

San Joaquin River Restoration Interim Flow Release Program  
2013 Annual Technical Report  
Surface Water Quality January 2013 – December 2013  
Stacy Brown<sup>1</sup>  
U.S. Bureau of Reclamation

Through October 2013, Reclamation continued to collect water samples from seven sites along the river, as well as within the Mendota Wildlife Management Area. A total of 752 samples were collected between January and July 2013 to measure TSS, nutrients, TOC/DOC, bacteria (*E. coli*, fecal coliform, total coliform), cations, anions, and trace metals. Special samples were collected in April to measure carbamates, pyrethroids, organophosphate, and organochlorine pesticides. Roughly 2635 analyses have been made of 133 constituents. Sediment samples were collected in May of 2013 at five sites in Reaches 1, 2 and 3. A majority of the water quality and sediment samples were collected in Reaches 1, 2 and 3 due to the lack of water below Sack Dam. Sampling ended in October of 2013.

Project data indicate that there are few contaminants of concern in Reaches 1 and 2, between Friant Dam and the Mendota Pool. Despite the adjacent urban areas no pesticides were detected in all water samples. Several trace elements (e.g. nickel and selenium) have been measured in the water below Mendota Dam because of the inflow of water from the Delta-Mendota Canal and other tributaries. Many known sources of contamination in the San Joaquin River below Mendota Dam are monitored by Reclamation and the Central Valley Regional Water Quality Control Board.

This report includes summary figures that illustrate real-time measurements of flow, temperature, and salinity, as well as results from the monthly grab samples. Figures 7j and 7k include additional data collected at Fremont Ford under the Grasslands Bypass Project. All data including sediment and pesticide data are available from Reclamation upon request.

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**Figure 1a. San Joaquin River below Friant Dam (Lost Lake Park)**  
**Mean Daily Flow (cfs)**



**Figure 1b. San Joaquin River below Friant Dam (Lost Lake Park)**  
**Temperature (deg F)**

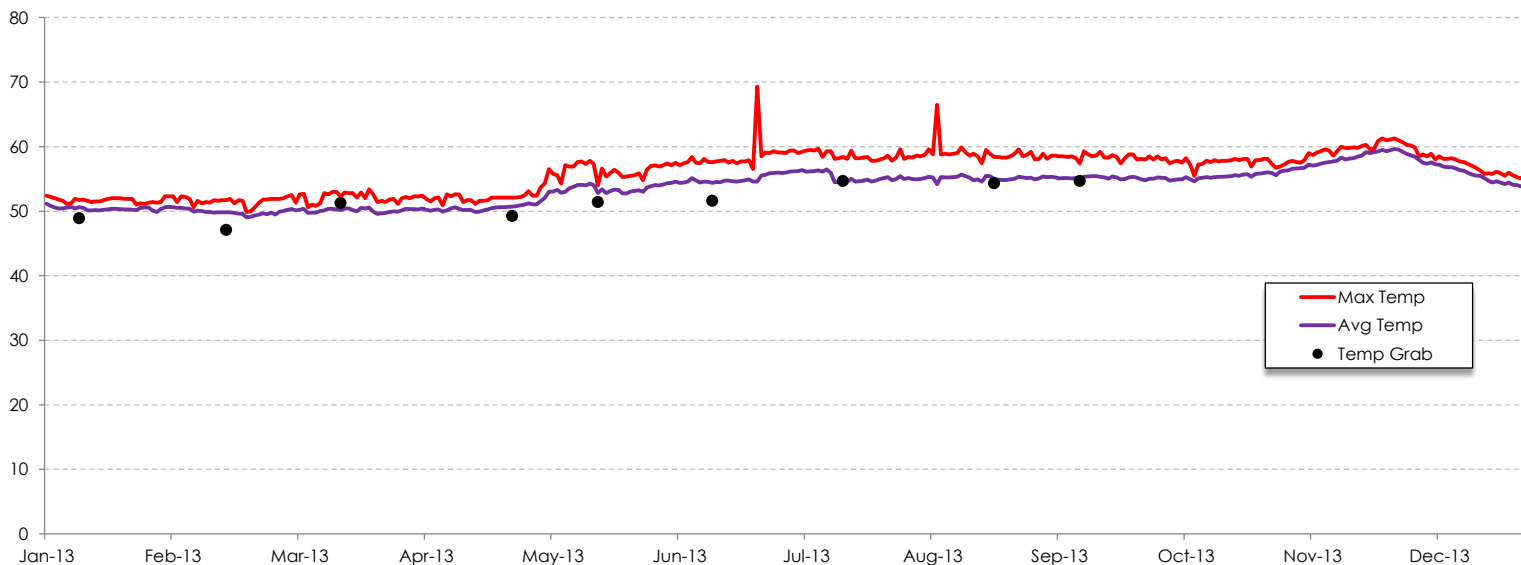


Figure 1c. San Joaquin River below Friant Dam (Lost Lake Park)  
Mean Daily Electrical Conductivity (uS/cm)

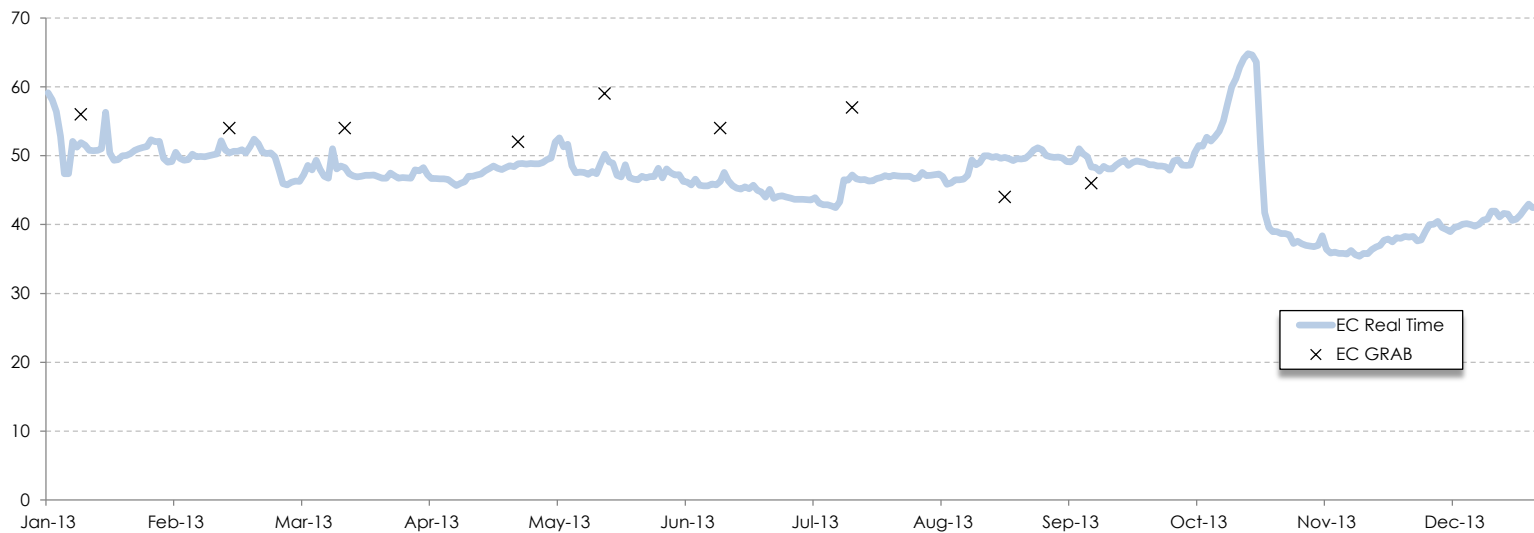


Figure 1d. San Joaquin River below Friant Dam (Lost Lake Park)  
Dissolved Oxygen (mg/L)

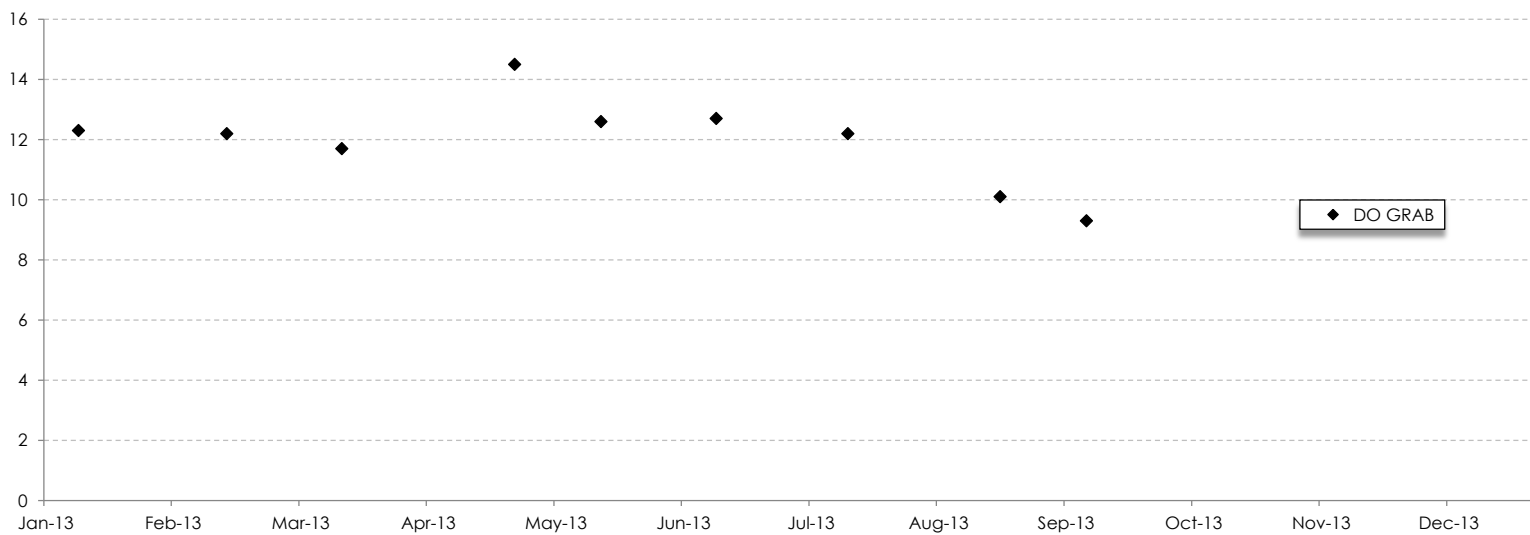


Figure 1e. San Joaquin River below Friant Dam (Lost Lake Park)  
Chlorophyll (ug/L)

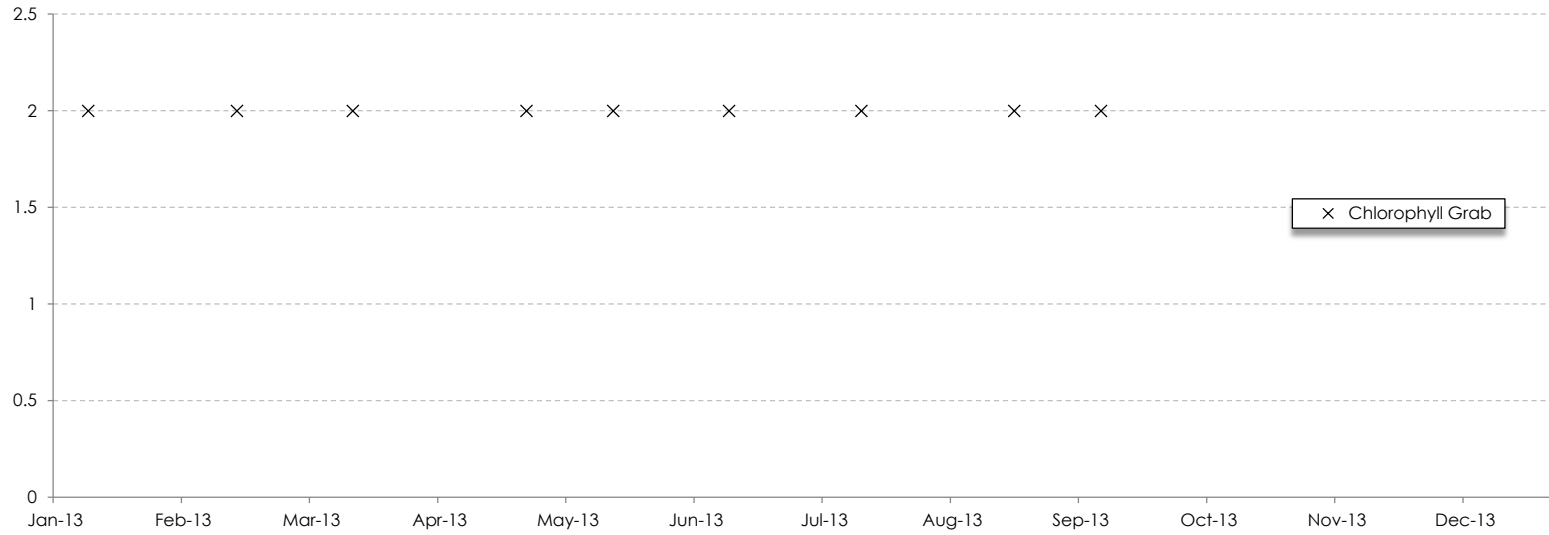


Figure 1f. San Joaquin River below Friant Dam (Lost Lake Park)  
pH

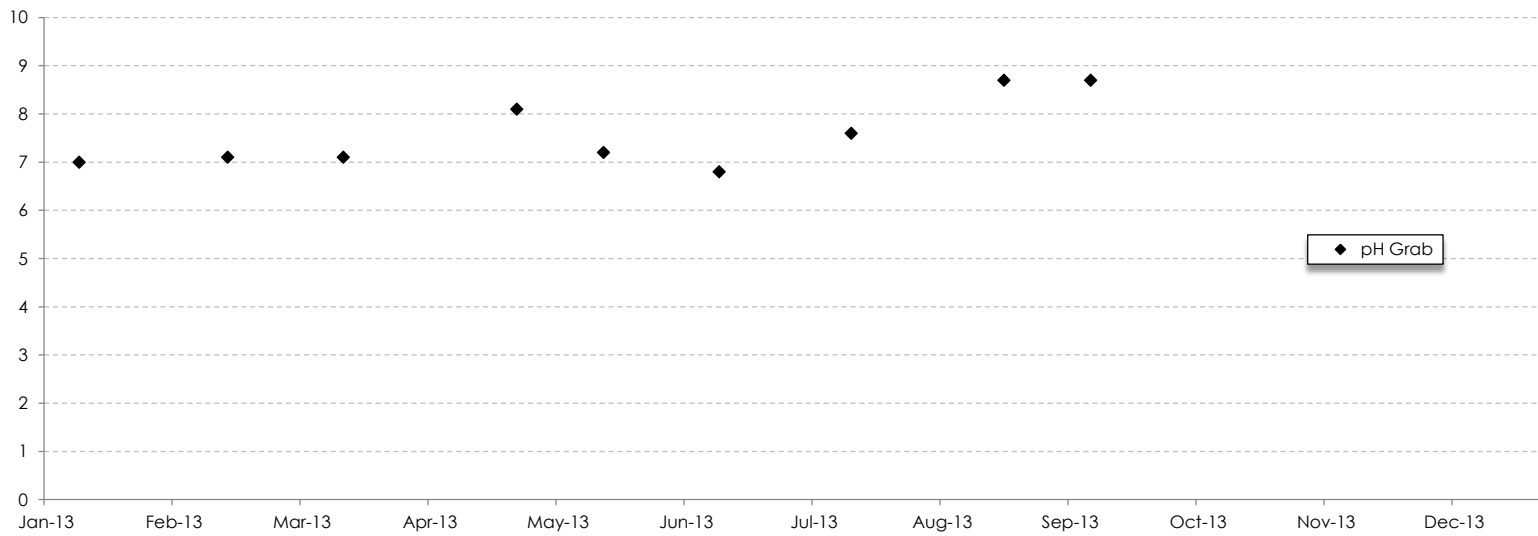


Figure 1g. San Joaquin River below Friant Dam (Lost Lake)  
Anions (mg/L)

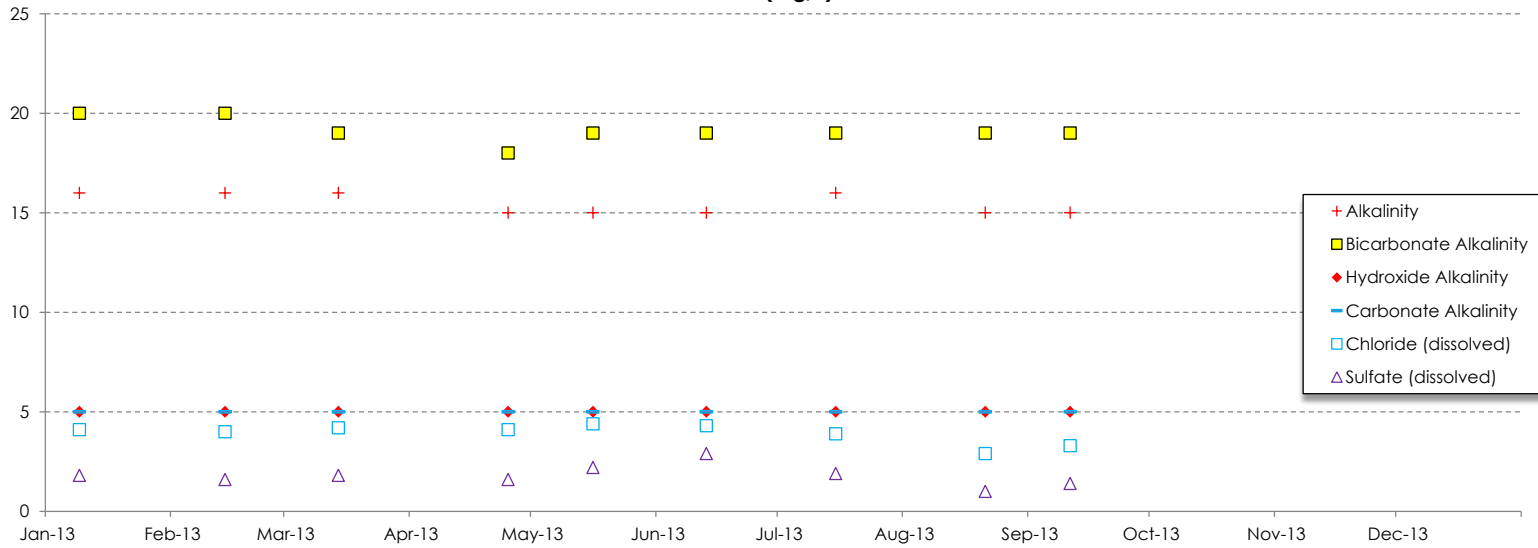
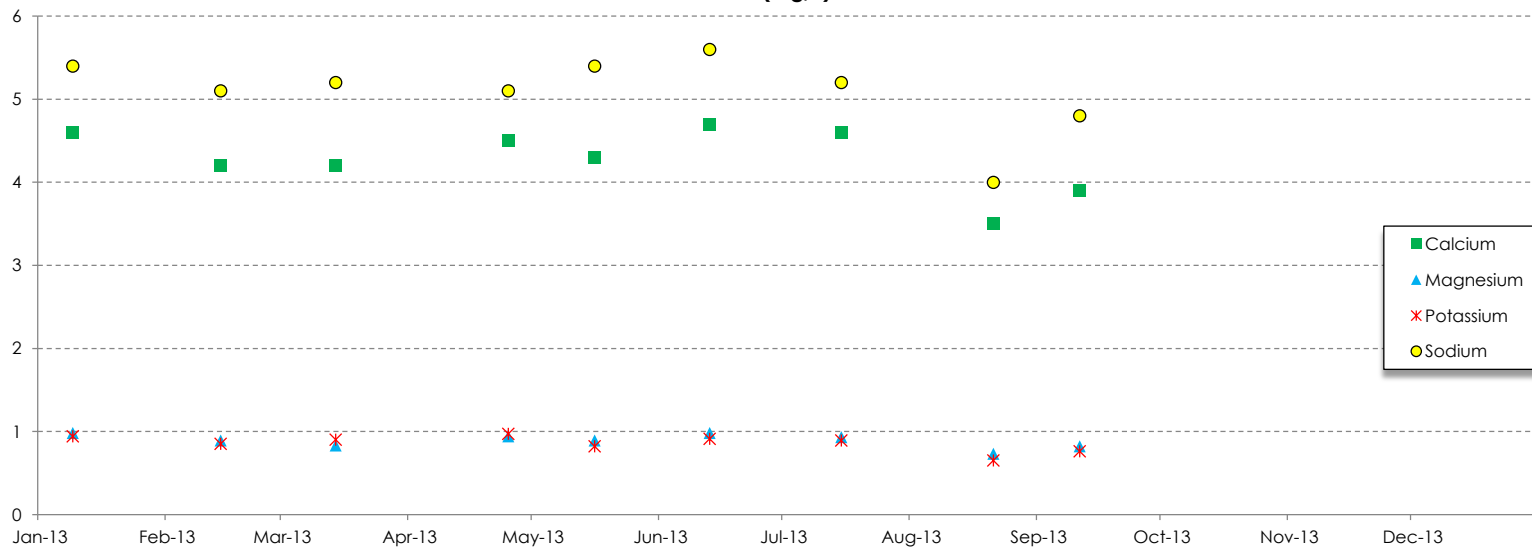
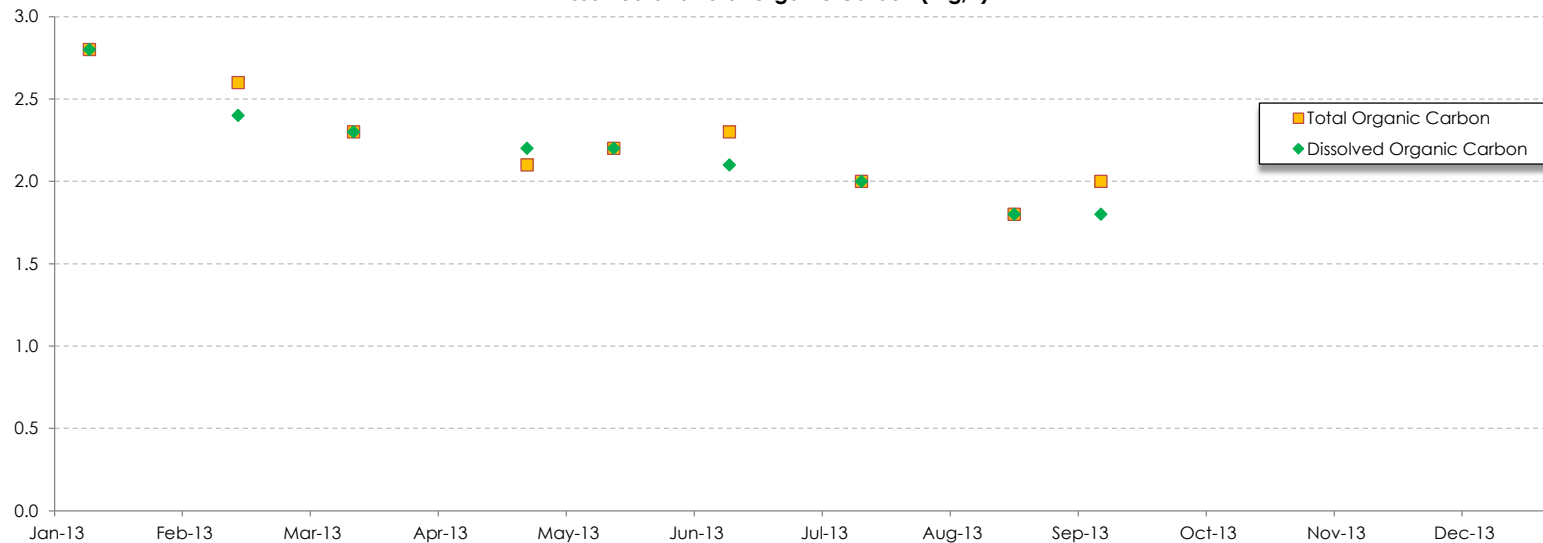


