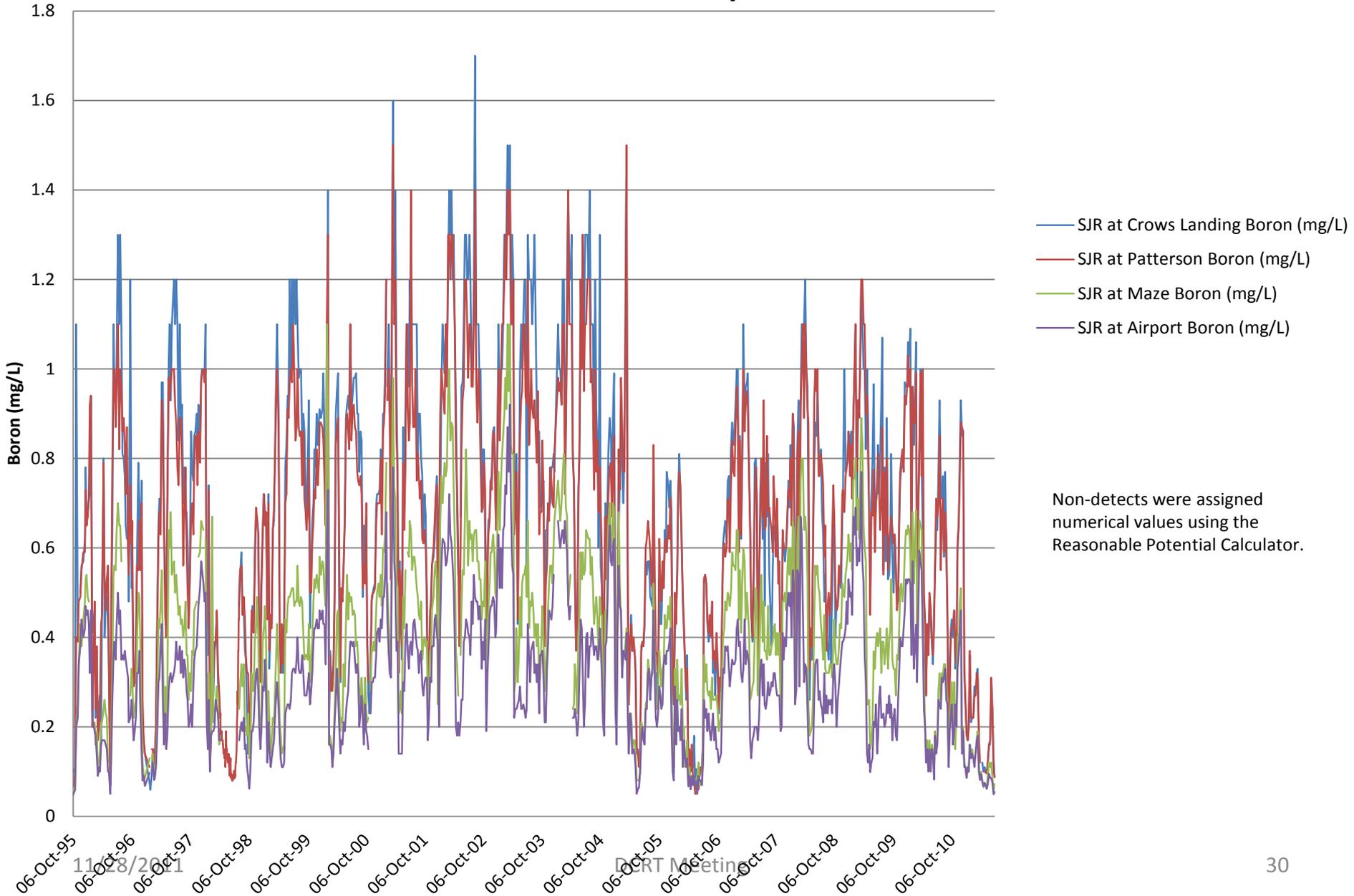
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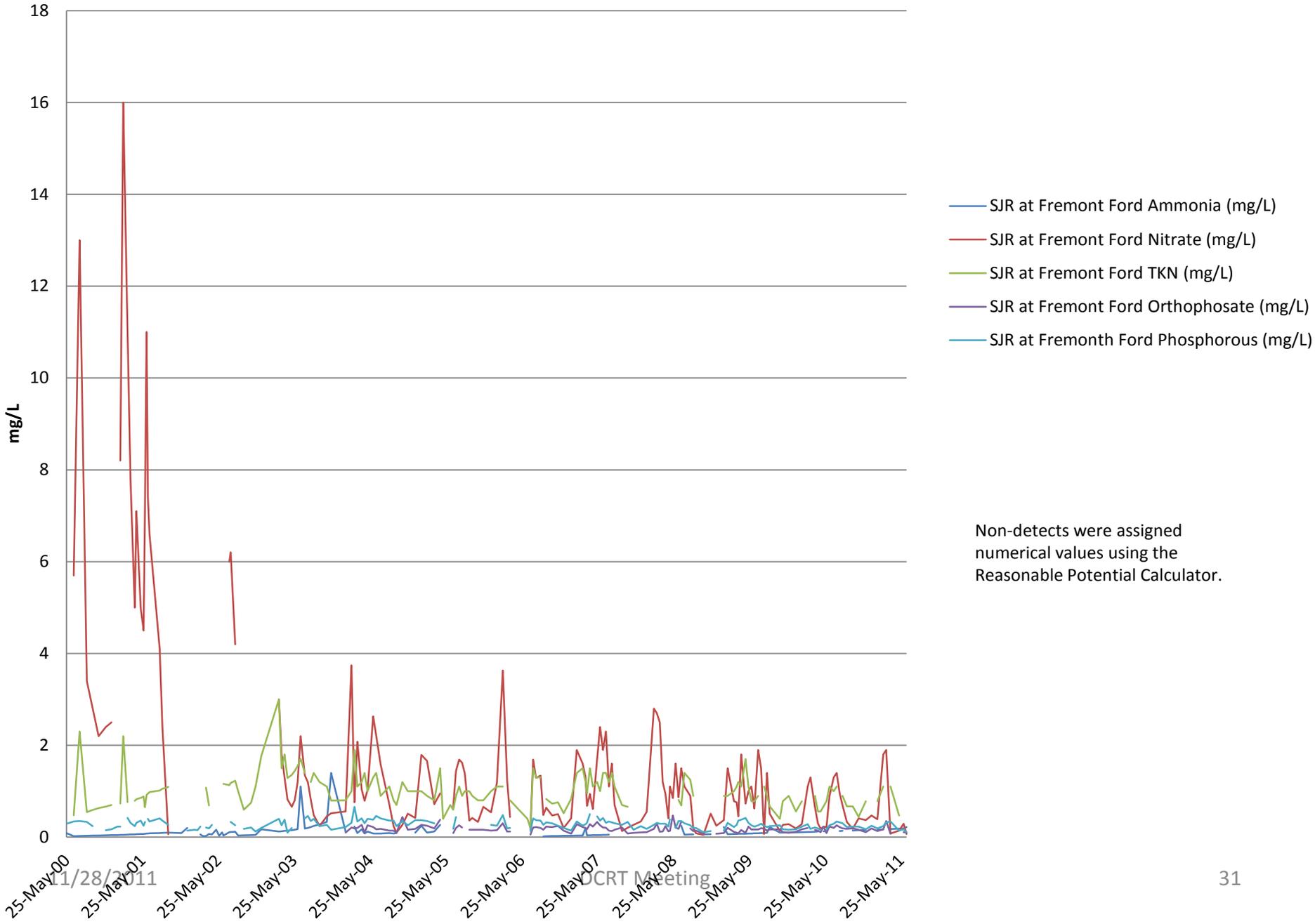
Mud Slough Downstream SLD Boron (mg/L)