Figure 1h. San Joaquin River Below Friant Dam (Lost Lake)  
Cations (mg/L)



**Figure 1i. San Joaquin River below Friant (Lost Lake)  
Dissolved and Total Organic Carbon (mg/L)**



**Figure 1j. San Joaquin River below Friant (Lost Lake)  
Nutrients (mg/L)**

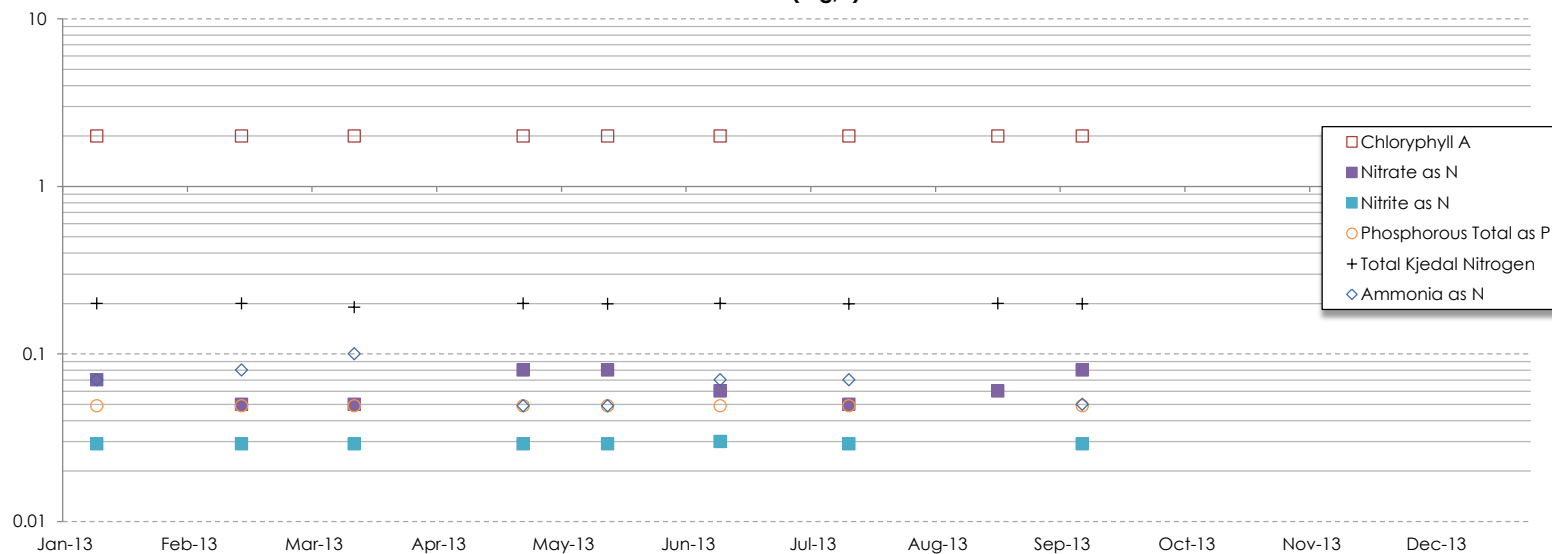
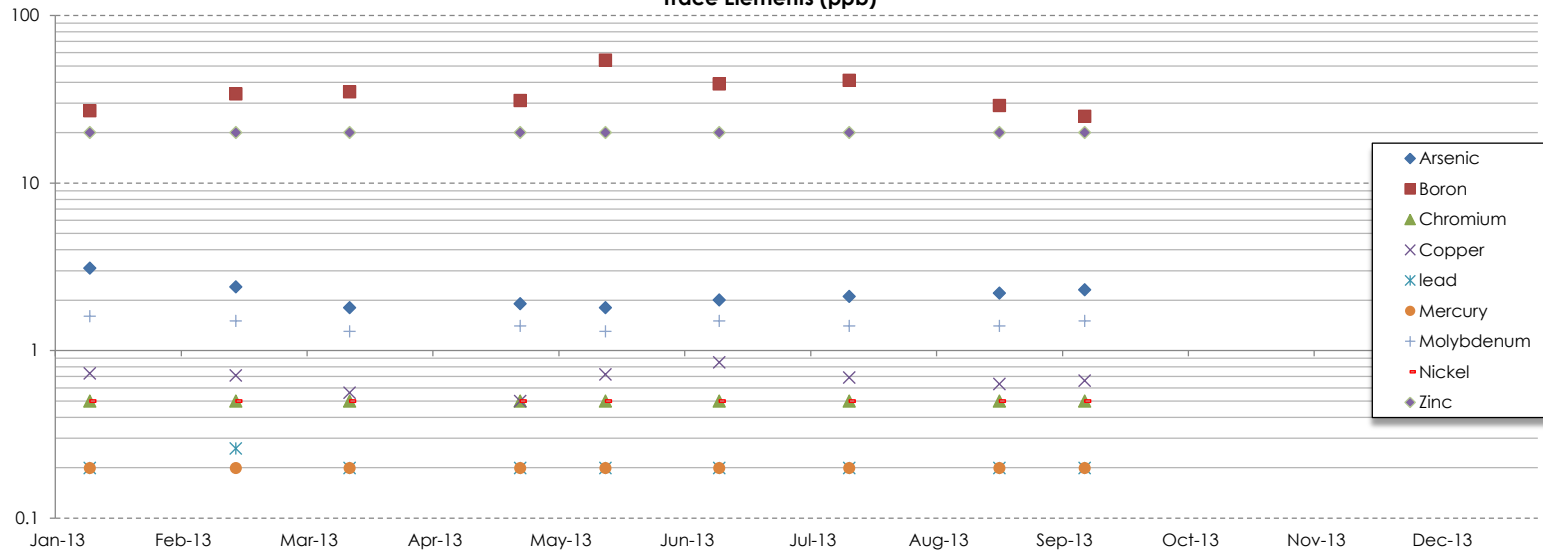
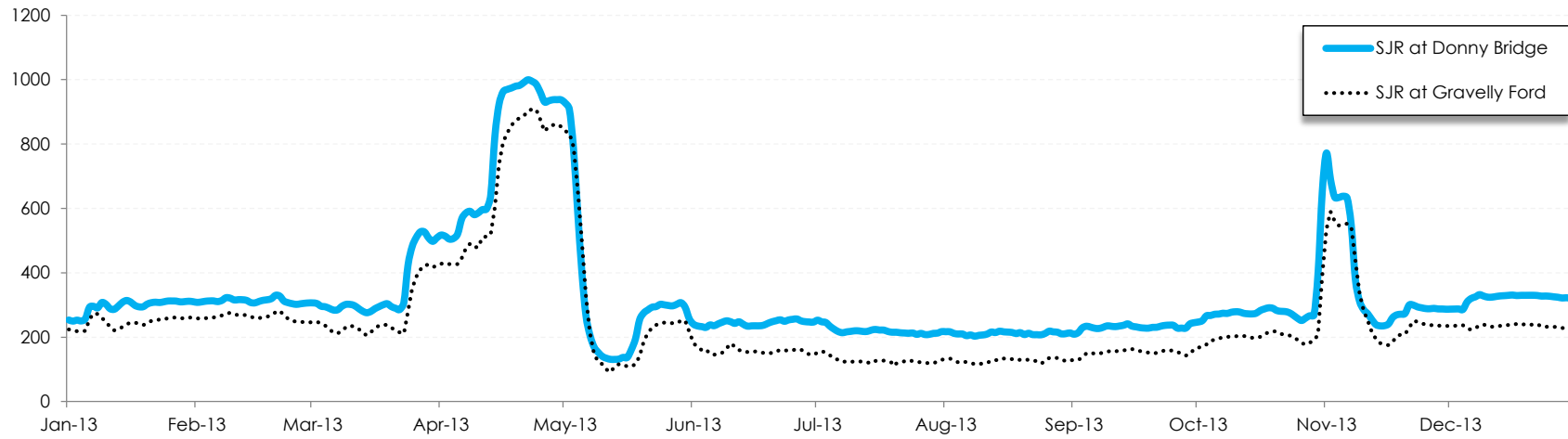


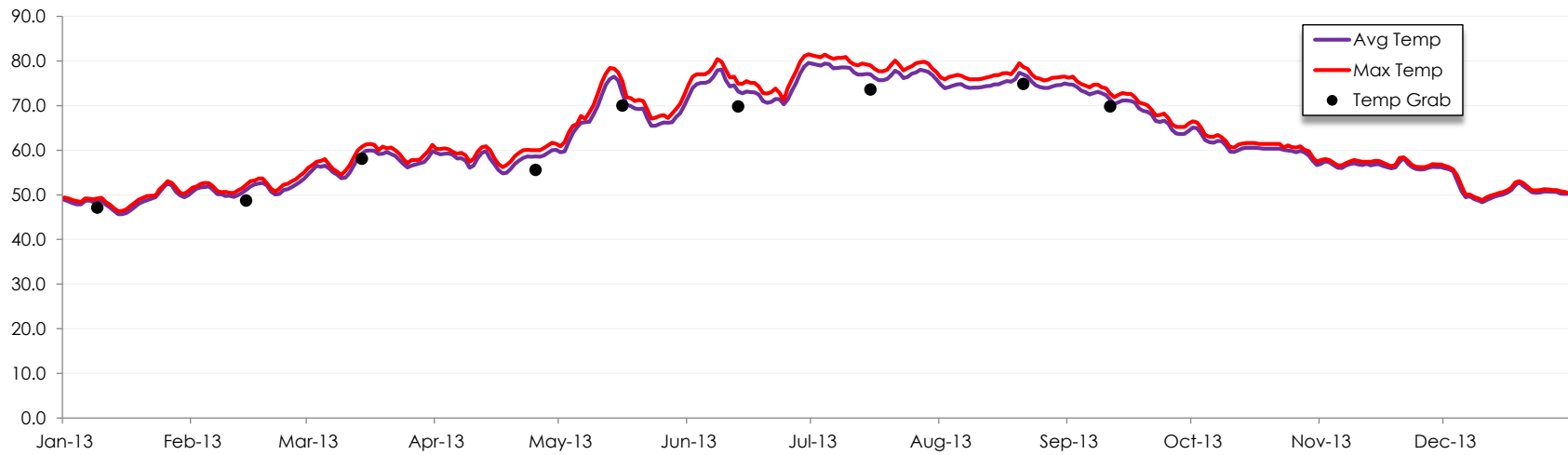
Figure 1k. San Joaquin River below Friant Dam (Lost Lake)  
Trace Elements (ppb)



**Figure 2a. San Joaquin River near HWY 99 (Camp Pashayan)**  
**Mean Daily Flow (cfs)**

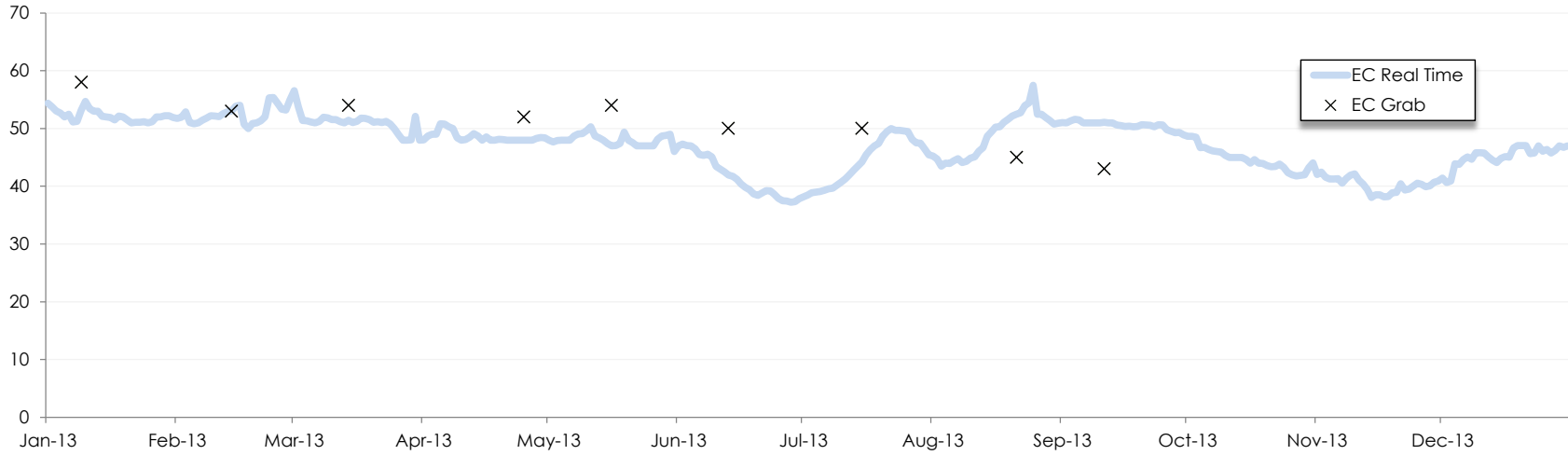


**Figure 2b. San Joaquin River at Hwy 99 (Camp Pashayan)**  
**Temperature (deg F)**

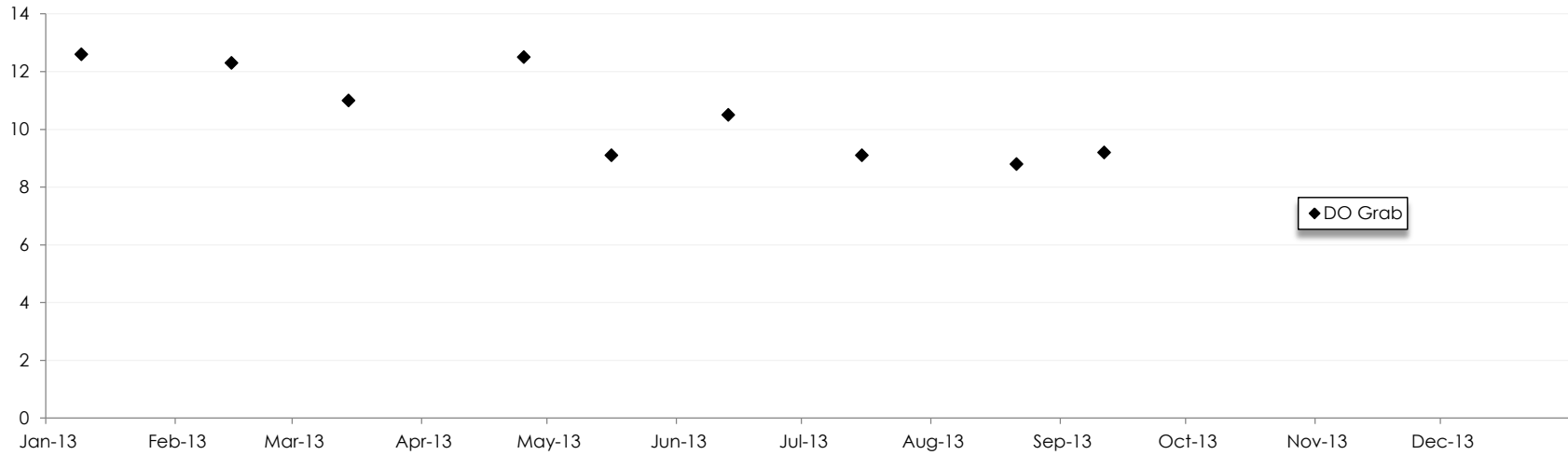




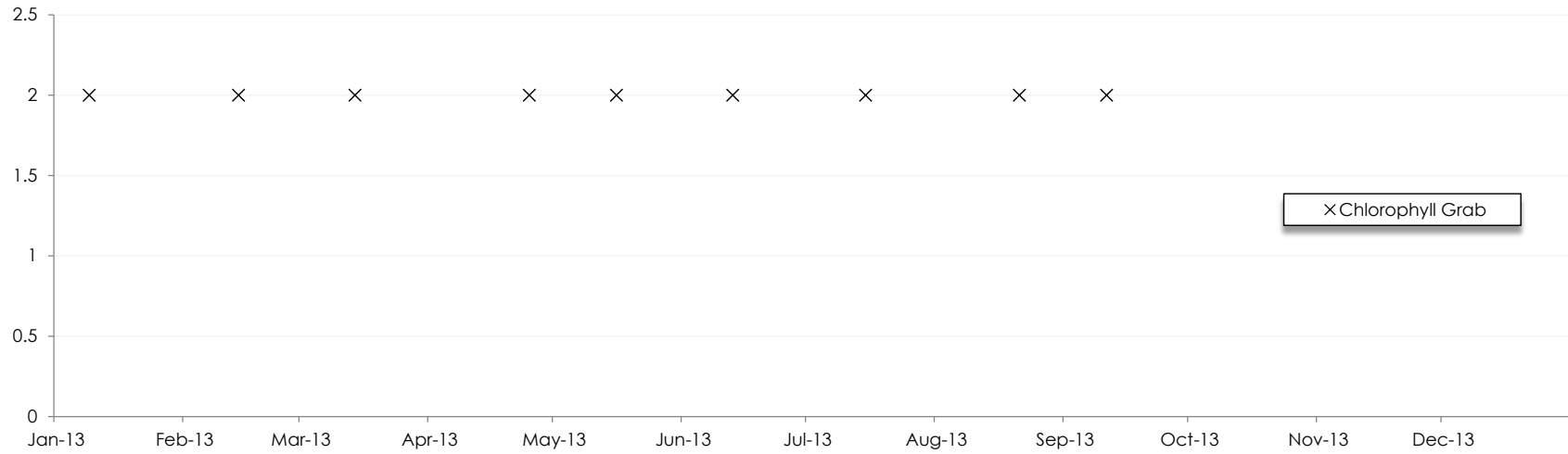
**Figure 2c. San Joaquin River at Hwy 99 (Camp Pashayan)  
Electrical Conductivity (uS/cm)**



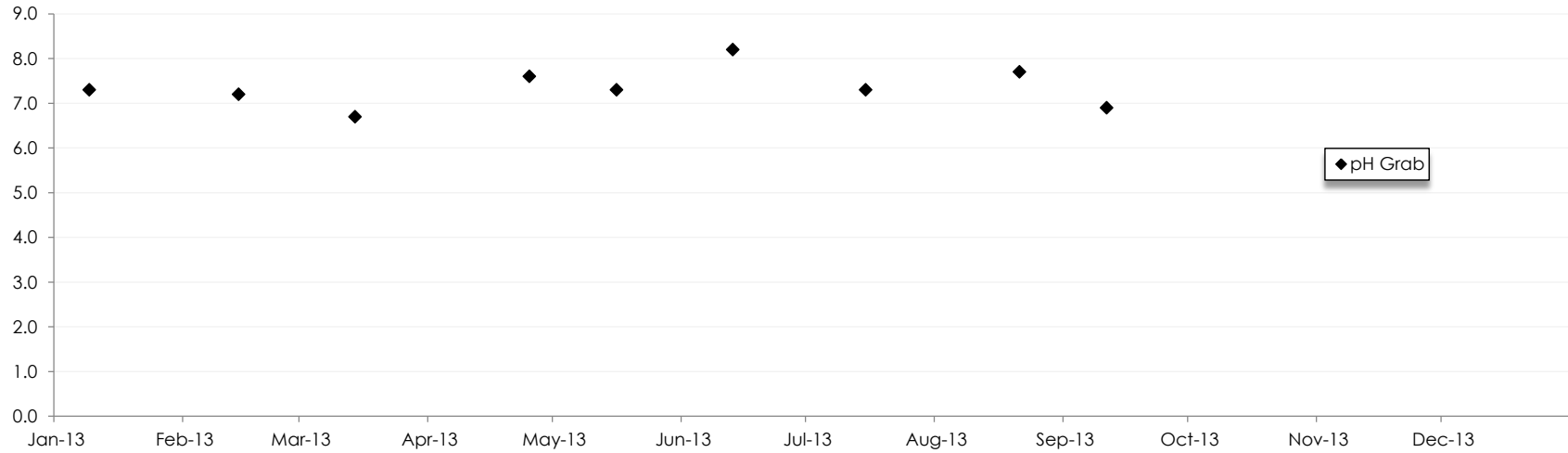
**Figure 2d. San Joaquin River at Hwy 99 (Camp Pashayan)  
Dissolved Oxygen (mg/L)**



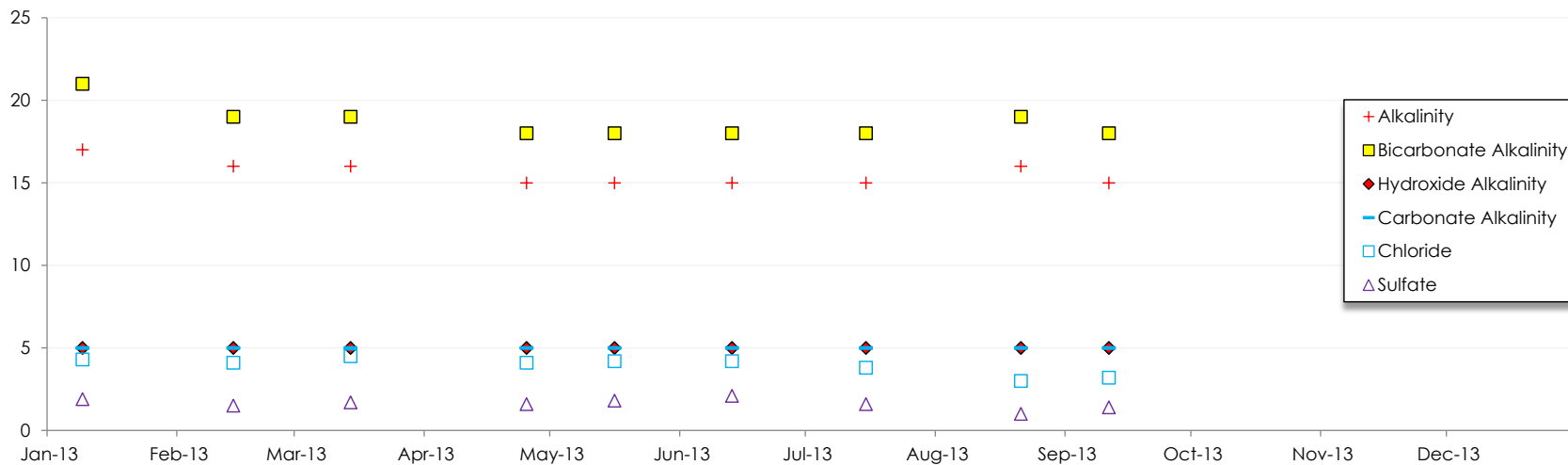
**Figure 2e. San Joaquin River at Hwy 99 (Camp Pashayan)  
Chlorophyll (ug/L)**



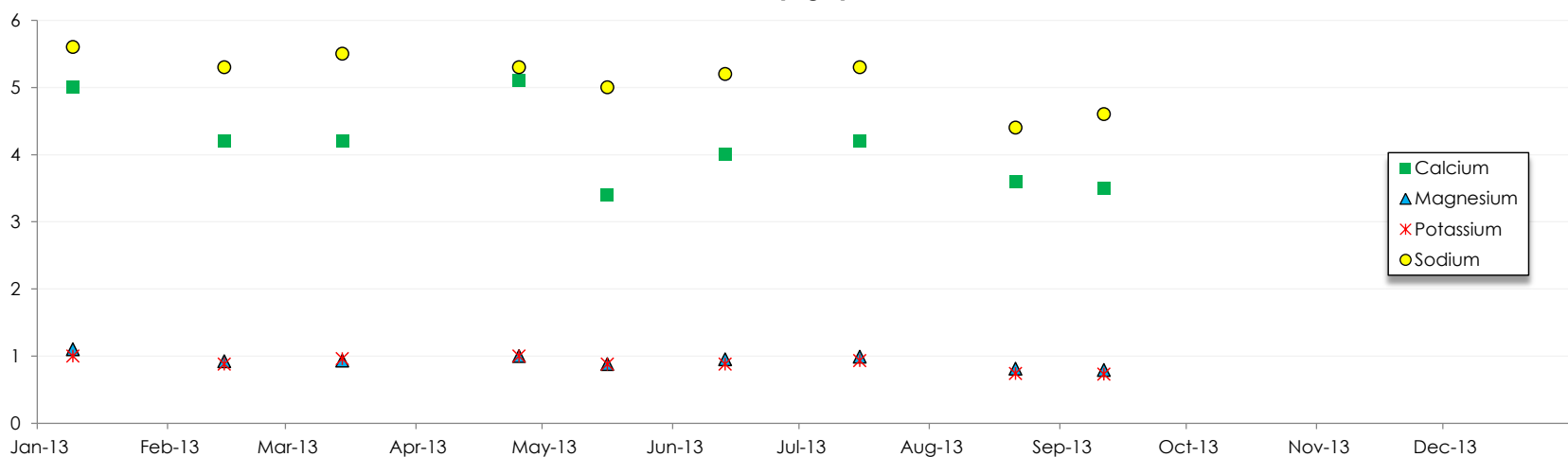
**Figure 2f. San Joaquin River at Hwy 99 (Camp Pashayan)  
pH**



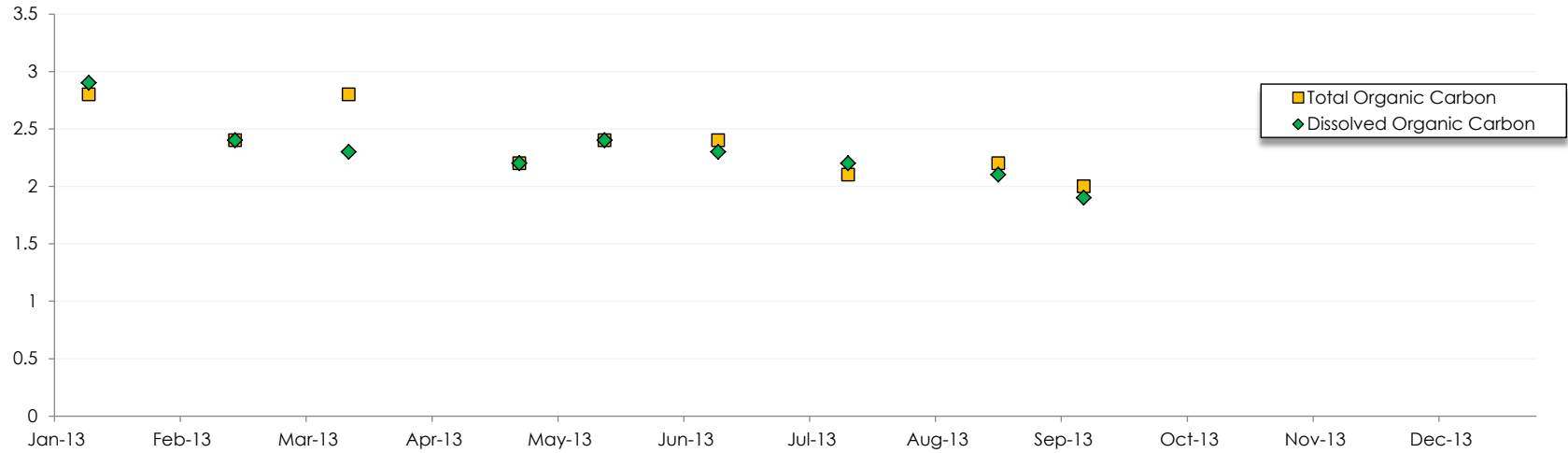
**Figure 2g. San Joaquin River at Hwy 99 (Camp Pashayan)**  
Anions (mg/L)



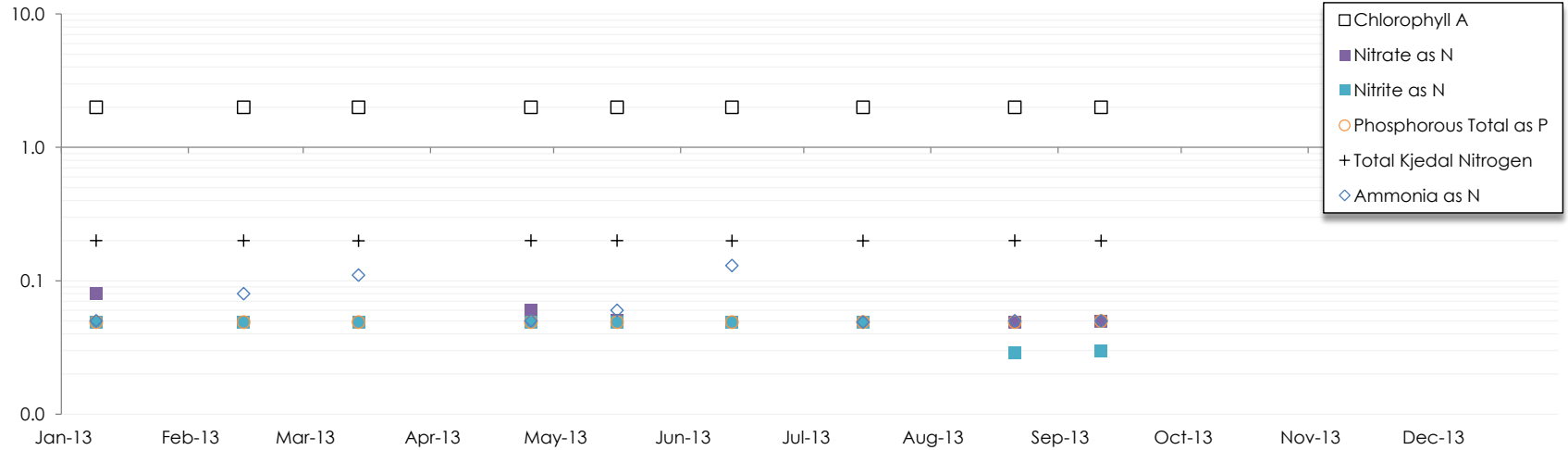
**Figure 2h. San Joaquin River at Hwy 99 (Camp Pashayan)**  
Cations (mg/L)



**Figure 2i. San Joaquin River at Hwy 99 (Camp Pashayan)  
Dissolved and Total Organic Carbon (mg/L)**

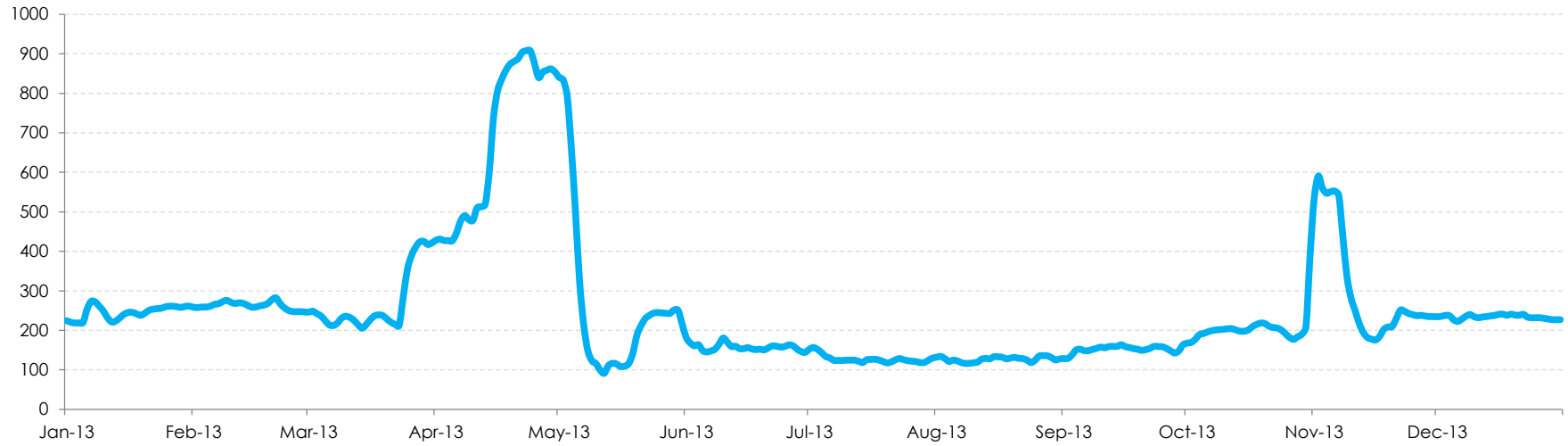


**Figure 2j. San Joaquin River at Hwy 99 (Camp Pashayan)  
Nutrients (mg/L)**

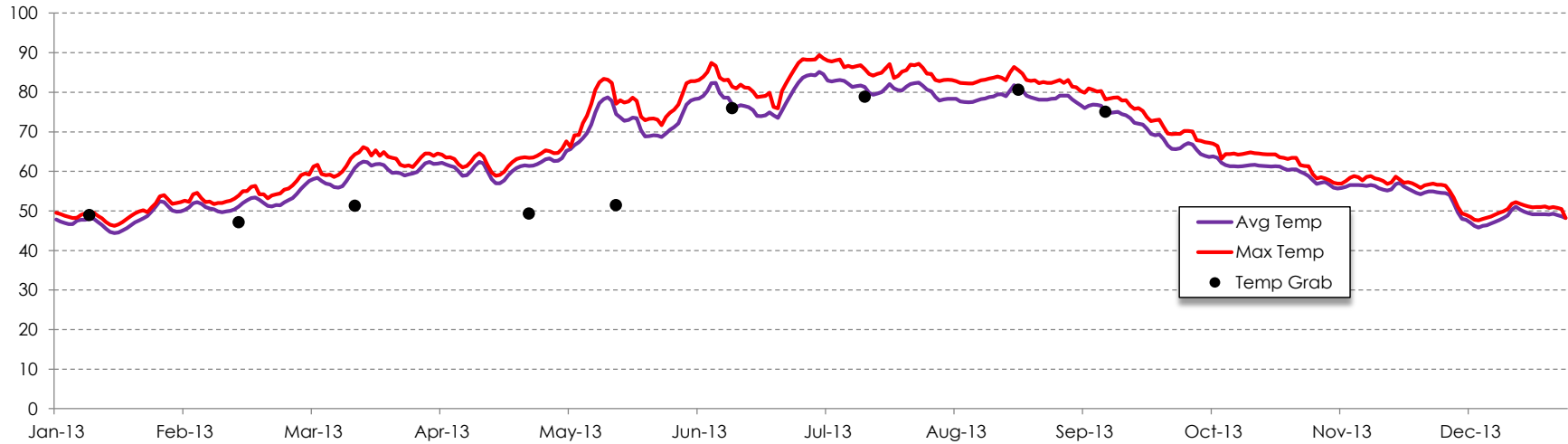




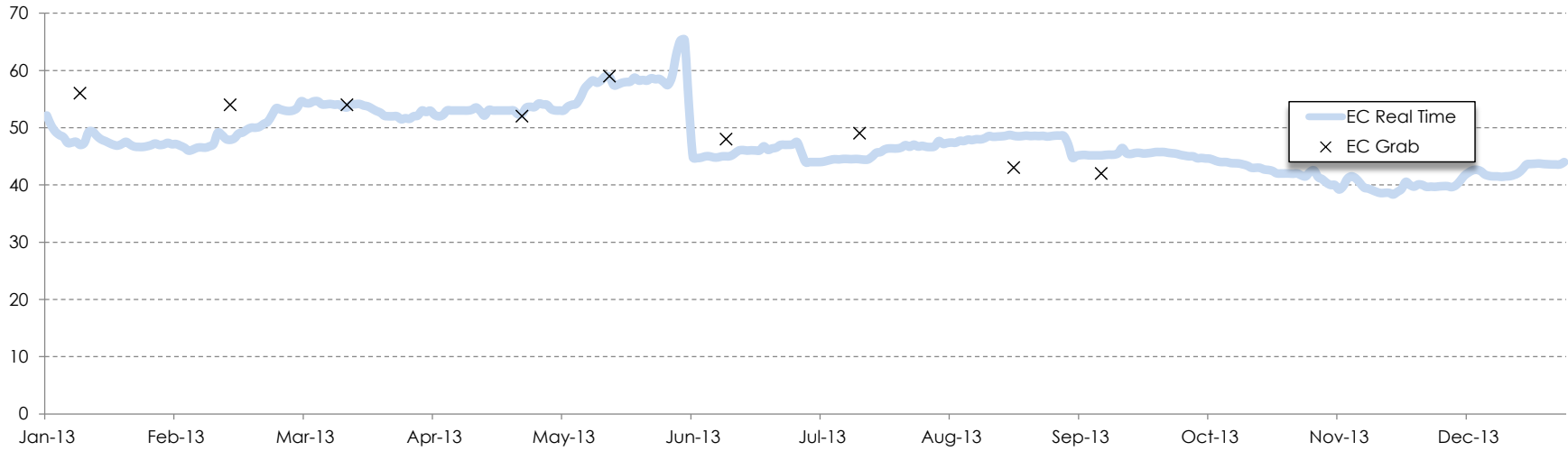
**Figure 3a. San Joaquin River at Gravelly Ford  
Mean Daily Flow (cfs)**



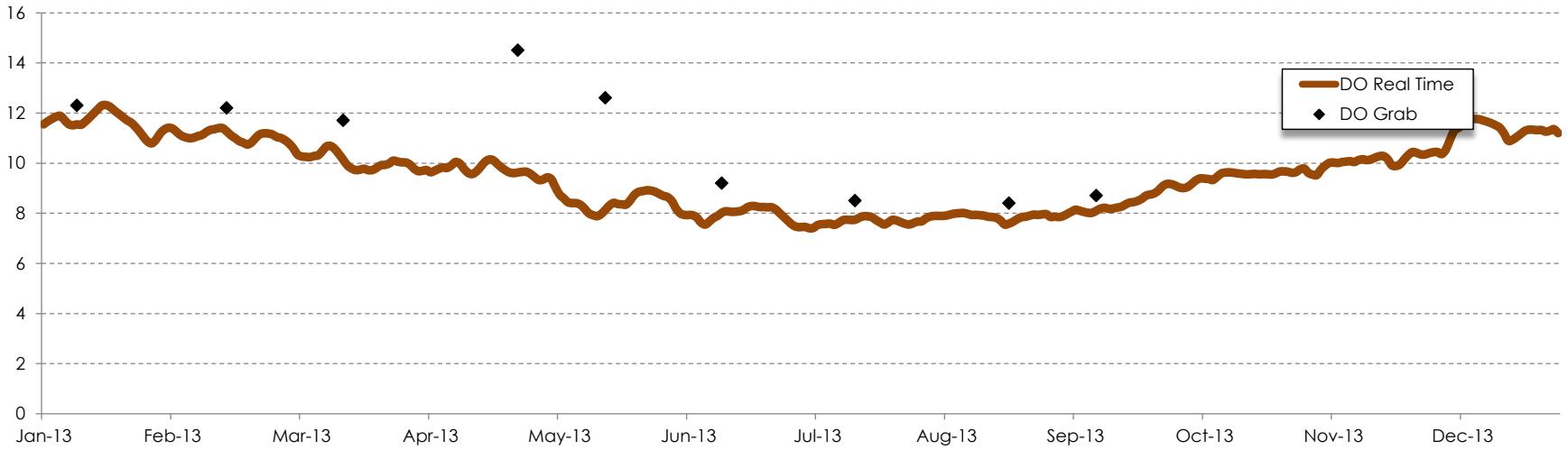
**Figure 3b. San Joaquin River at Gravelly Ford  
Temperature (Deg F)**



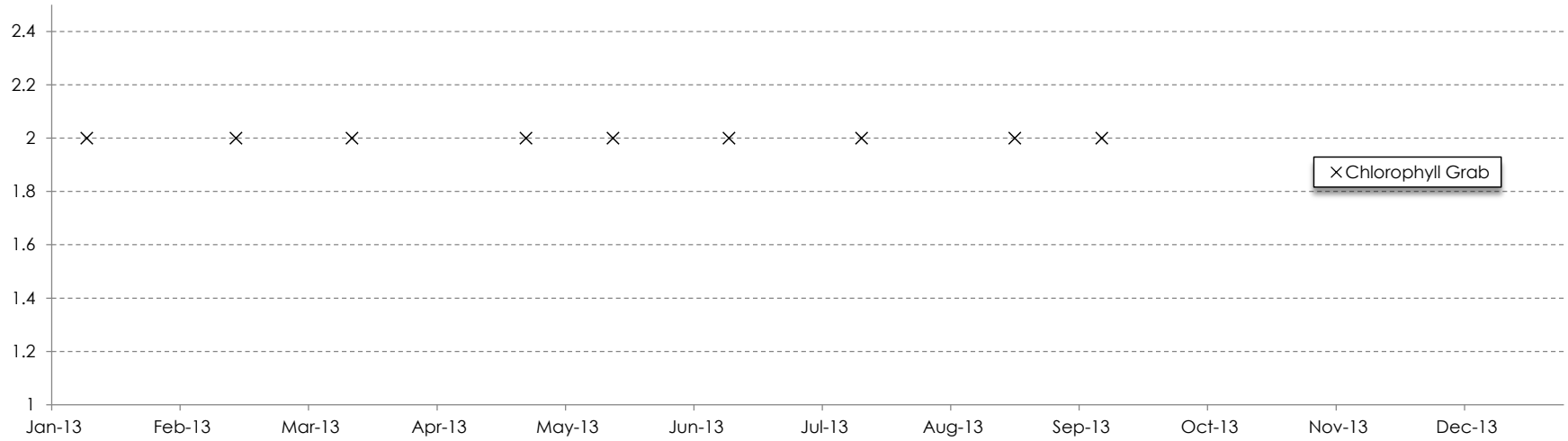
**Figure 3c. San Joaquin River at Gravelly Ford  
Mean Daily Electrical Conductivity (uS/cm)**



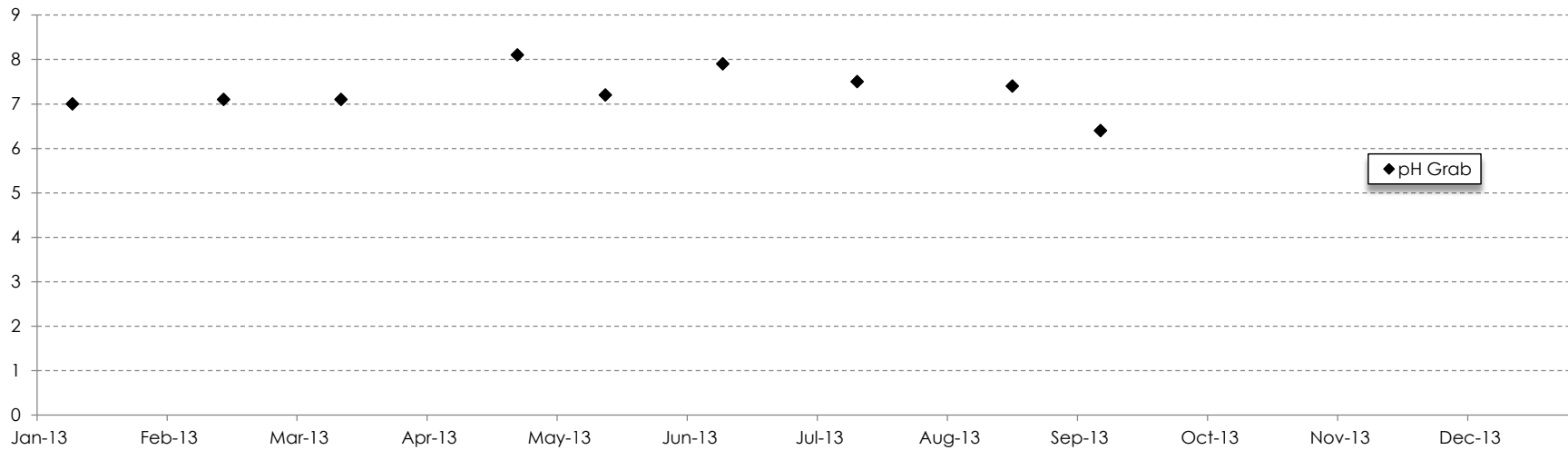
**Figure 3d. San Joaquin River at Gravelly Ford  
Mean Daily Dissolved Oxygen (mg/L)**