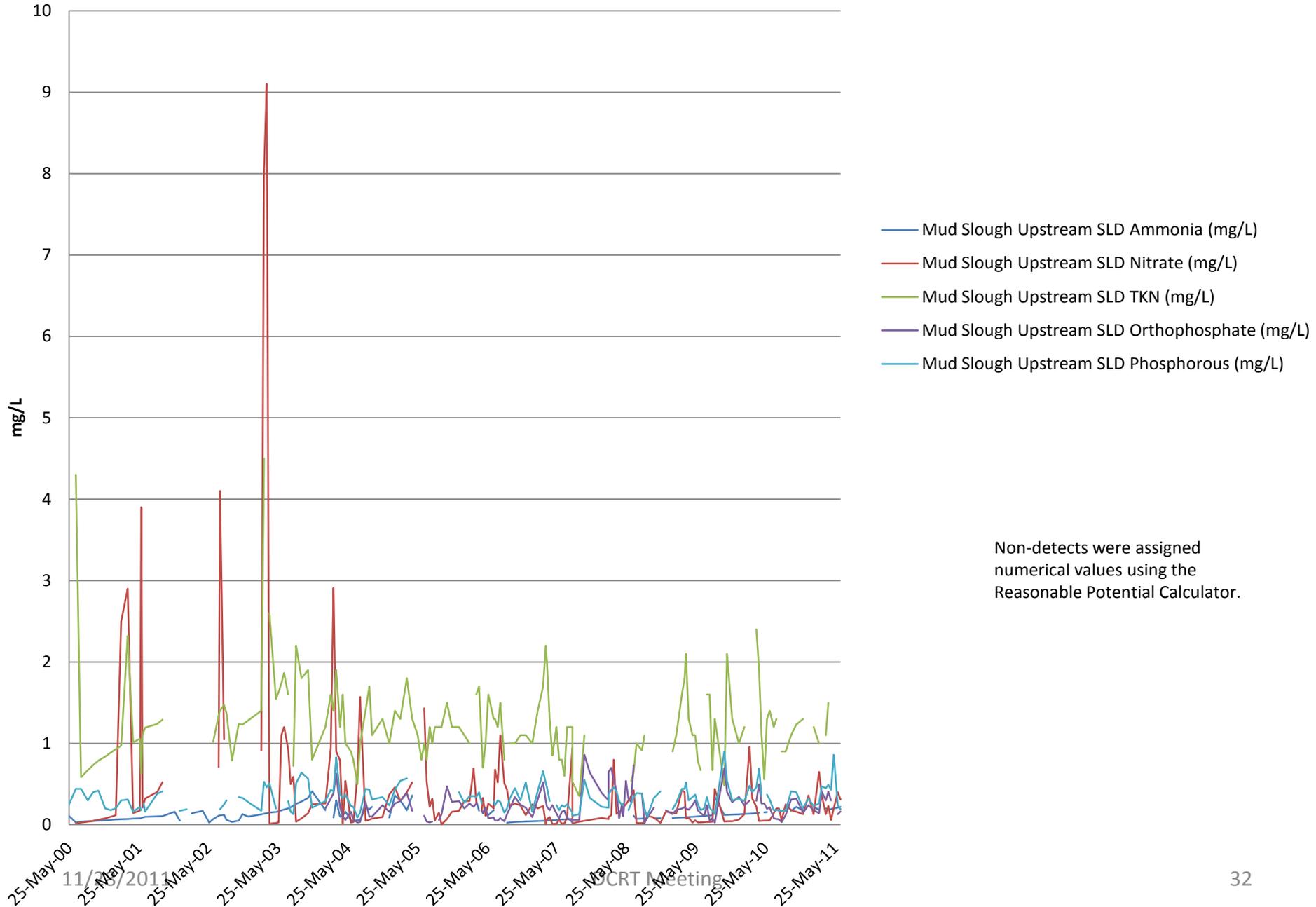
Boron in SJR at Crows Landing (grab samples), SJR at Patterson, SJR at Maze, and SJR at Airport



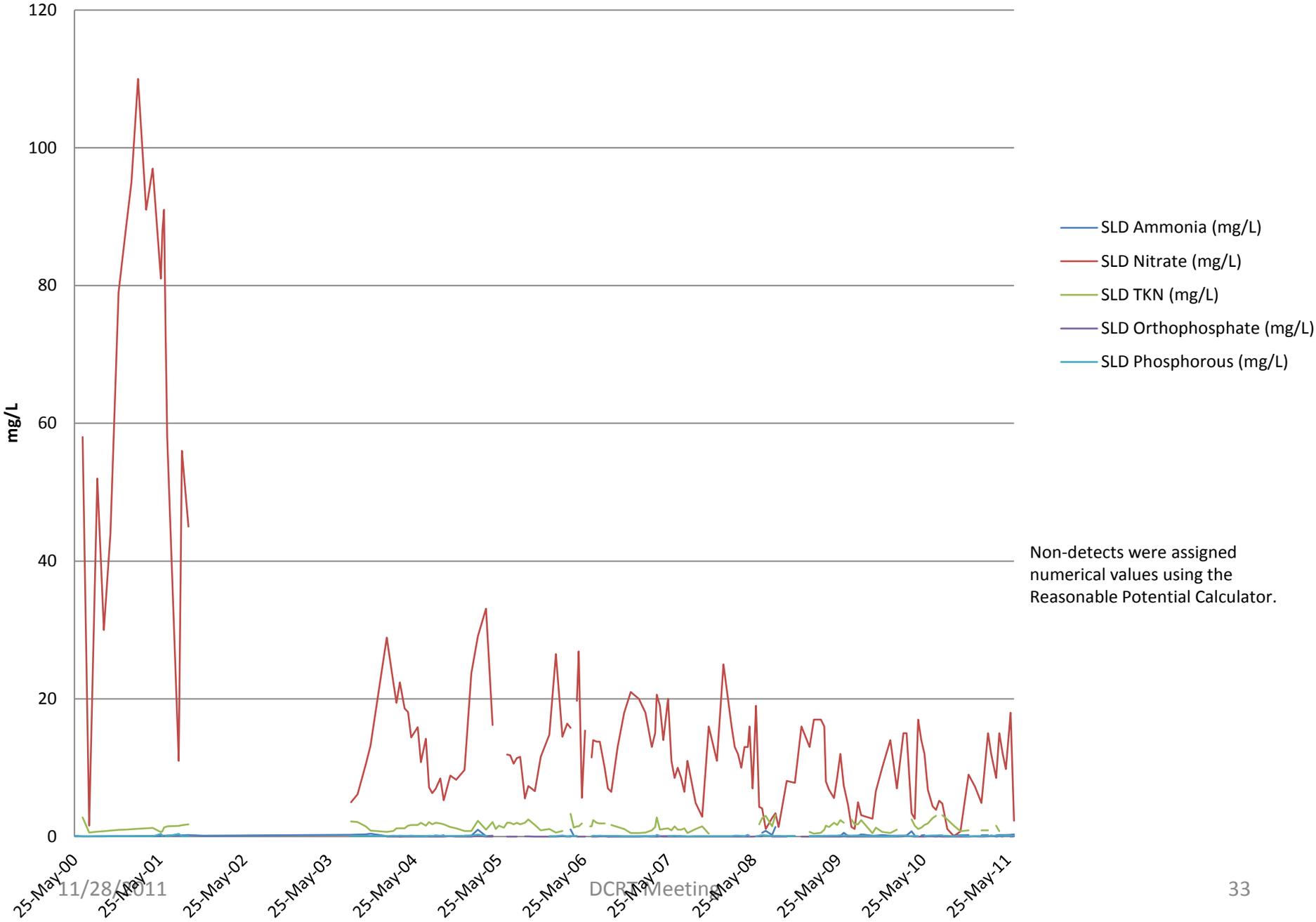
Nutrients in SJR at Fremont Ford