**Figure 3e. San Joaquin River at Gravelly Ford  
Chlorophyll (ug/L)**

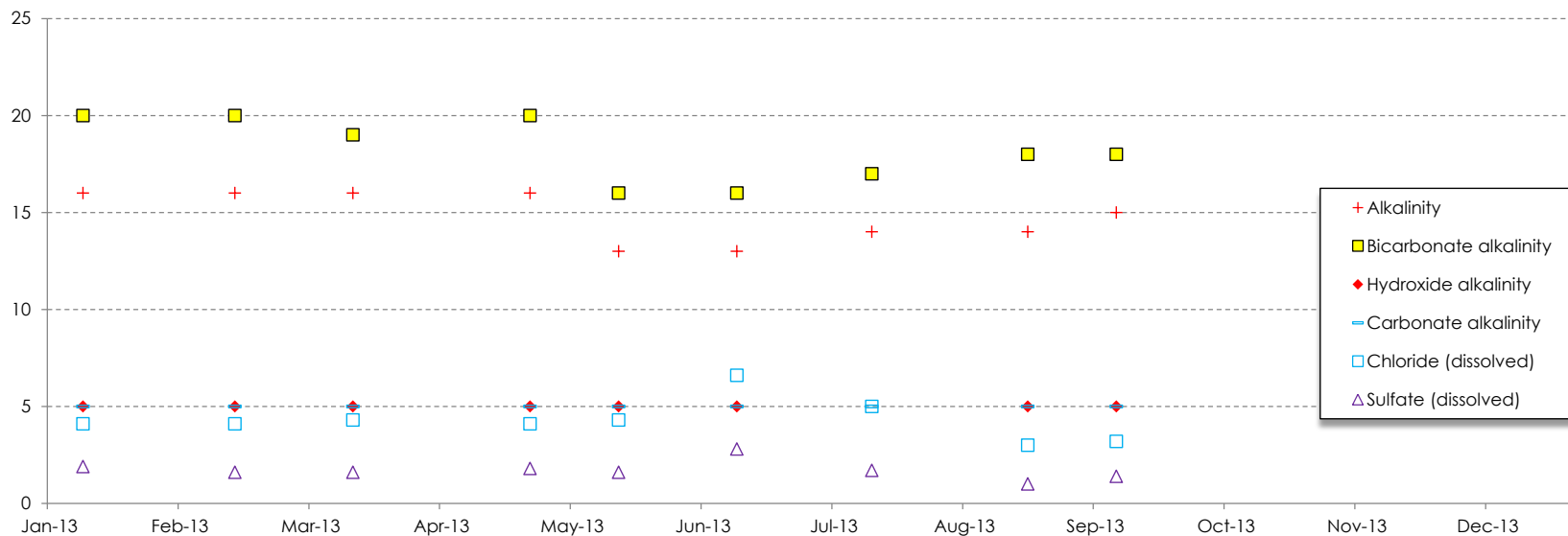


**Figure 3f. San Joaquin River at Gravelly Ford  
pH**

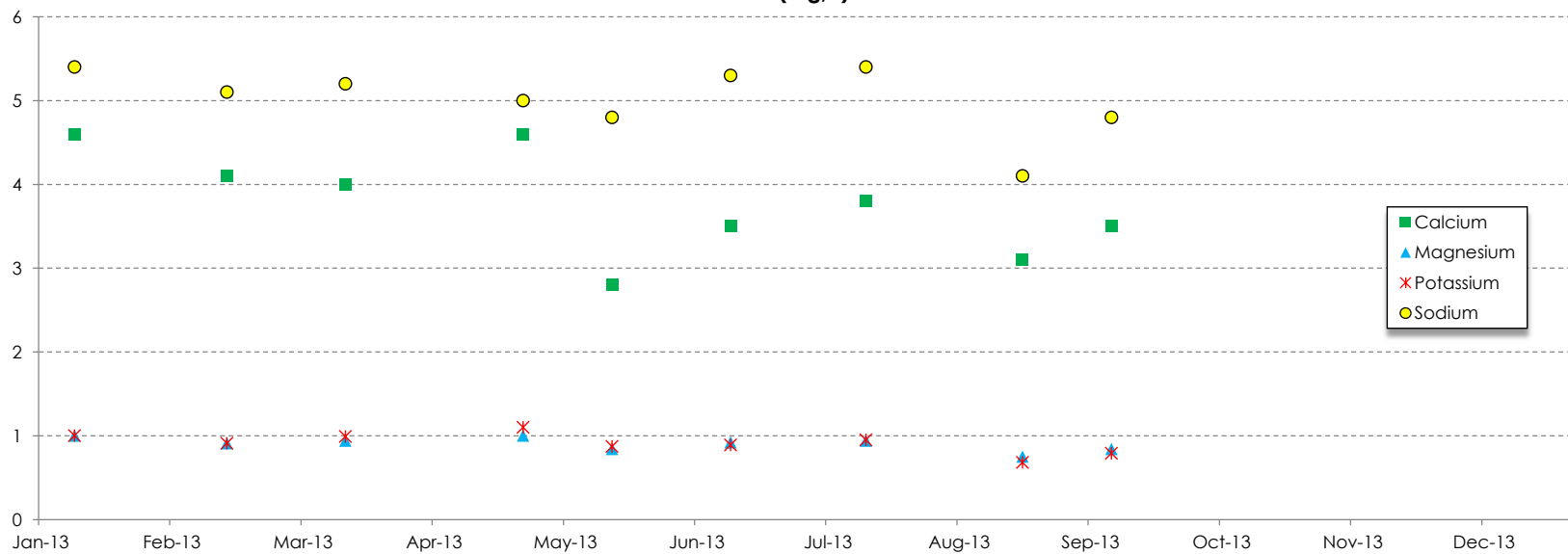




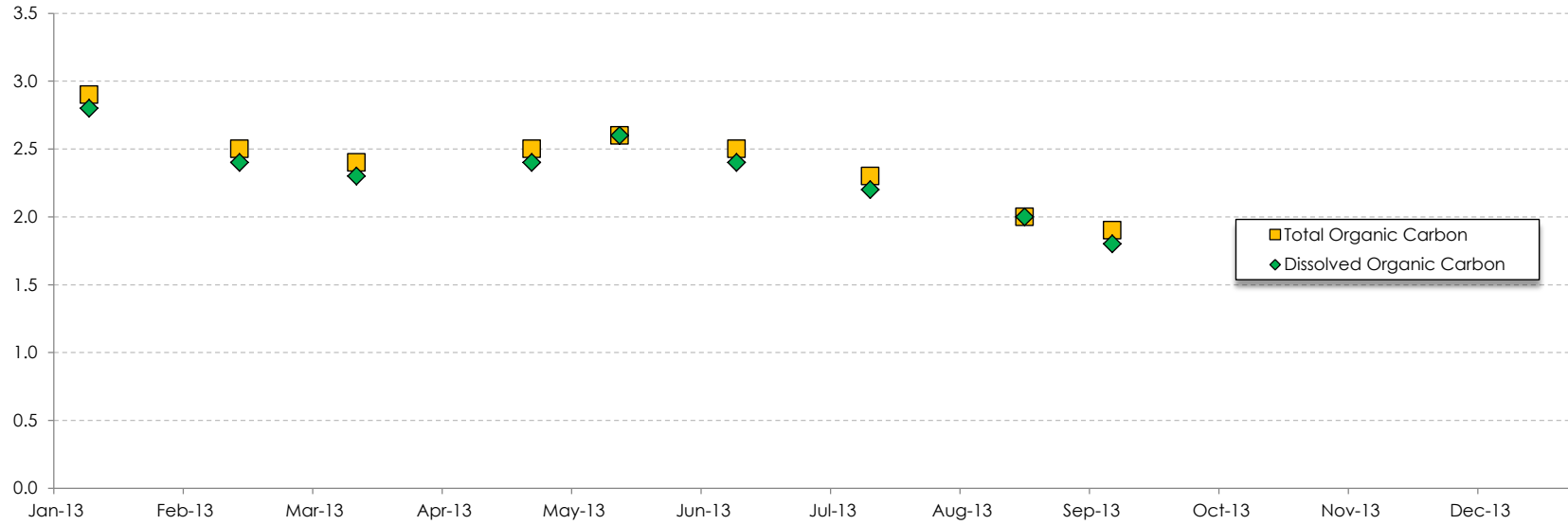
**Figure 3g. San Joaquin River at Gravelly Ford  
Anions (mg/L)**



**Figure 3h. San Joaquin River at Gravelly Ford  
Cations (mg/L)**



**Figure 3i. San Joaquin River at Gravelly Ford  
Dissolved and Total Organic Carbon (mg/L)**



**Figure 3j. San Joaquin River at Gravelly Ford  
Nutrients (mg/L)**

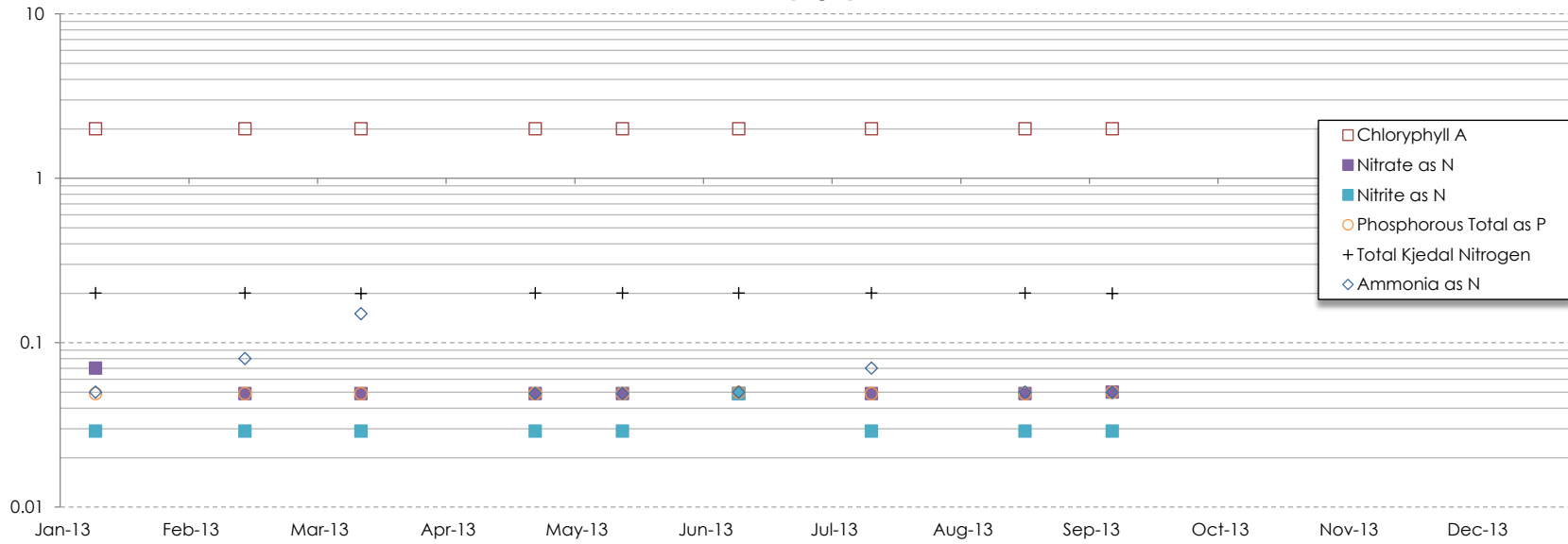




Figure 4a. Mendota Wildlife Management Area  
Temperature (deg C)

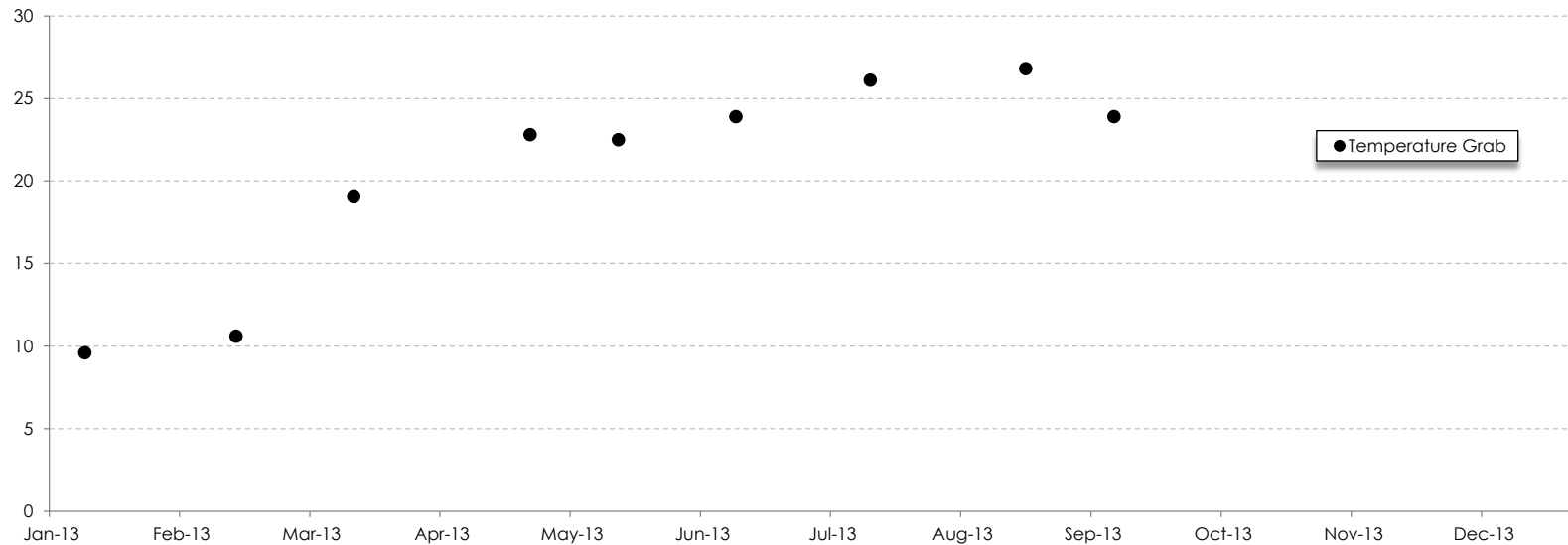
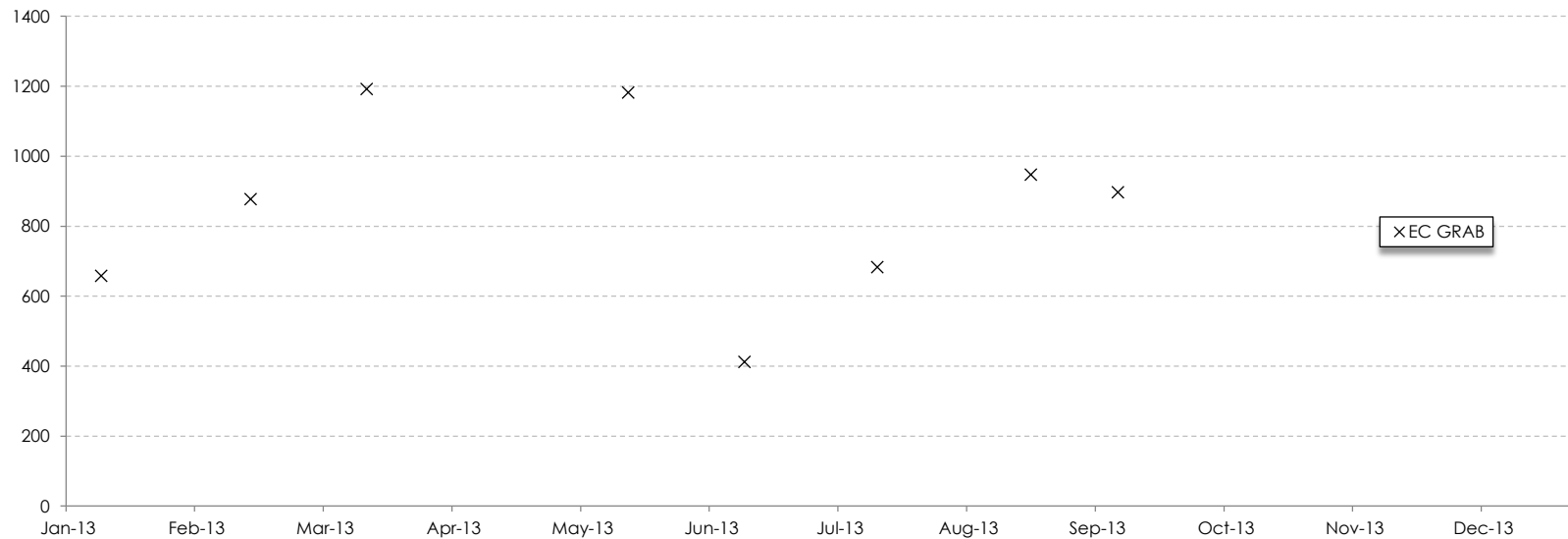
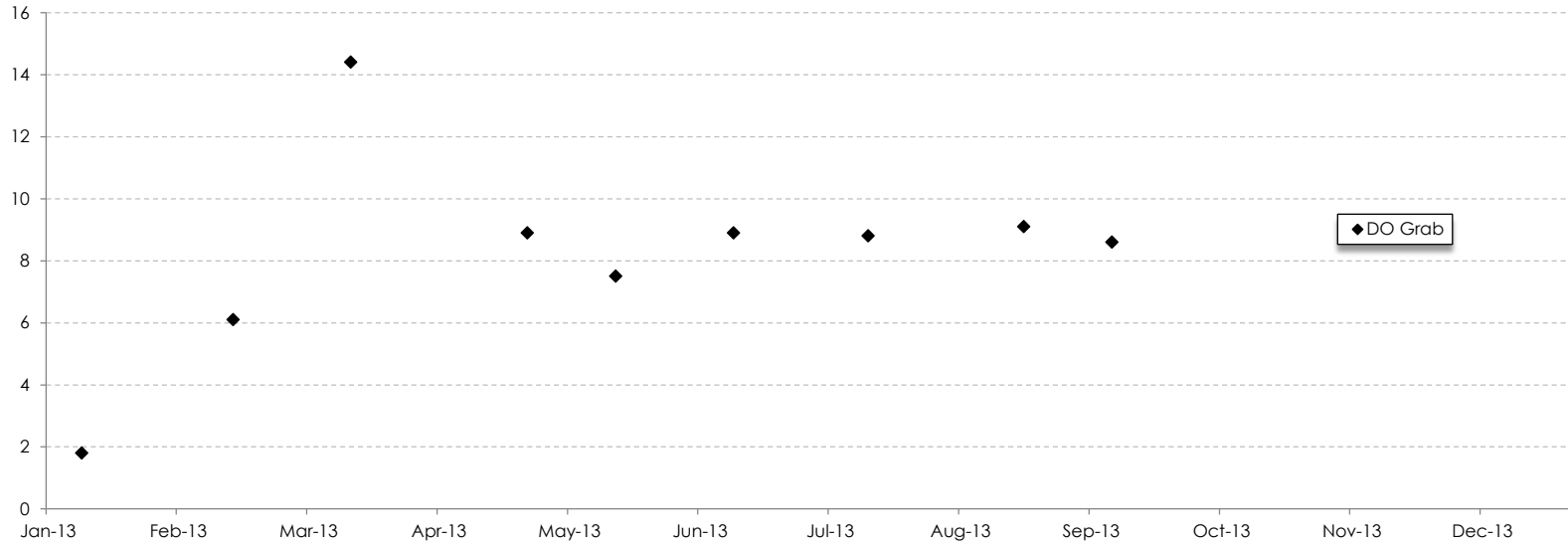


Figure 4b. Mendota Wildlife Management Area  
Electrical Conductivity (uS/cm)



**Figure 4c. Mendota Wildlife Management Area  
Dissolved Oxygen (mg/L)**



**Figure 4d. Mendota Wildlife Management Area  
pH**

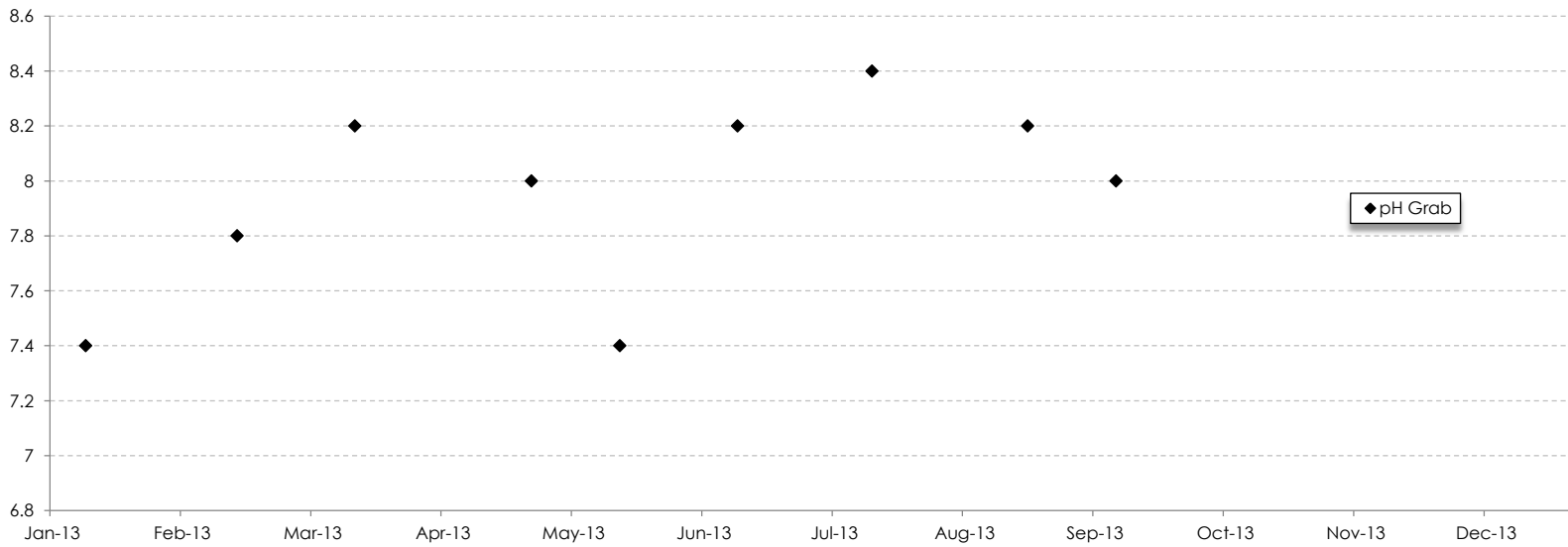
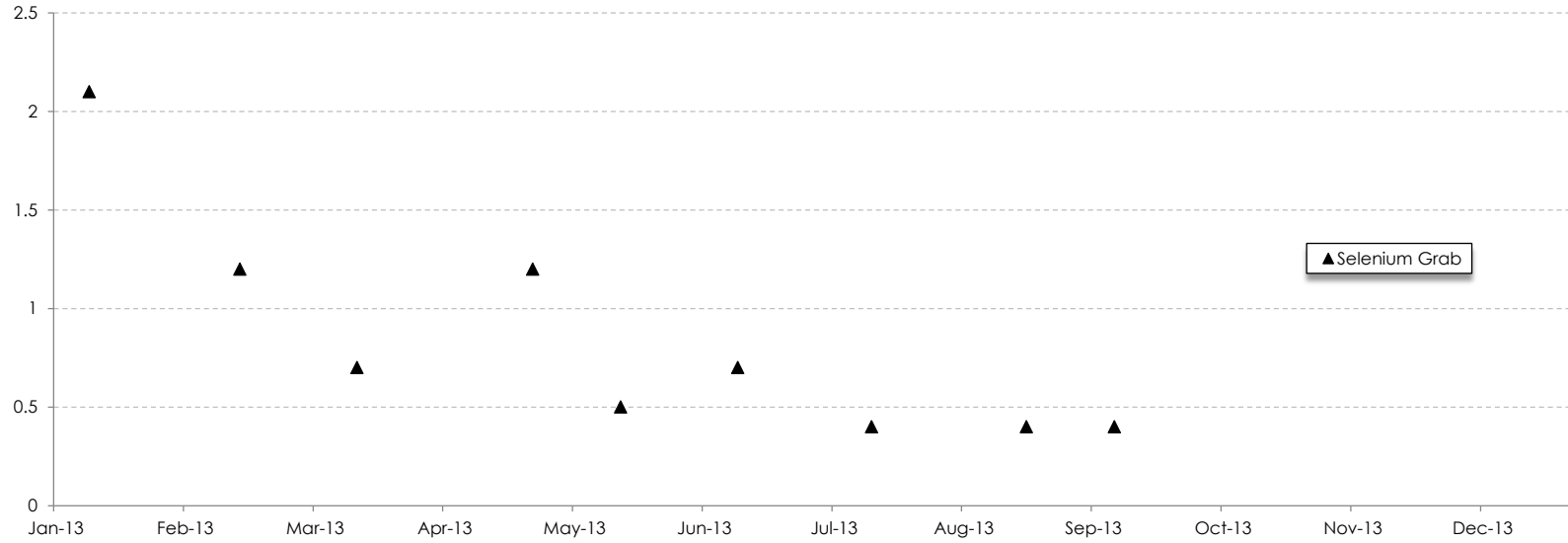
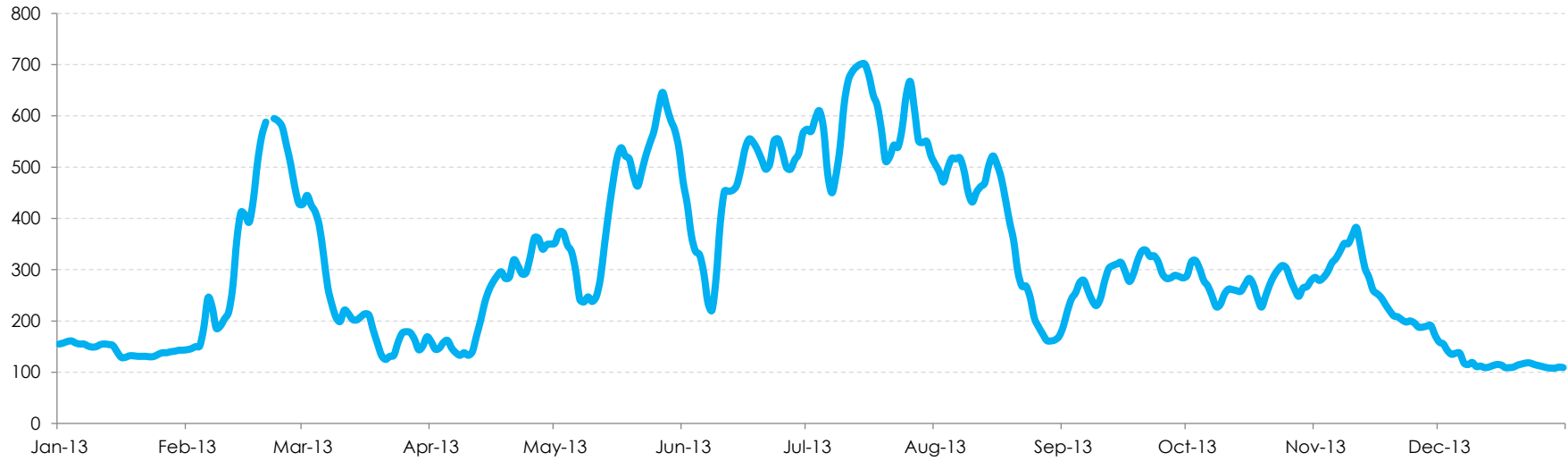


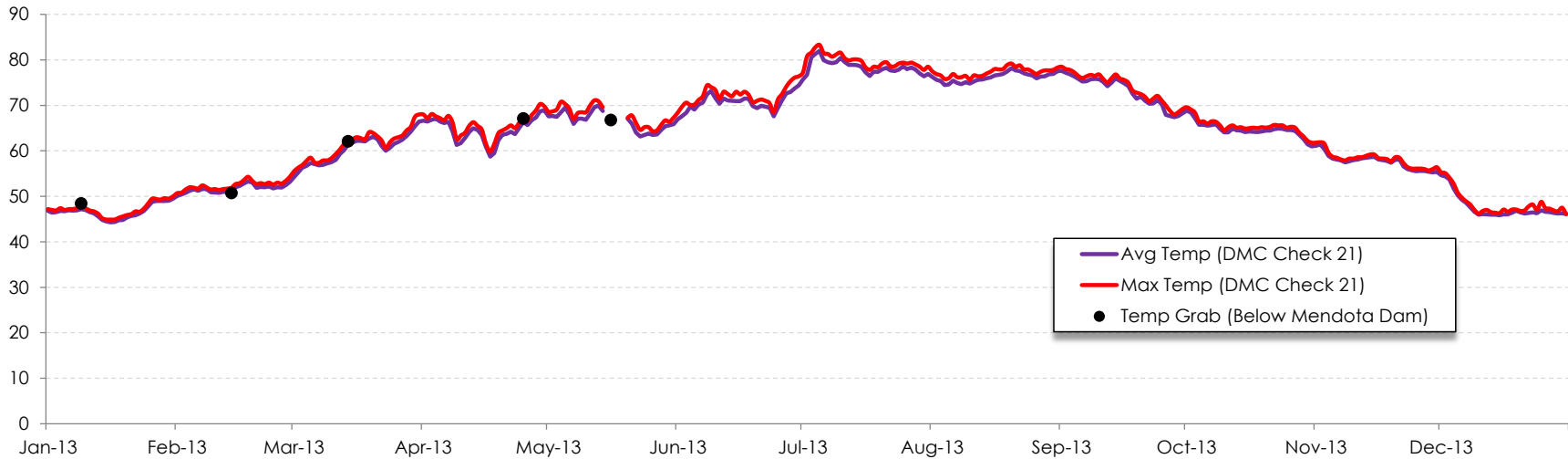
Figure 4e. Mendota Wildlife Management Area  
Selenium Concentration (ug/L)



**Figure 5a. San Joaquin River Below Mendota Dam  
Mean Daily Flow (cfs)**



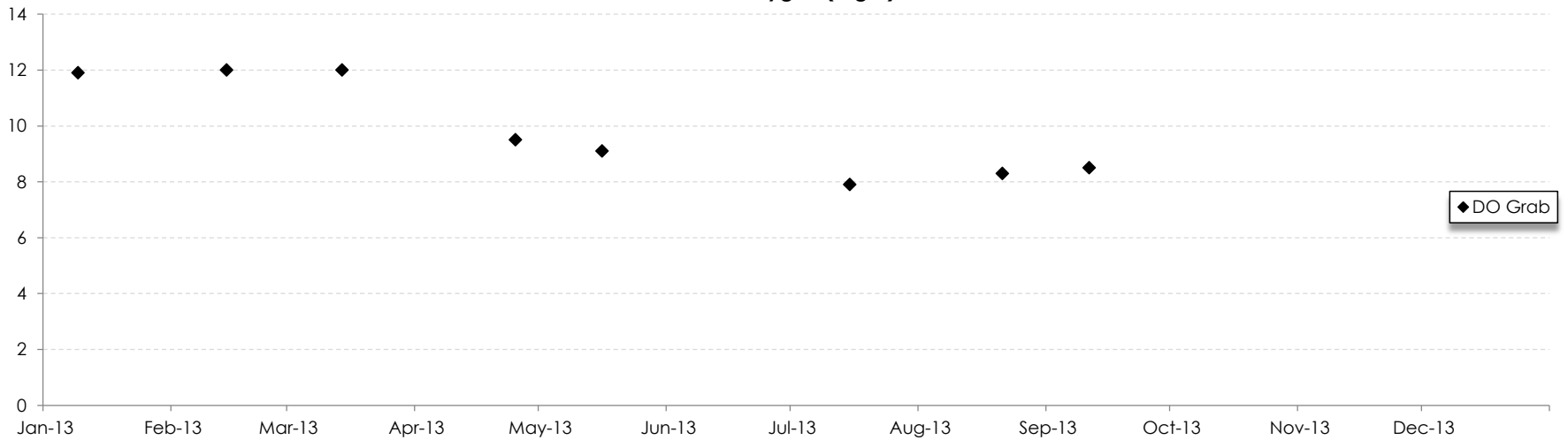
**Figure 5b. DMC Check 21 and San Joaquin River below Mendota Dam  
Temperature (deg F)**



**Figure 5c. San Joaquin River below Mendota Dam  
Electrical Conductivity (uS/cm)**

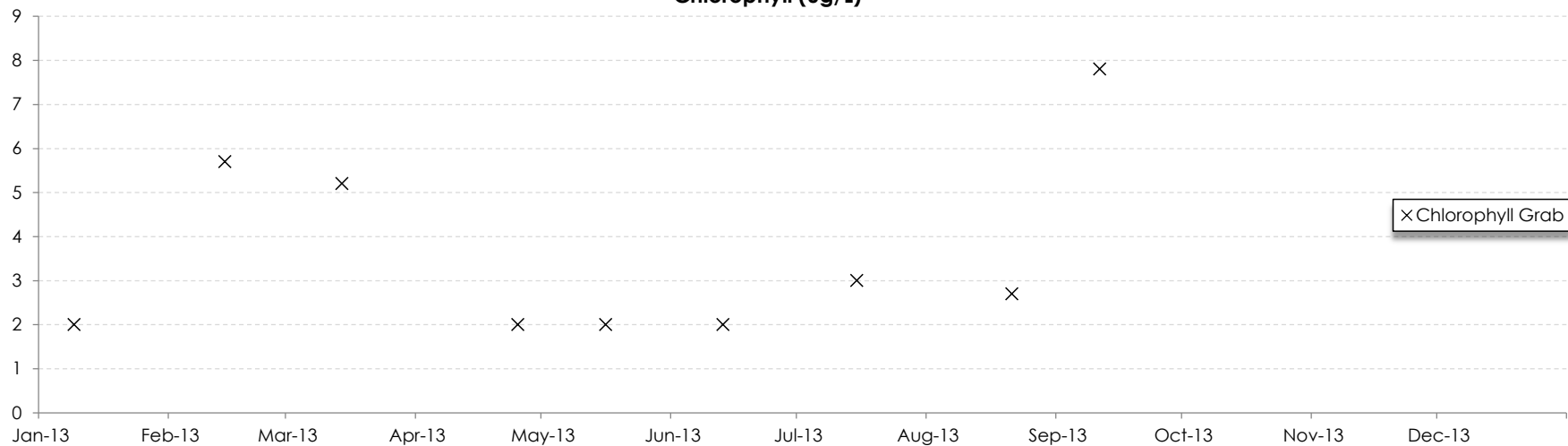


**Figure 5d. San Joaquin River below Mendota Dam  
Dissolved Oxygen (mg/L)**

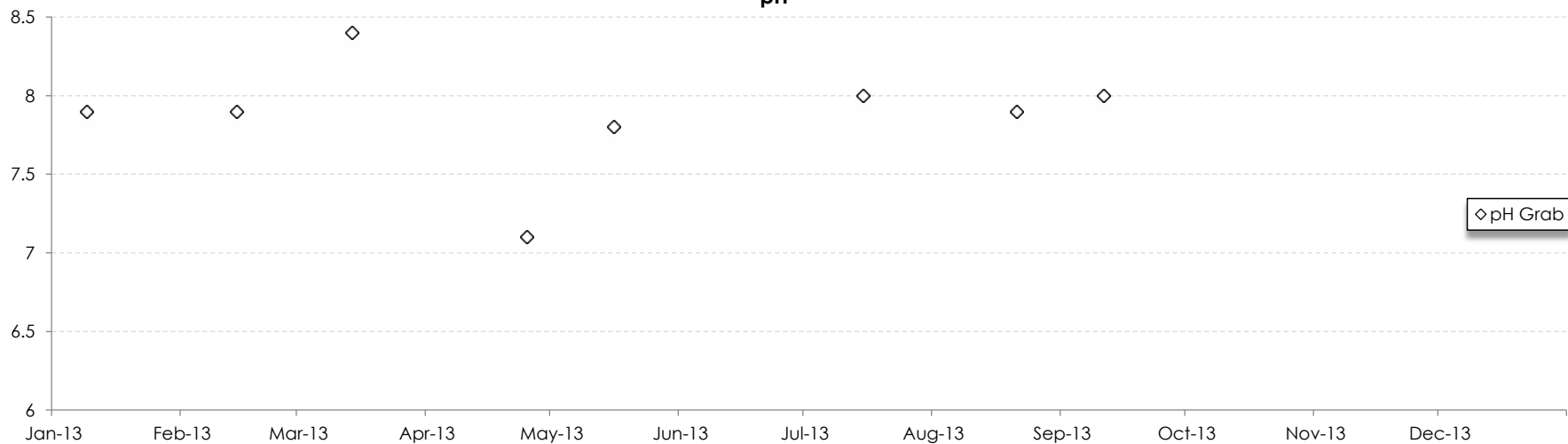




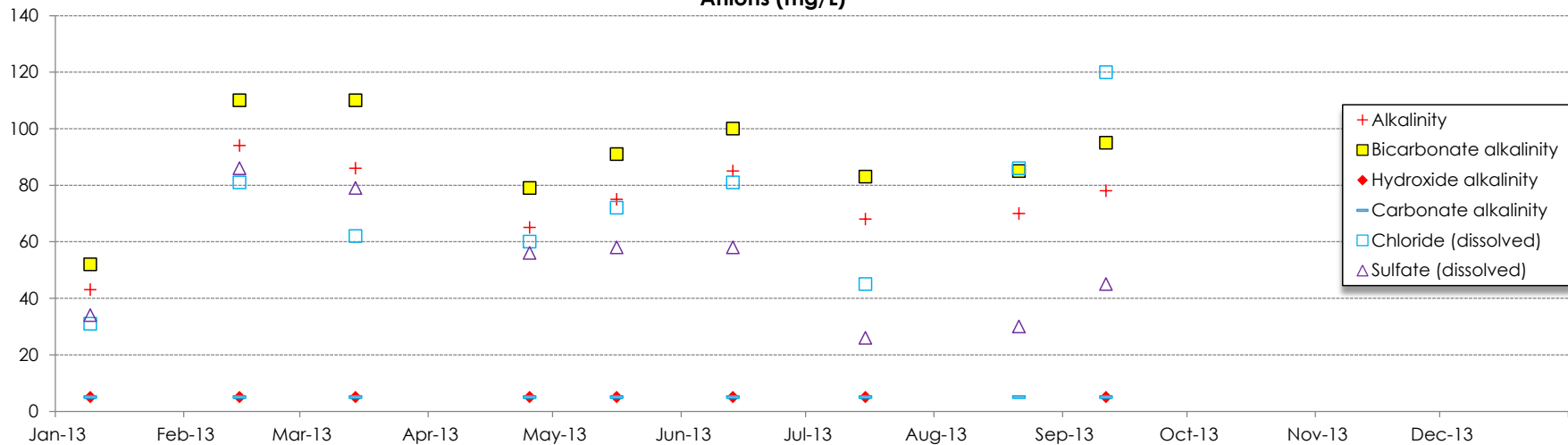
**Figure 5e. San Joaquin River below Mendota Dam  
Chlorophyll (ug/L)**



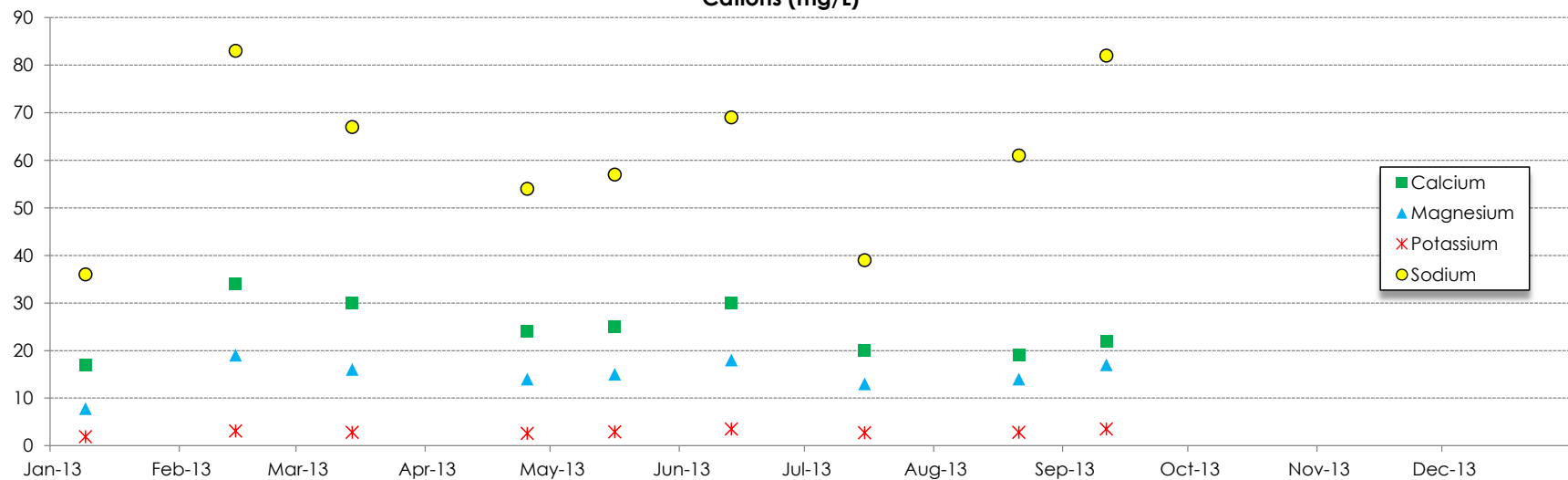
**Figure 5f. San Joaquin River below Mendota Dam  
pH**



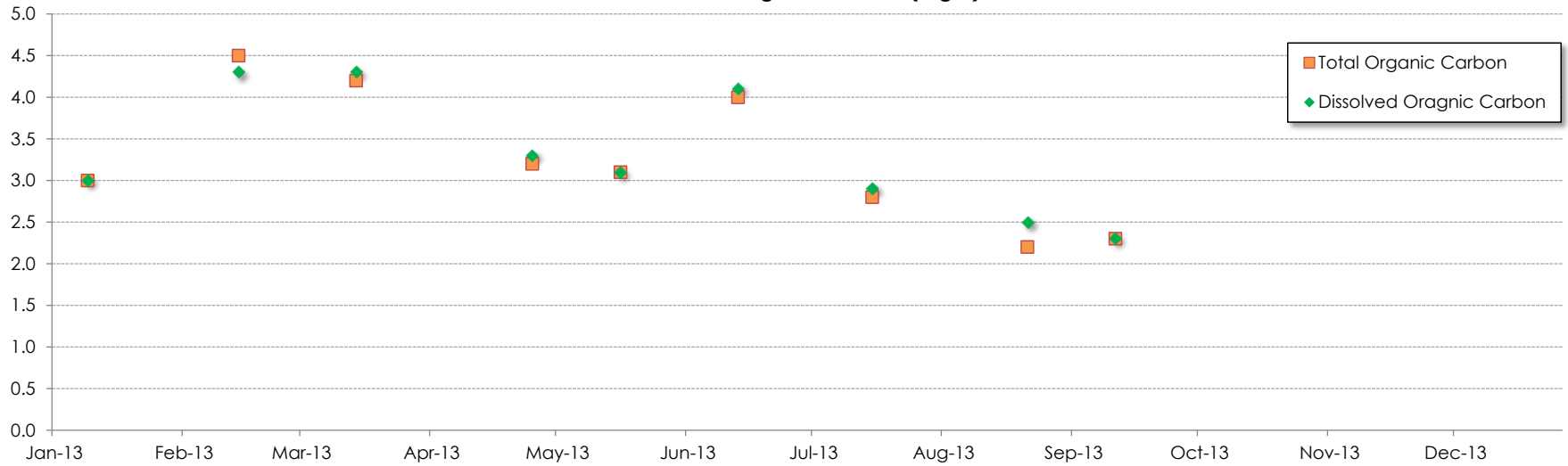
**Figure 5g. San Joaquin River below Mendota Dam  
Anions (mg/L)**



**Figure 5h. San Joaquin River below Mendota Dam  
Cations (mg/L)**



**Figure 5i. San Joaquin River below Mendota Dam  
Dissolved & Total Organic Carbon (mg/L)**



**Figure 5j. San Joaquin River below Mendota Dam  
Nutrients (mg/L)**

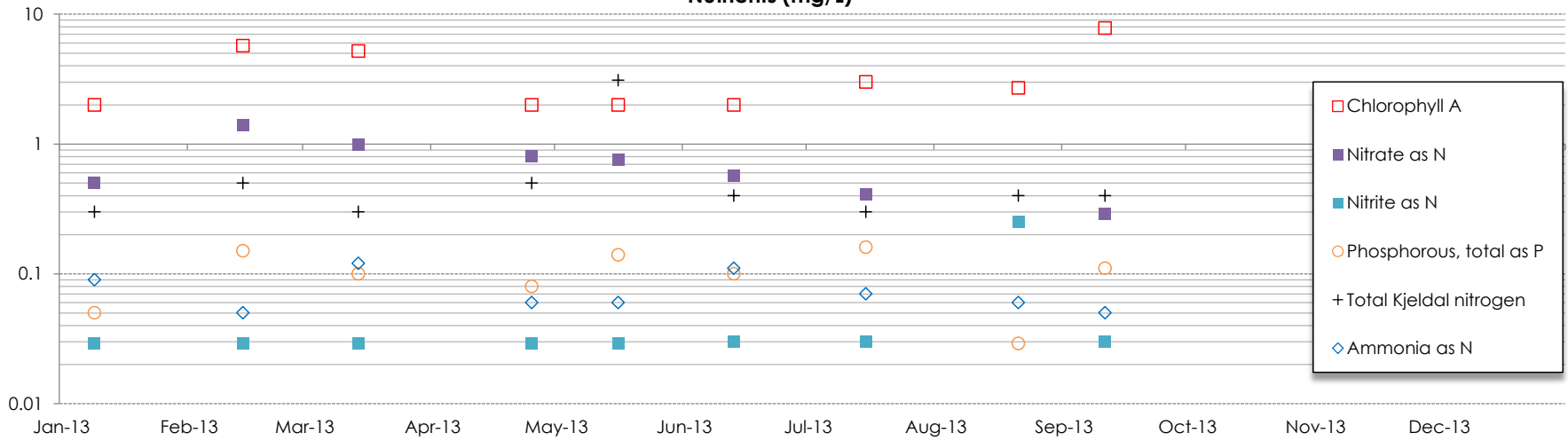


Figure 5k. San Joaquin River below Mendota Dam  
Trace Metals (ug/L)