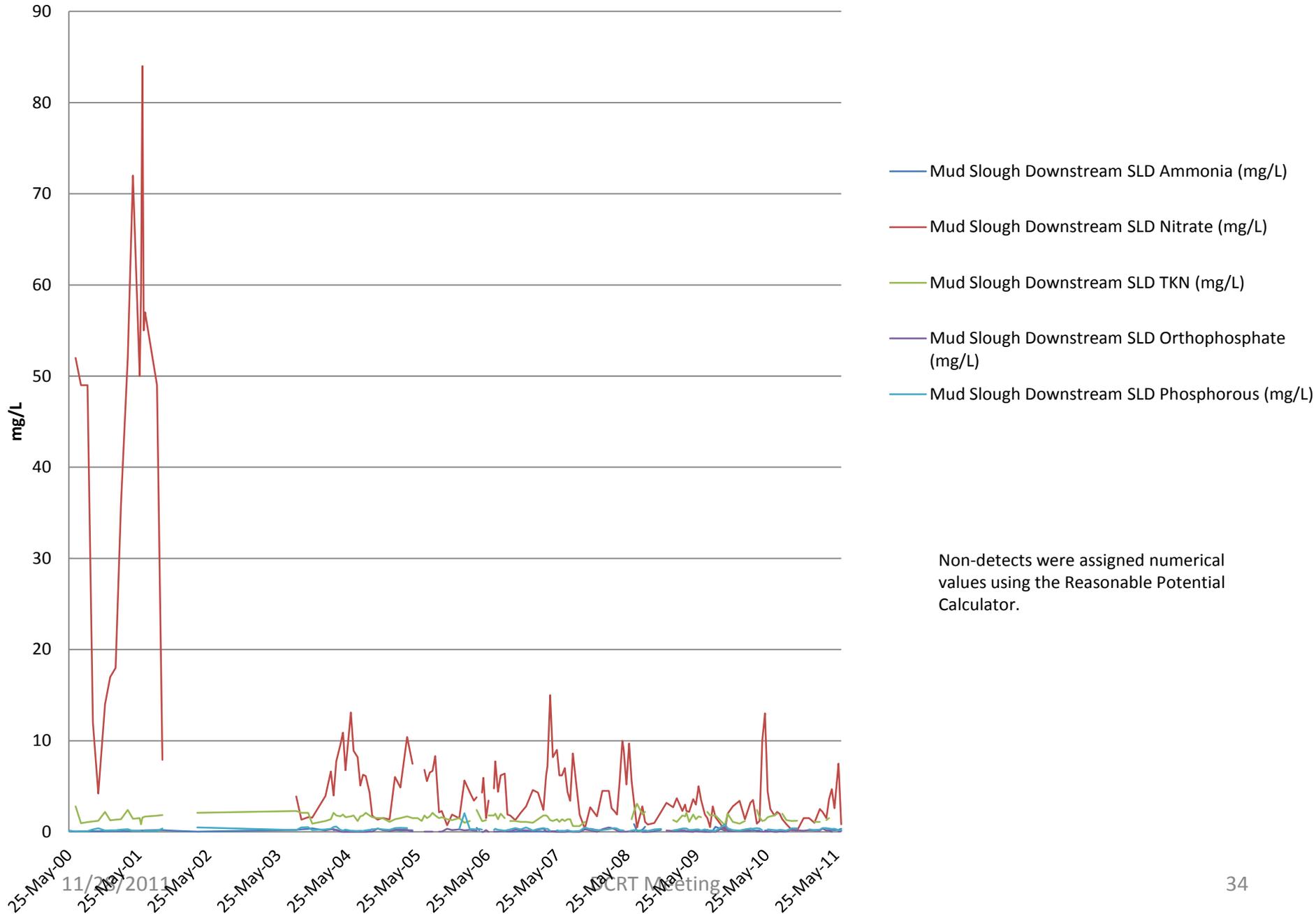
Nutrients in Mud Slough above SLD



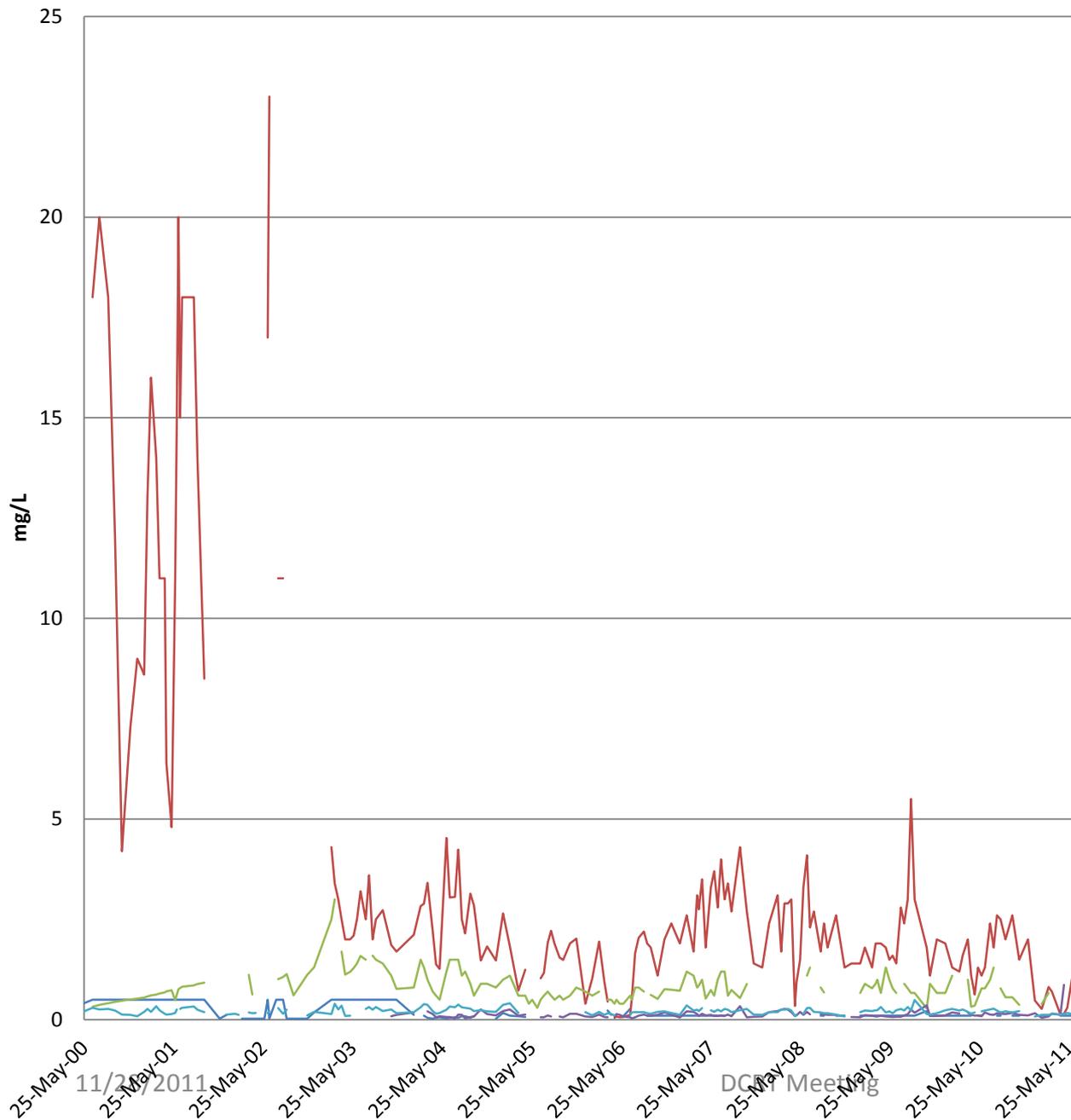
Nutrient Levels in SLD at Terminous



Nutrients in Mud slough Downstream of SLD



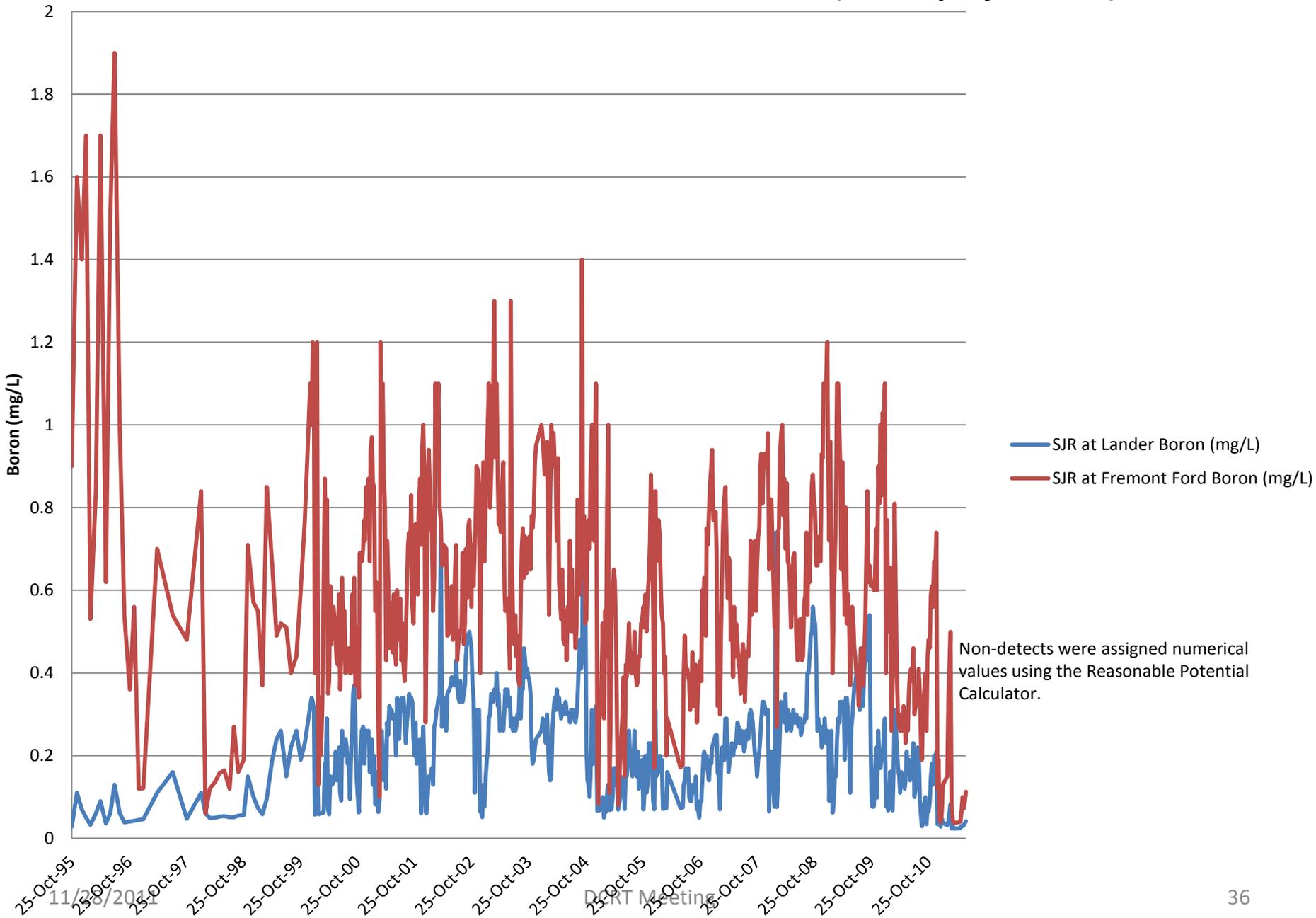
Nutrients in SJR at Crows Landing



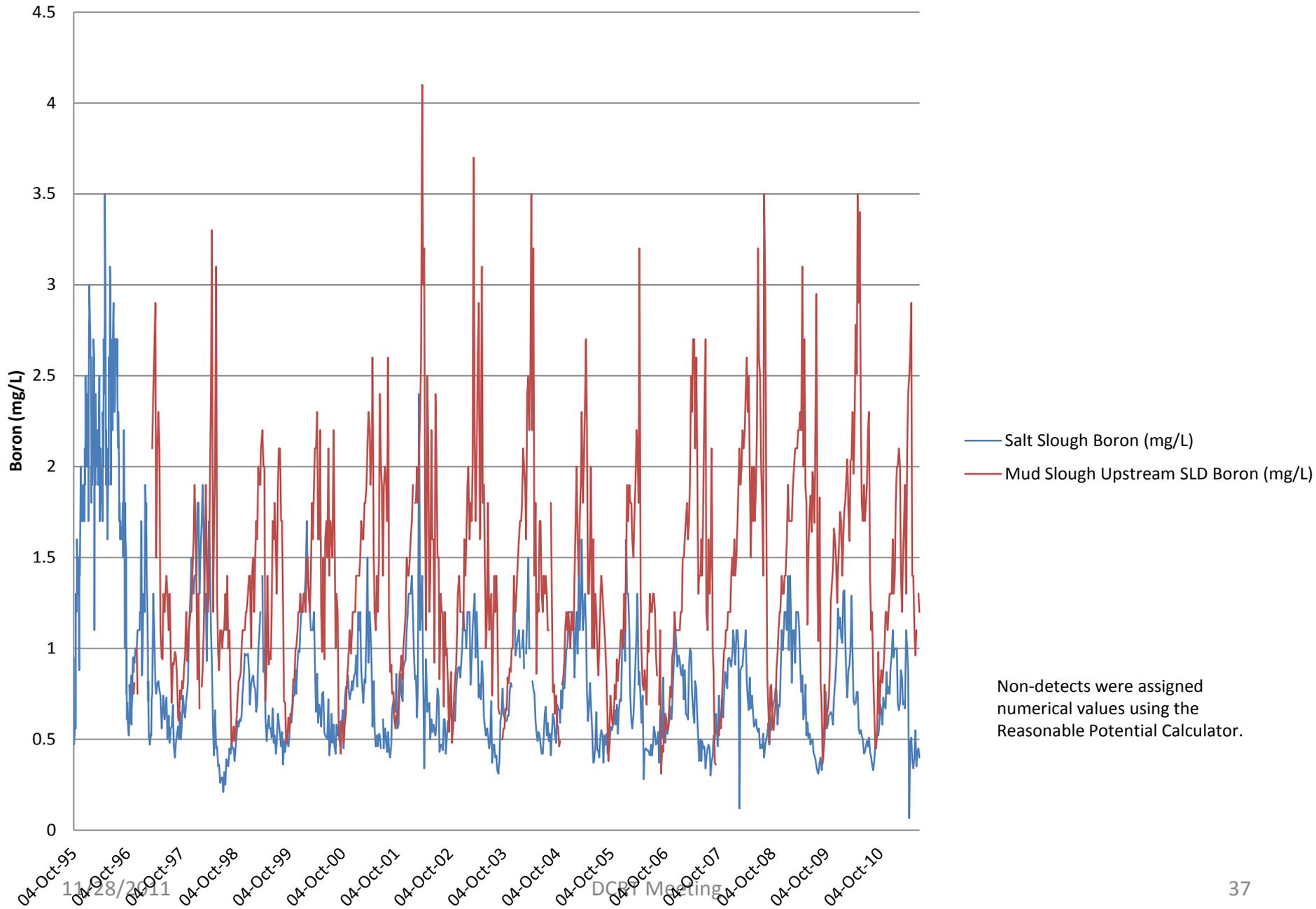
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- SJR