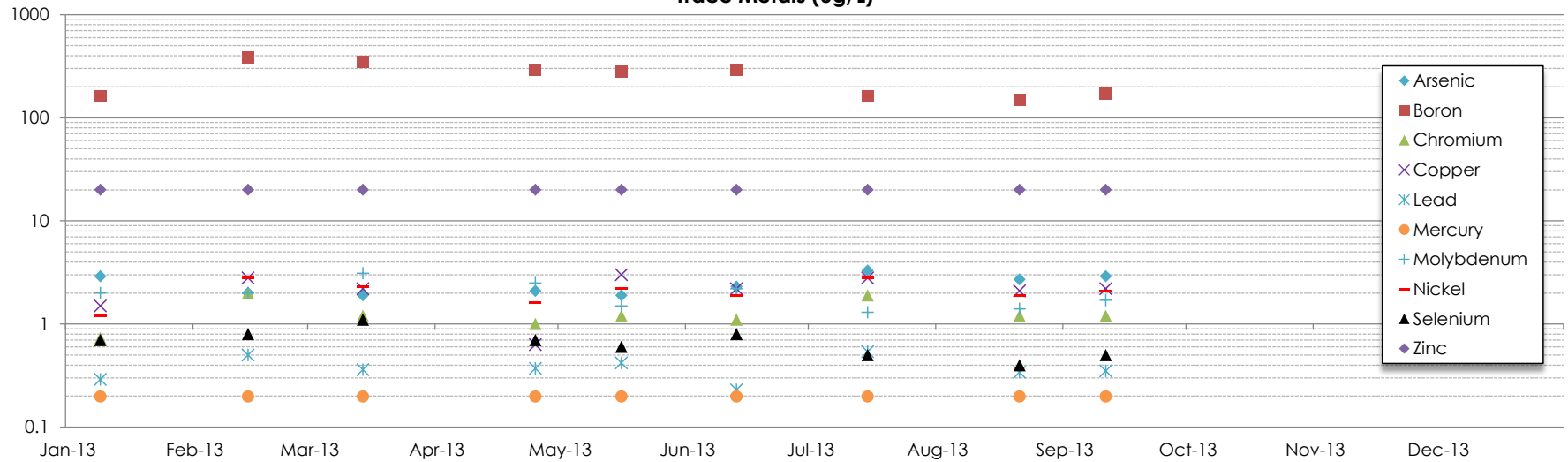


Figure 6a. San Joaquin River at Sack Dam (SDP) and Washington Road (SWA)  
Mean Daily Flow (cfs)

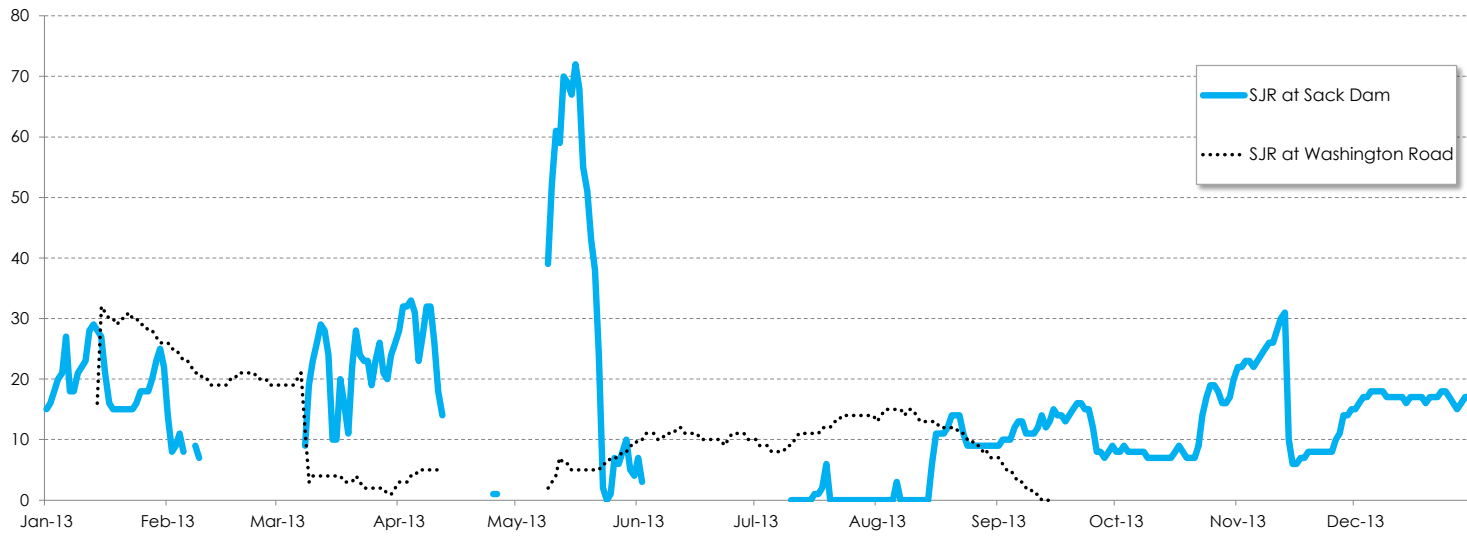


Figure 6b. San Joaquin River at Washington Road (SWA)  
Temperature (deg F)

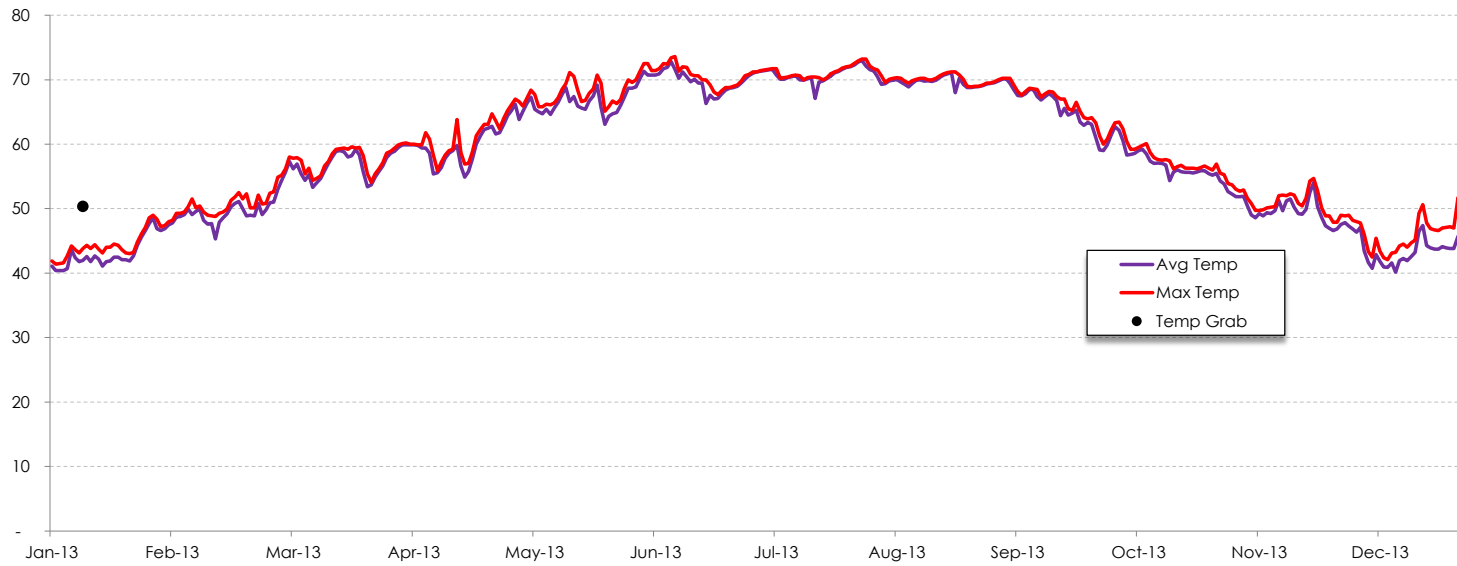


Figure 6c. San Joaquin River at Washington Road (SWA)  
Mean Daily Electrical Conductivity (uS/cm)



Figure 6d. San Joaquin River at Washington Road (SWA)  
Dissolved Oxygen (mg/L)

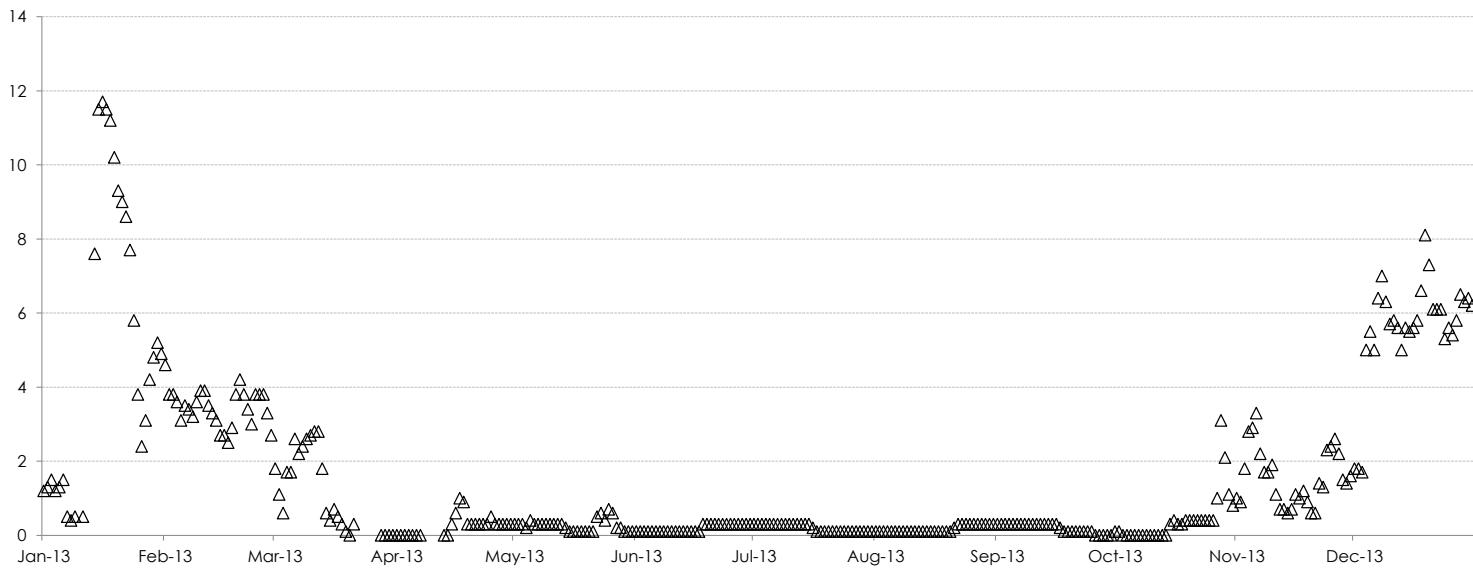


Figure 6e. San Joaquin River at Washington Road (SWA)  
Chlorophyll (ug/L)

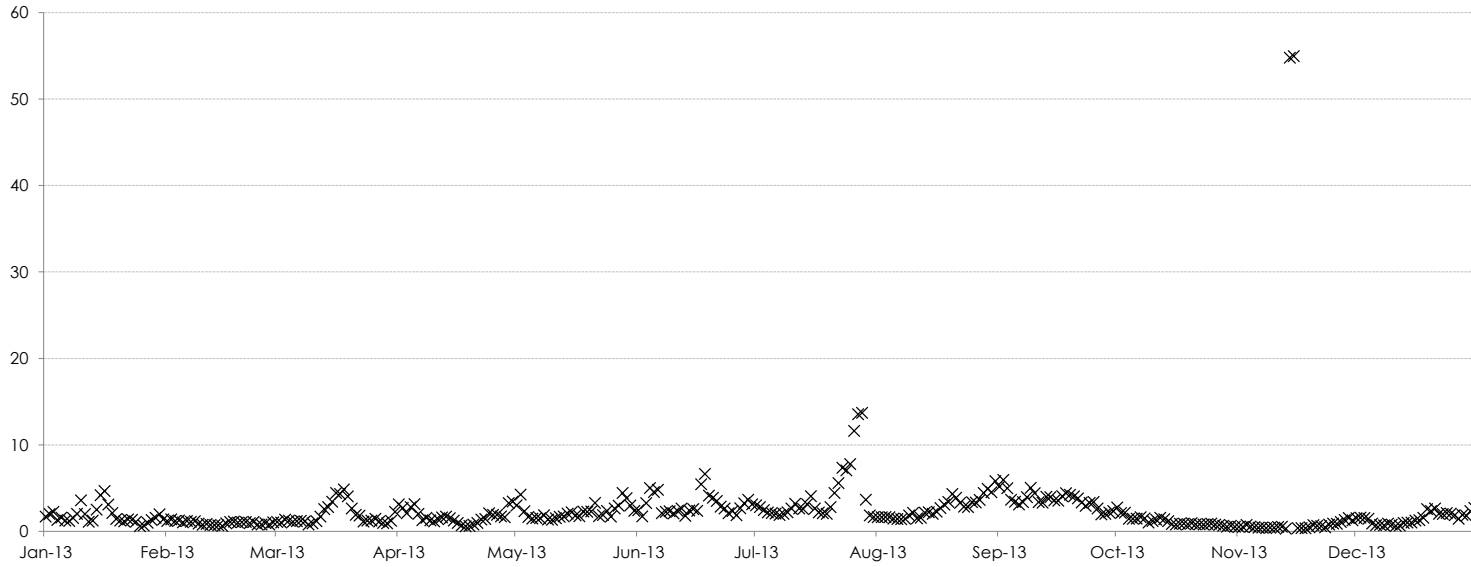


Figure 6f. San Joaquin River at Washington Road (SWA)  
pH

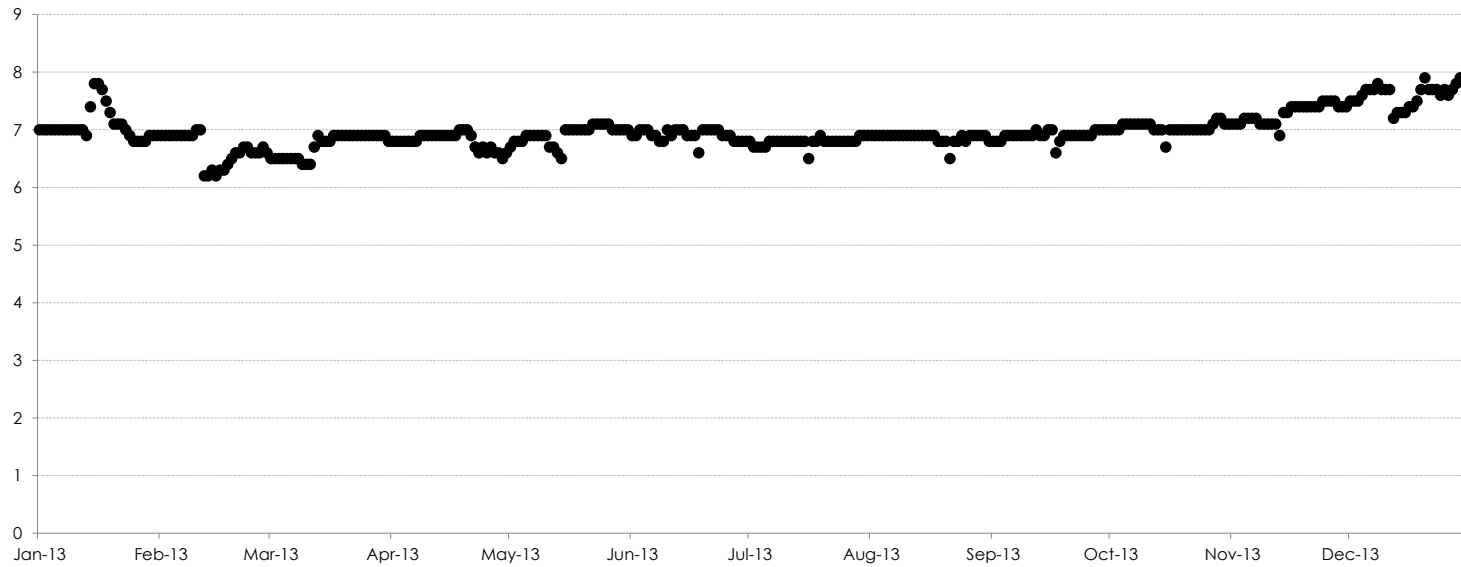


Figure 6g. San Joaquin River at HWY 152  
Anions (mg/L)

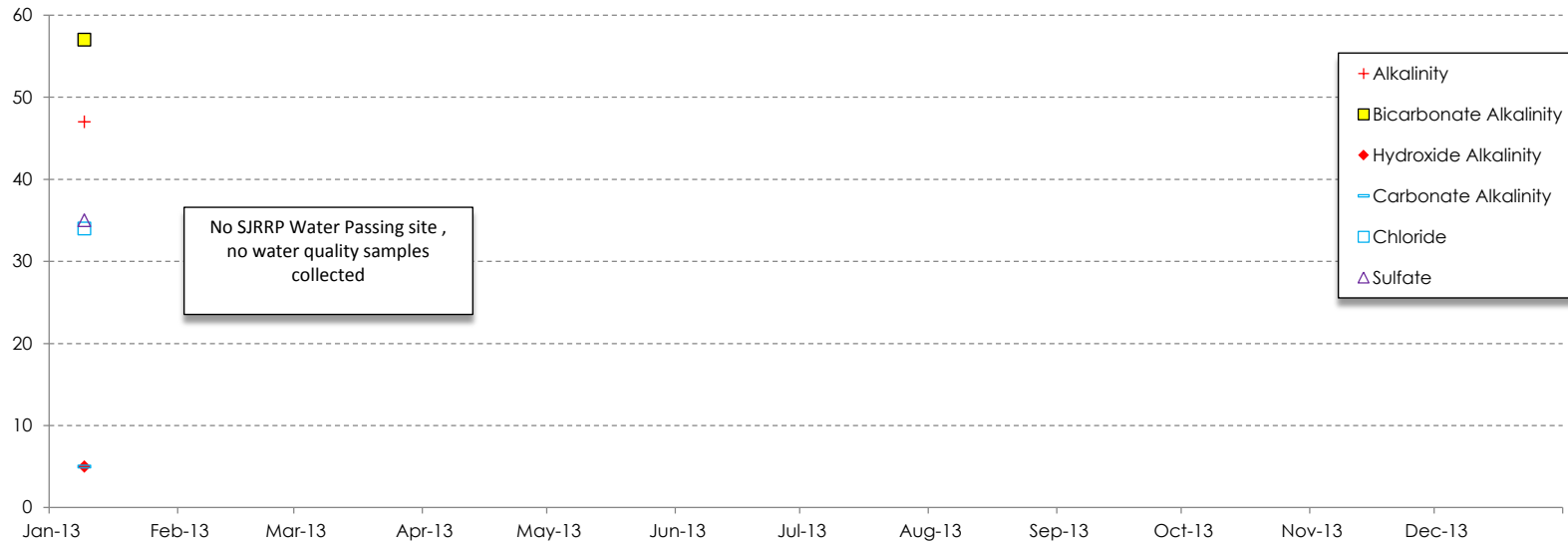
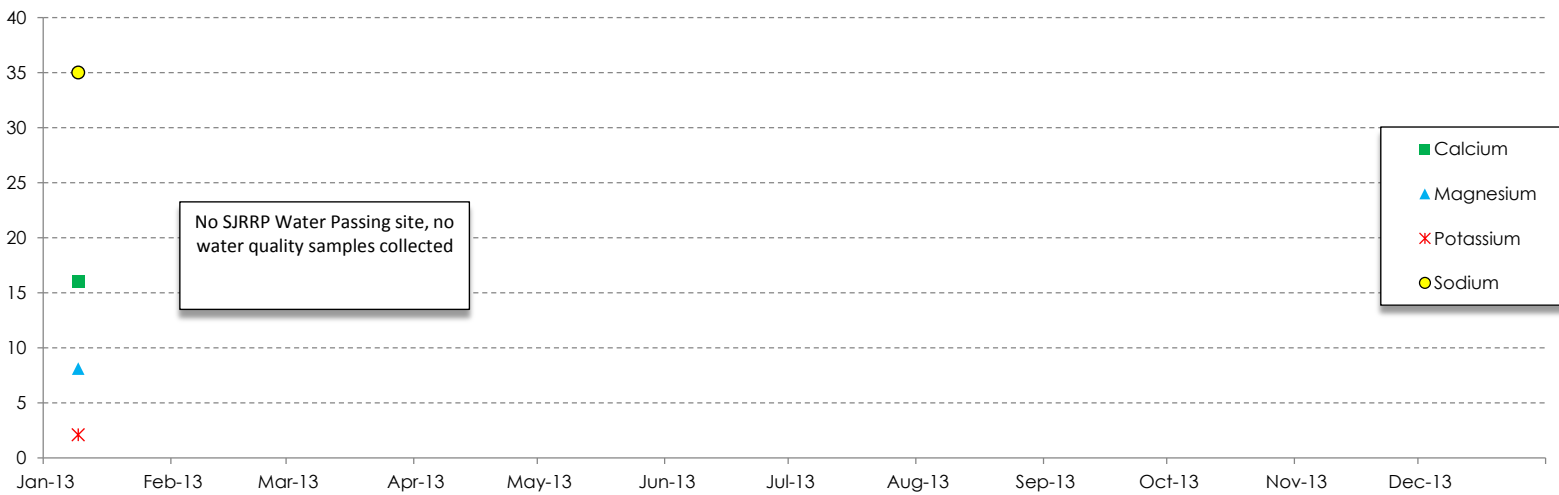


Figure 6h. San Joaquin River at HWY 152  
Cations (mg/L)