at Crows Landing TKN (mg/L)
- SJR at Crows Landing Orthophosphate (mg/L)
- SJR at Crows Landing Phosphorous (mg/L)

Non-detects were assigned numerical values using the Reasonable Potential Calculator. Non-detects for Ammonia results were assigned numerical values of half the reporting limit because there were not enough data to use the Reasonable Potential Calculator.

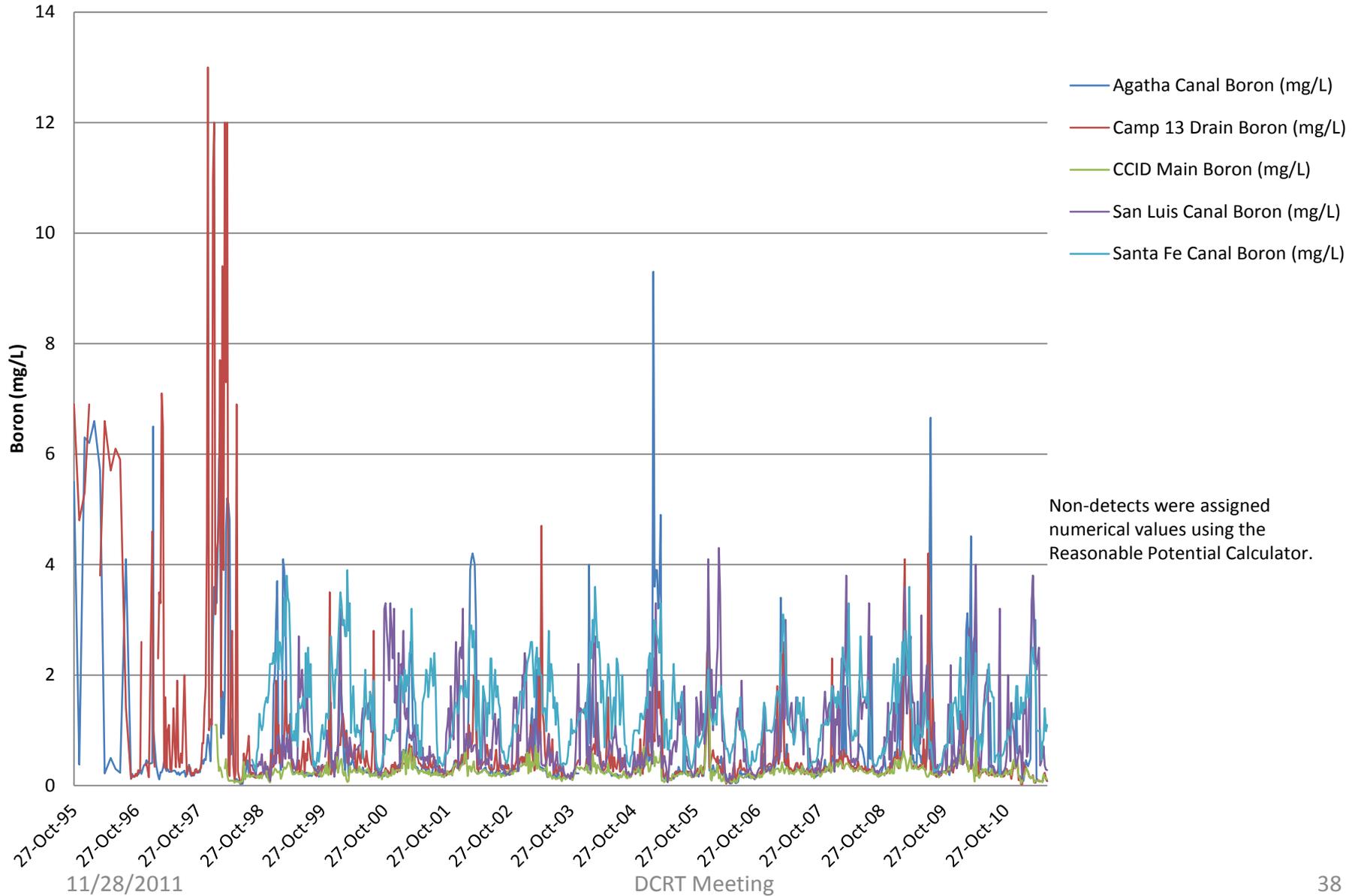
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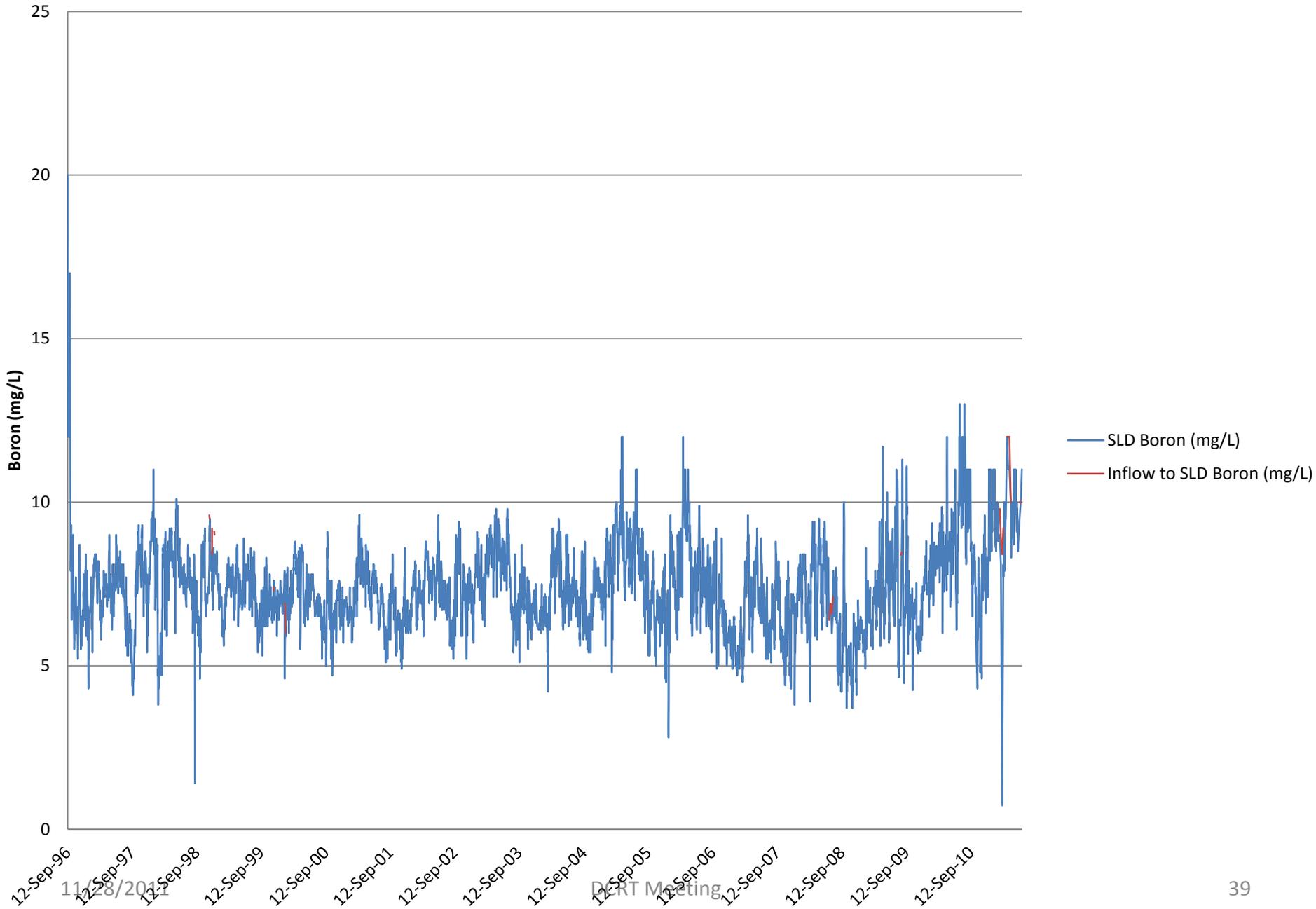
Boron in Salt Slough and Mud Slough above SLD



Boron at Agatha Canal, Camp 13 Drain, CCID Main, San Luis Canal, and Santa Fe Canal



Boron in San Luis Drain at Inflow and Terminous



Selenium in Salt Slough and Mud Slough above SLD