**Figure 6i. San Joaquin River at HWY 152  
Dissolved and Total Organic Carbon (mg/L)**



**Figure 6j. San Joaquin River at HWY 152  
Nutrients (mg/L)**

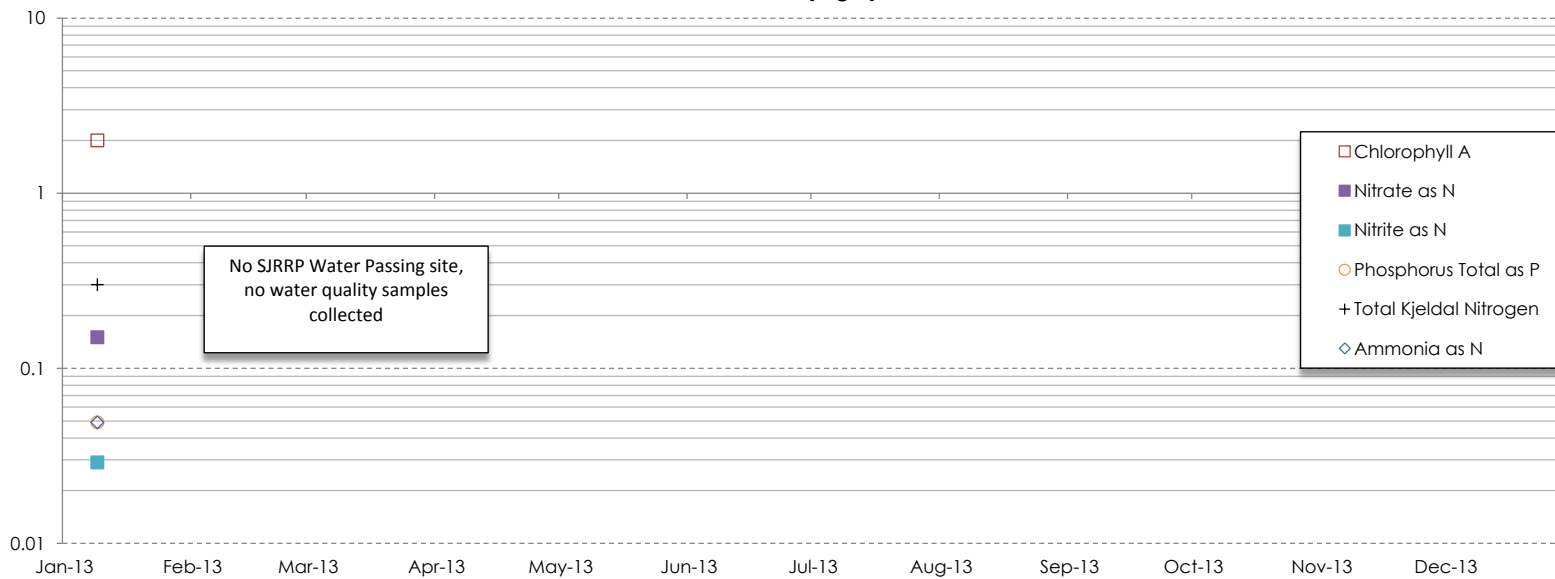
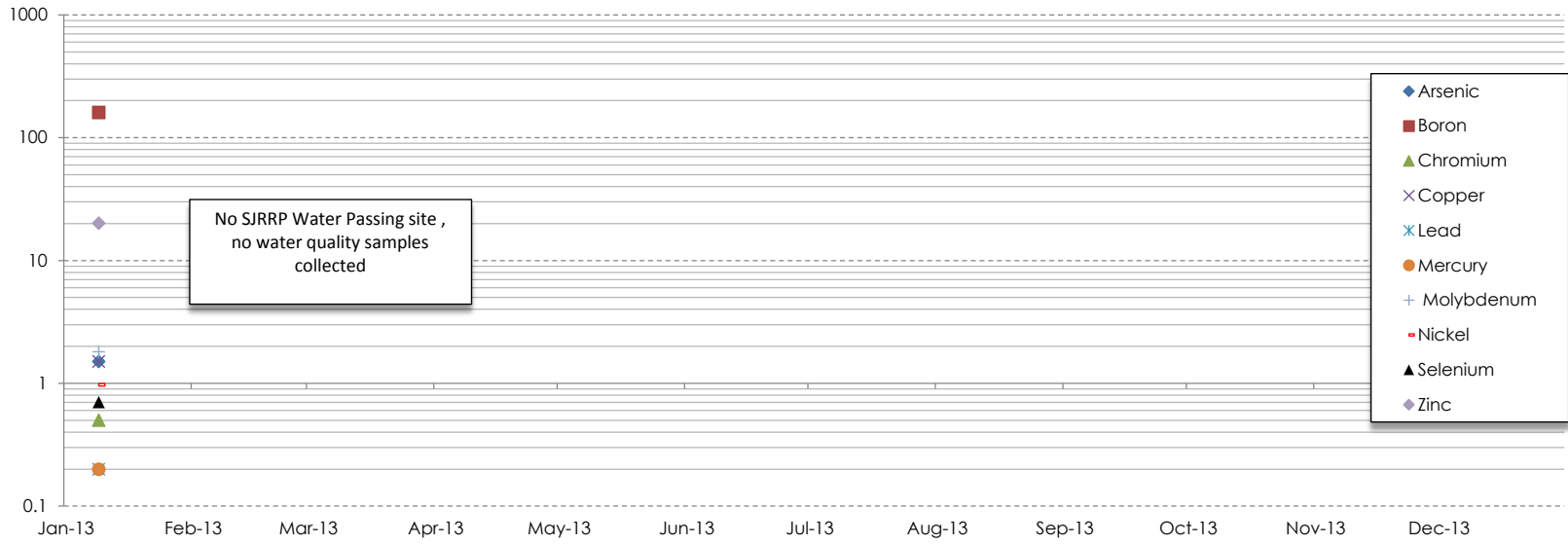
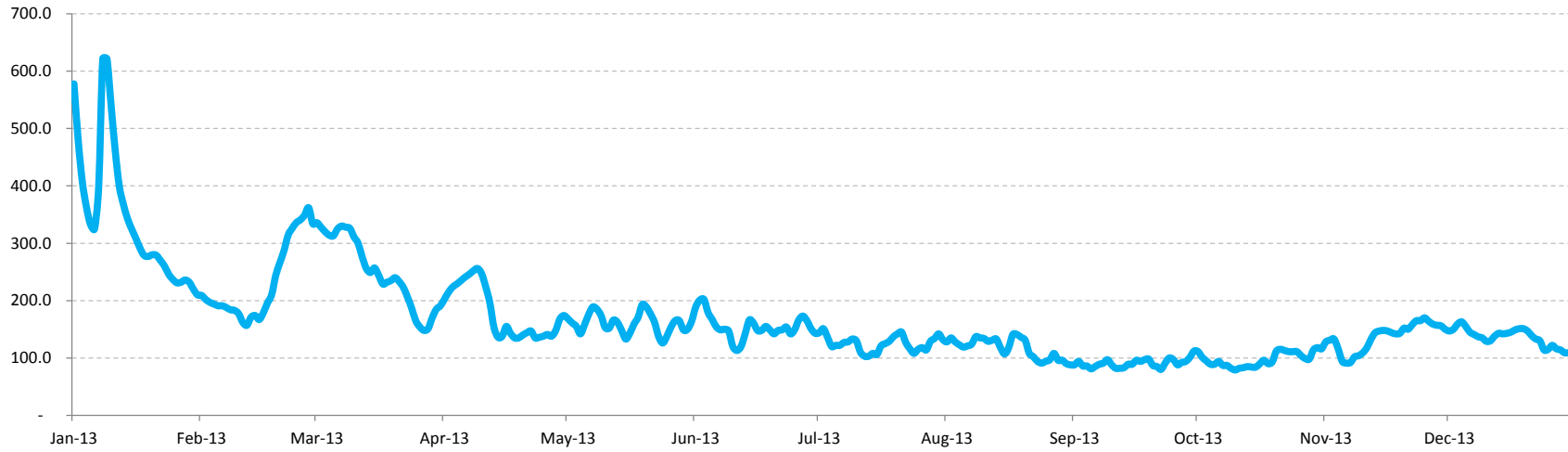


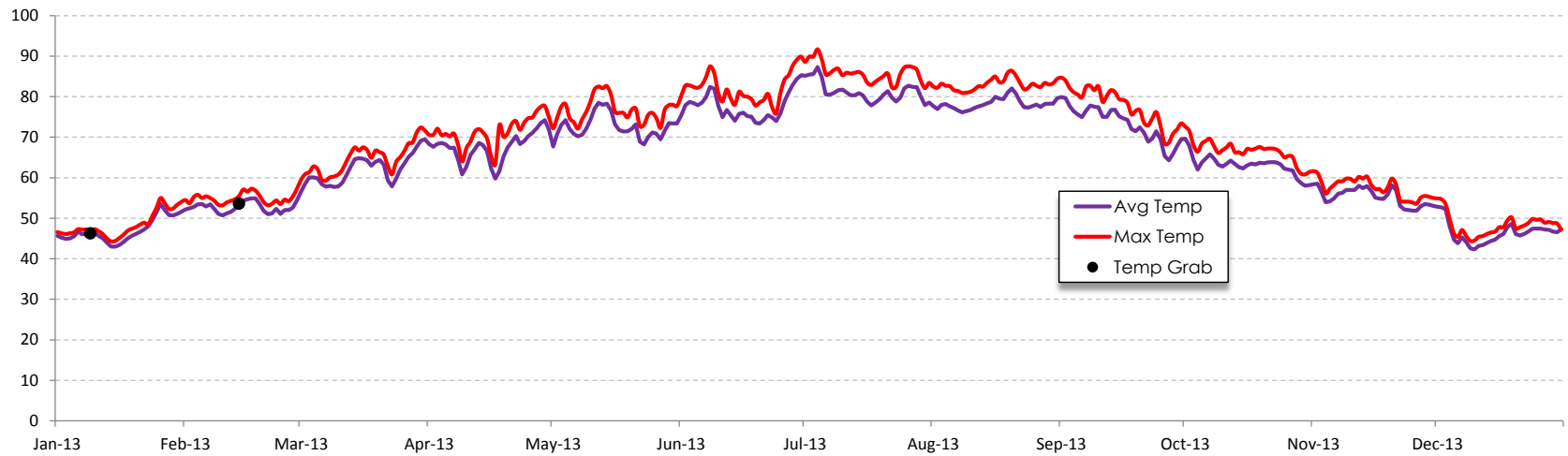
Figure 6k. San Joaquin River at HWY 152  
Trace Elements (ug/L)



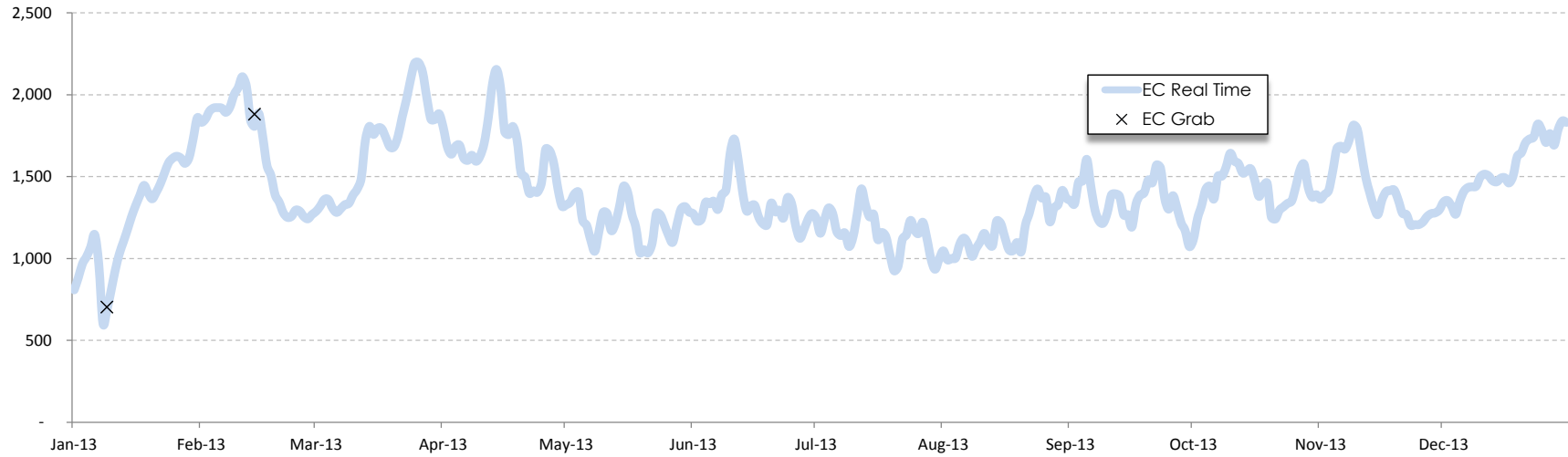
**Figure 7a. San Joaquin River at Fremont Ford  
Mean Daily Flow (cfs)**



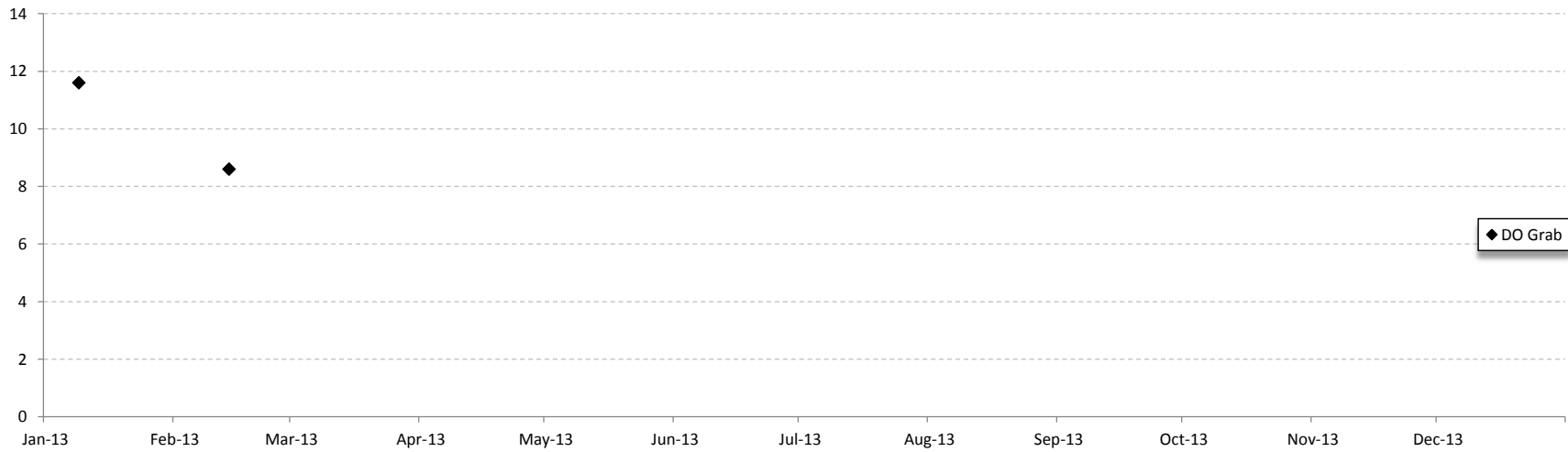
**Figure 7b. San Joaquin River at Fremont Ford  
Temperature (Deg F)**



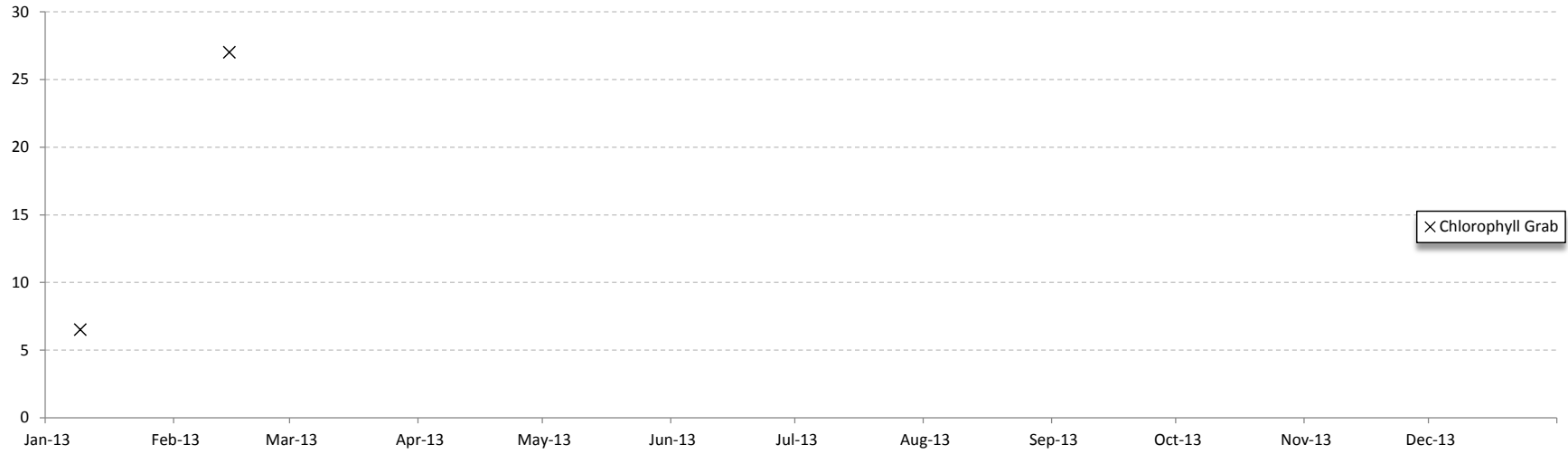
**Figure 7c. San Joaquin River at Fremont Ford  
Mean Daily Electrical Conductivity (uS/cm)**



**Figure 7d. San Joaquin River at Fremont Ford  
Dissolved Oxygen (mg/L)**



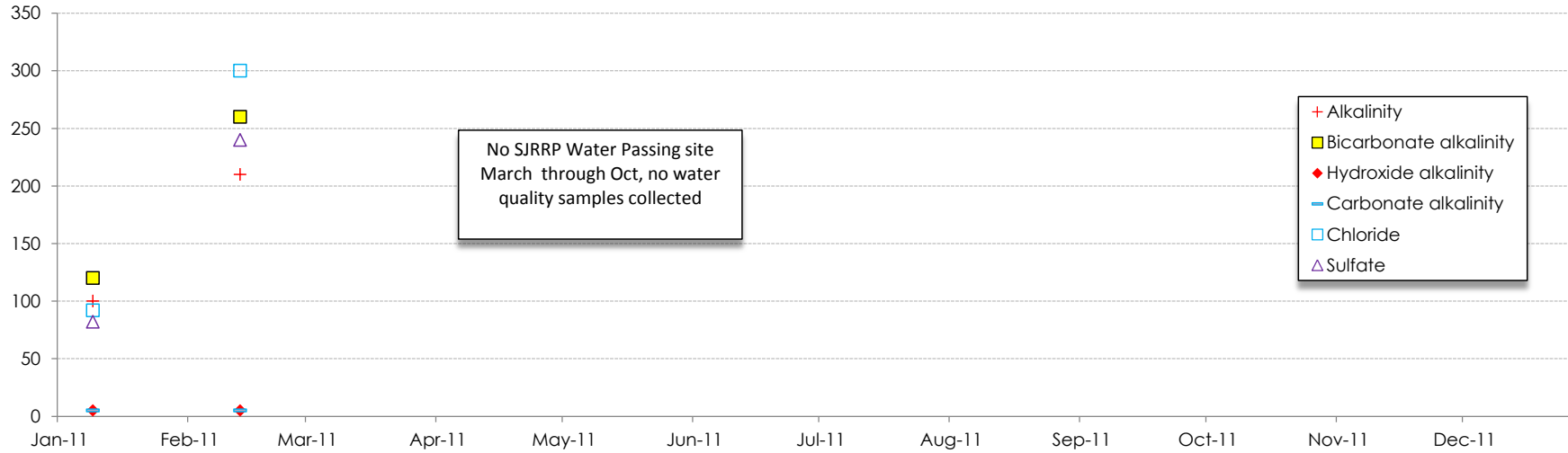
**Figure 7e. San Joaquin River at Fremont Ford  
Chlorophyll (ug/L)**



**Figure 7f. San Joaquin River at Fremont Ford  
pH**



**Figure 7g. San Joaquin River at Fremont Ford  
Anions (mg/L)**



**Figure 7h. San Joaquin River at Fremont Ford  
Cations (mg/L)**

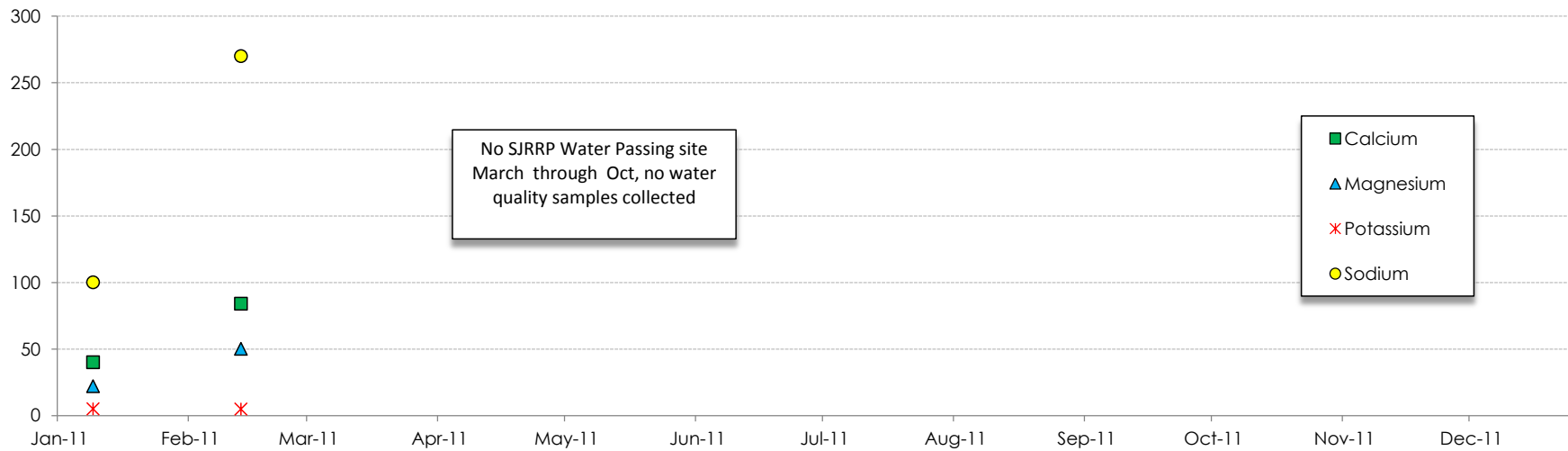
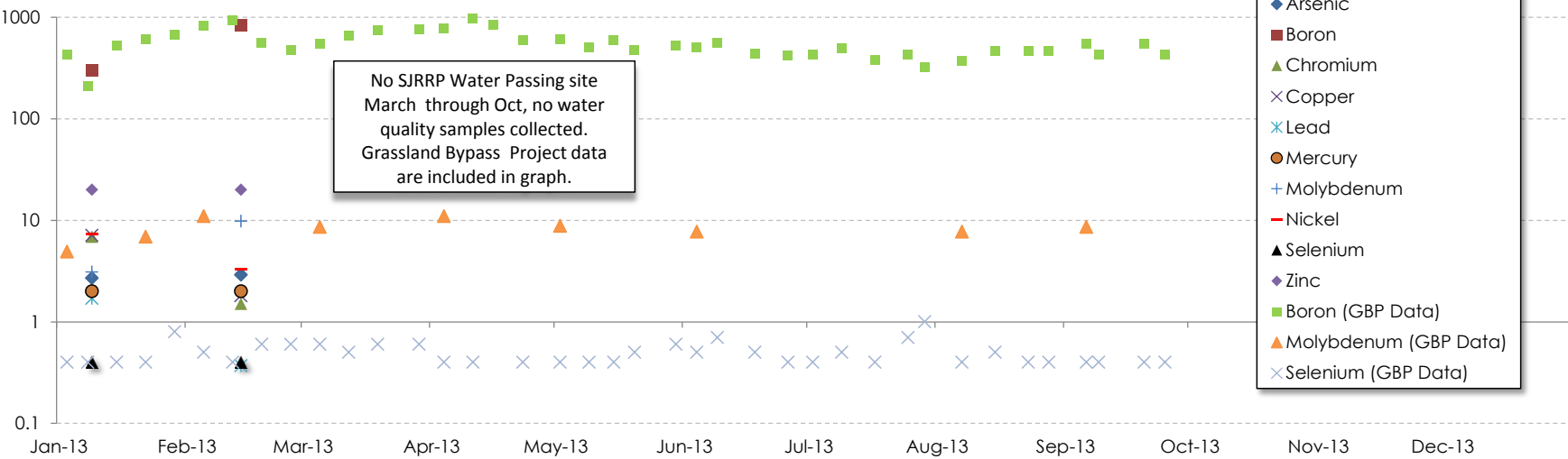


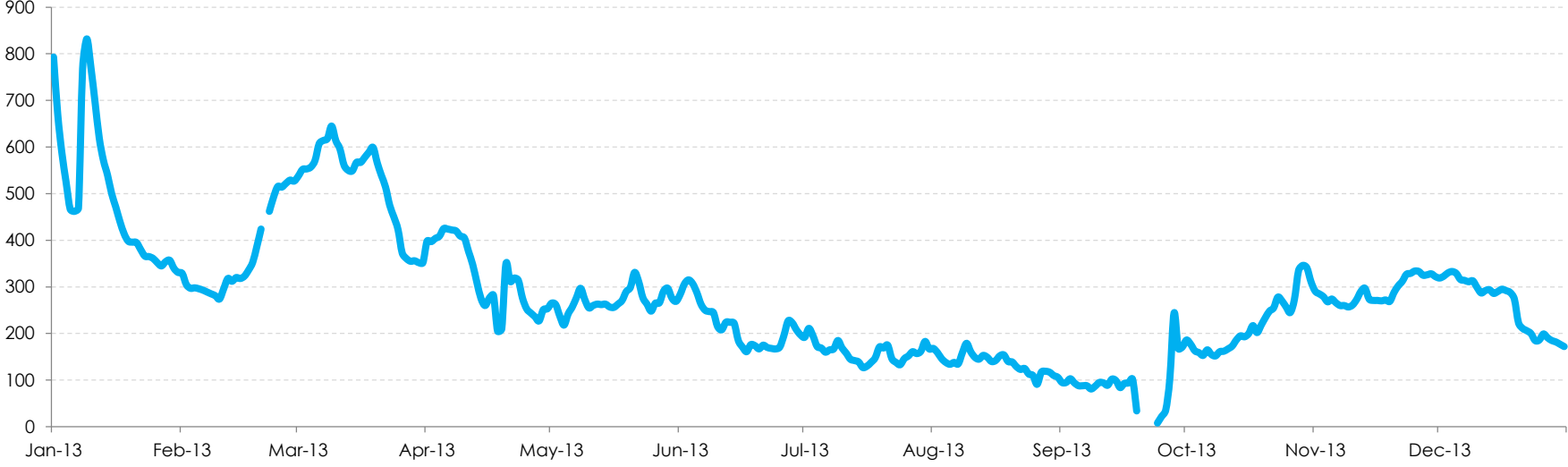


Figure 7k. San Joaquin River at Fremont Ford  
Trace Metals (ug/L)

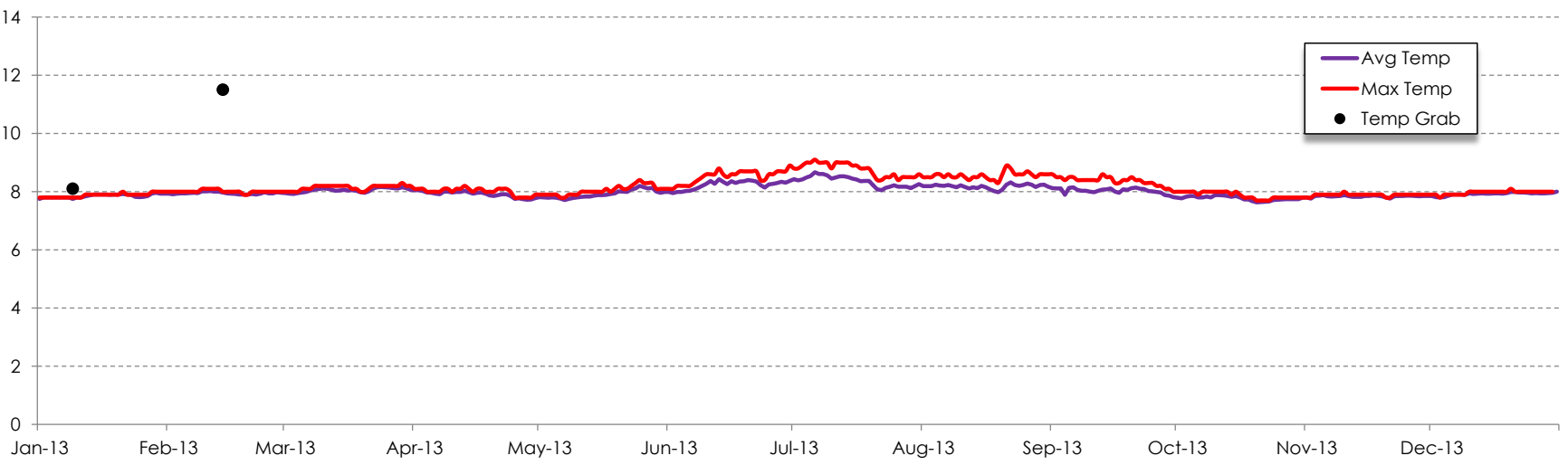




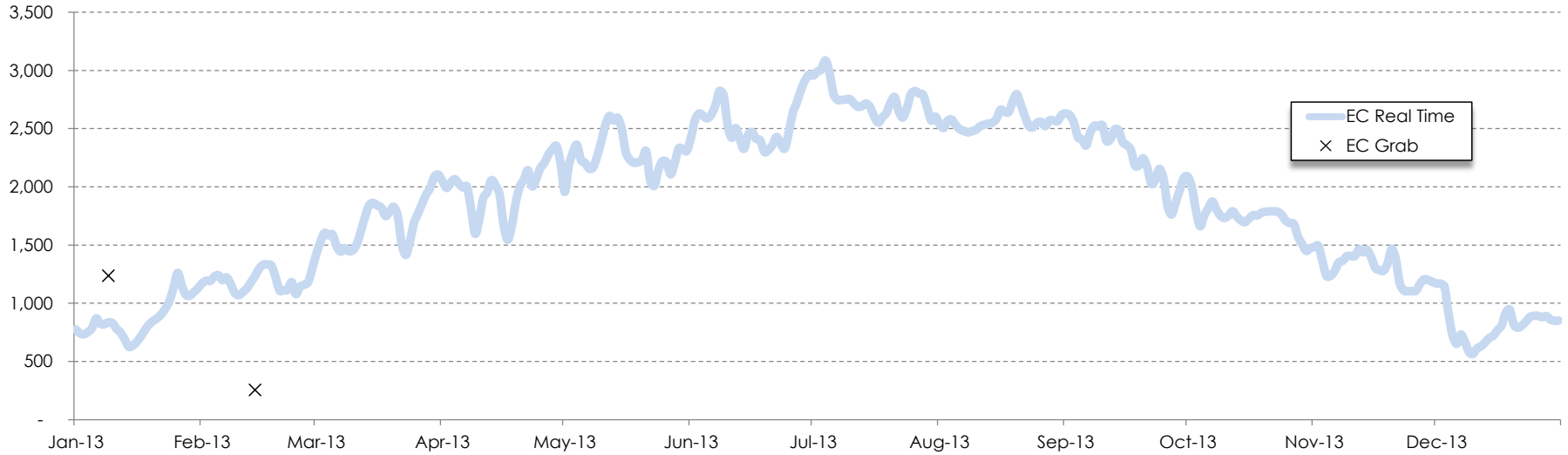
**Figure 8a. San Joaquin River at Hills Ferry  
Mean Daily Flow (cfs)**



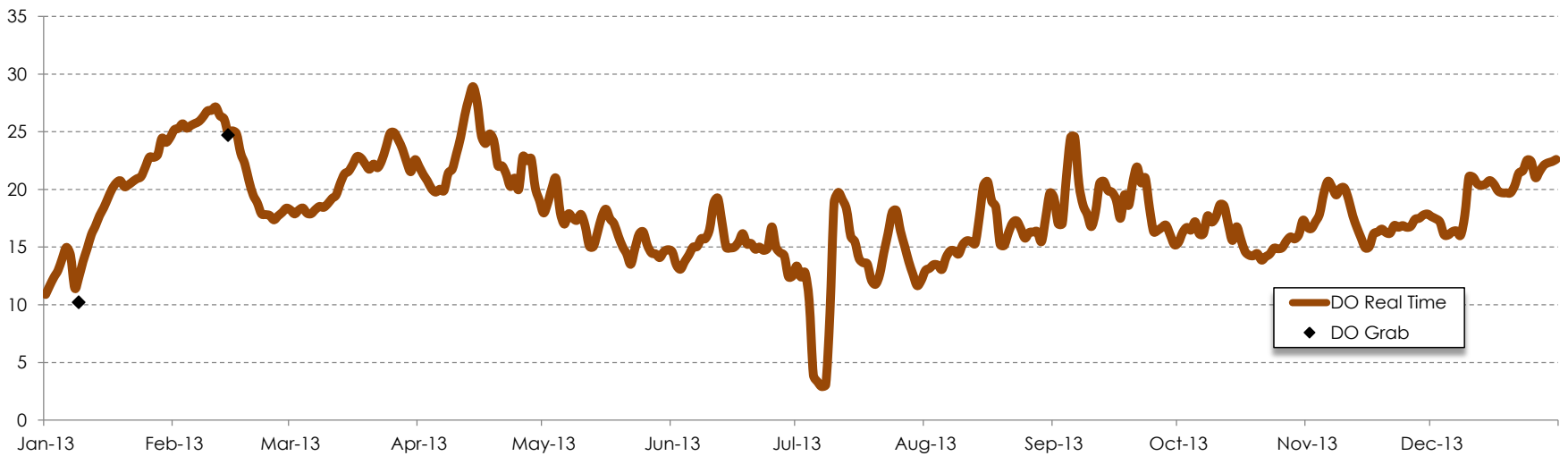
**Figure 8b. San Joaquin River at Hills Ferry  
Temperature (Deg C)**



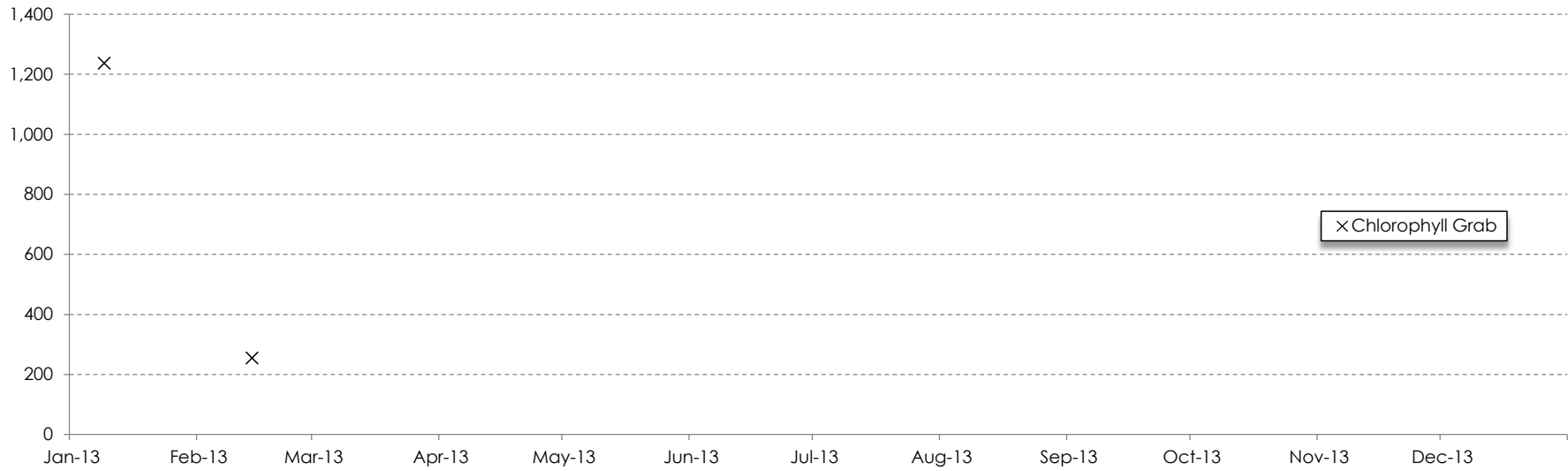
**Figure 8c. San Joaquin River at Hills Ferry  
Mean Daily Electrical Conductivity (uS/cm)**



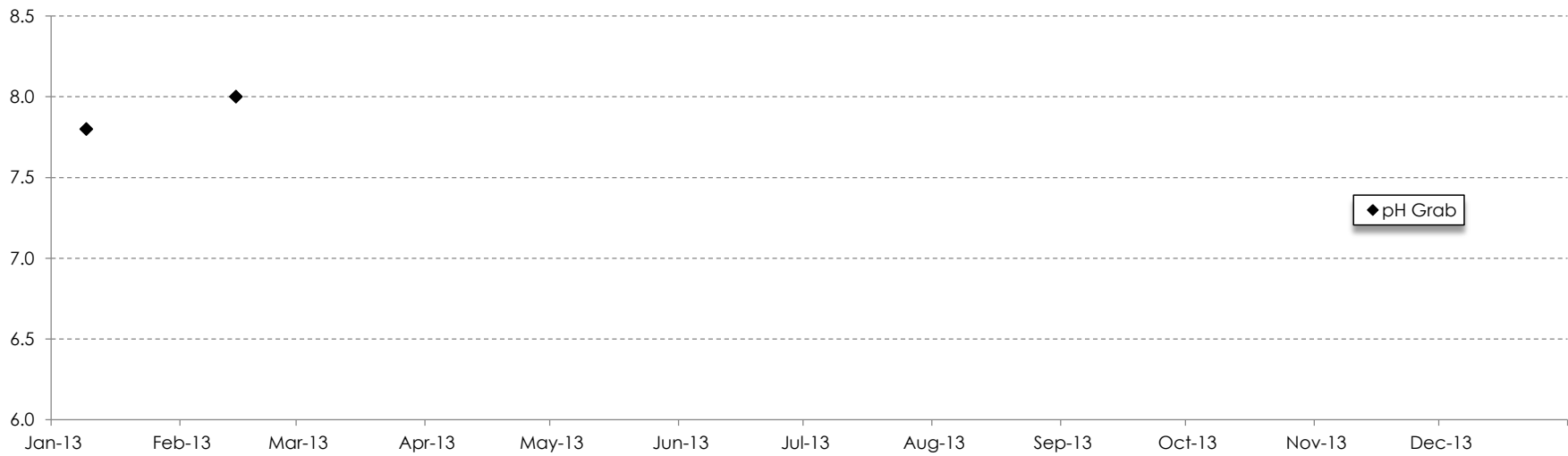
**Figure 8d. San Joaquin River at Hills Ferry  
Mean Daily Dissolved Oxygen (mg/L)**



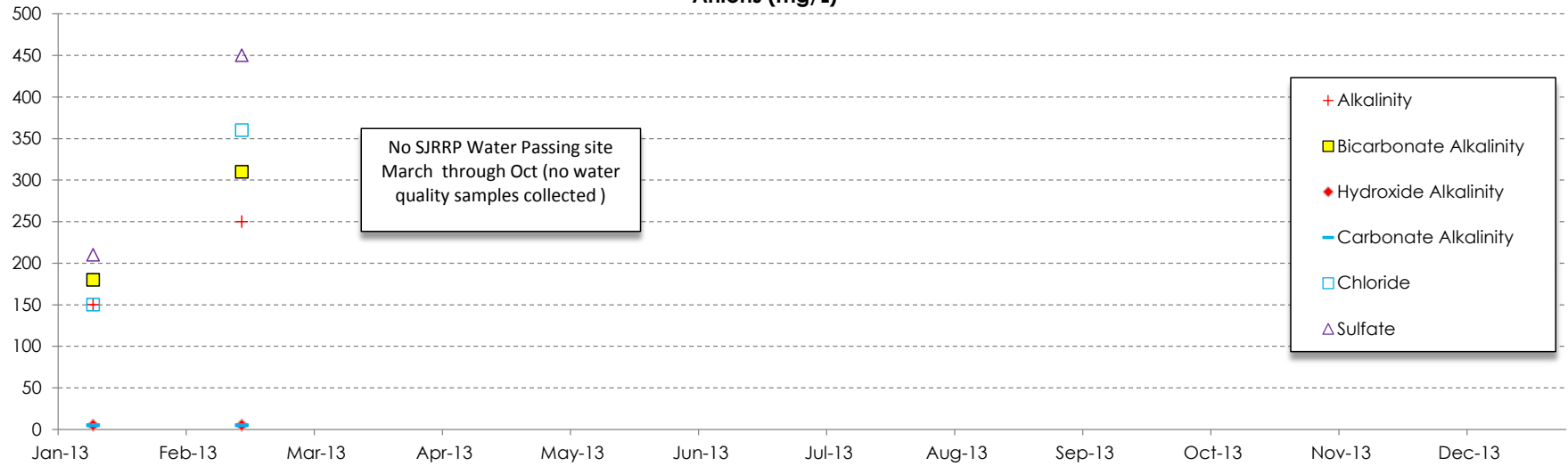
**Figure 8e. San Joaquin River at Hills Ferry  
Chlorophyll (ug/L)**



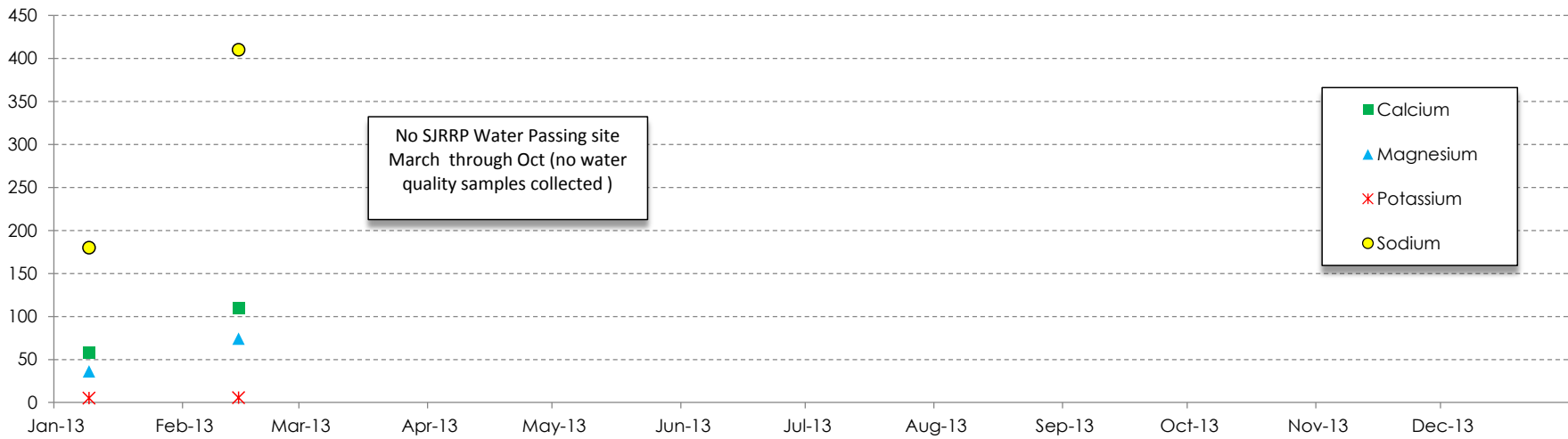
**Figure 8f. San Joaquin River at Hills Ferry  
pH**



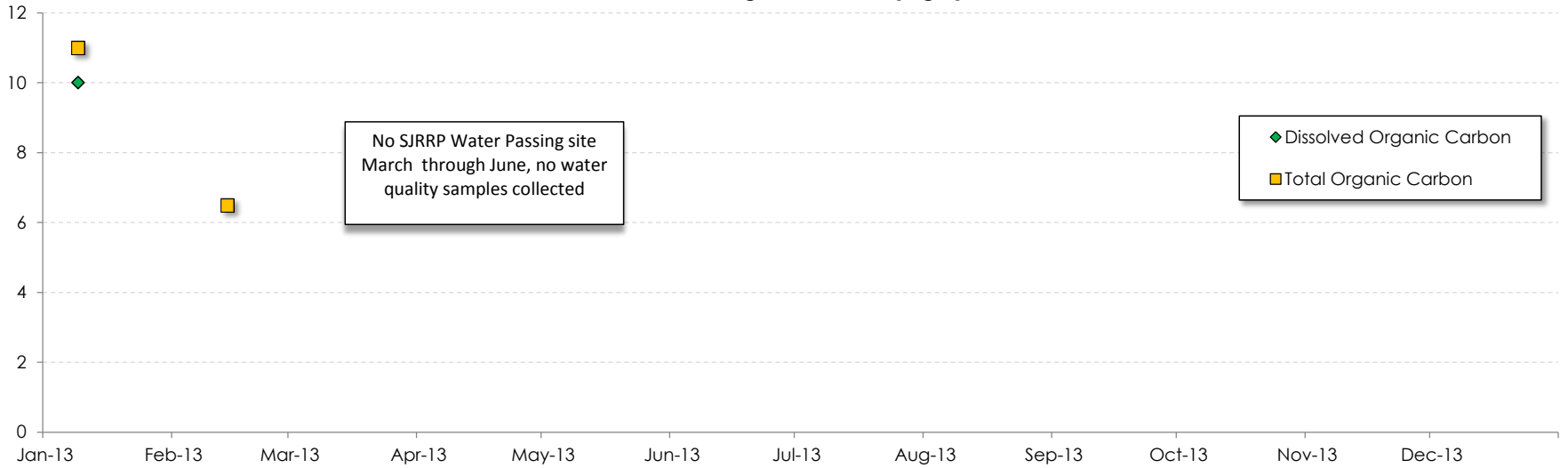
**Figure 8g. San Joaquin River at Hills Ferry  
Anions (mg/L)**



**Figure 8h. San Joaquin River at Hills Ferry  
Cations (mg/L)**



**Figure 8i. San Joaquin River at Hills Ferry  
Dissolved & Total Organic Carbon (mg/L)**



**Figure 8j. San Joaquin River at Hills Ferry  
Nutrients (mg/L)**



