

2018 EMP Discrete Water Quality Summary Report

Introduction:

To analyze discrete water quality trends from 2018, the EMP stations were grouped and averaged into six regions: San Pablo Bay, Grizzly and Suisun Bay, Confluence, Central Delta, Southern Interior Delta, and Northern Interior Delta. Water year 2018 was classified as Below Average in the Sacramento Valley and San Joaquin Valley, unlike the previous year, which was California's second-wettest year of record. To visualize these differences, the averaged six regions from 2018 were compared to the same averaged data from 2017. Table 1 describes how the stations were grouped, including the associated parameters and enhancements added in 2017.

Specific Conductance (Figure 1):

Specific conductance varied greatly in 2018 across EMP sampling regions with the highest levels occurring in the western regions (San Pablo Bay, Suisun Bay and Grizzly Bay and Confluence) where water from the Pacific Ocean has the strongest influence. Averaged specific conductance ranged from 148 (Confluence, April) to 40,082 (San Pablo Bay, November) $\mu\text{S}/\text{cm}$ in the western regions during 2018. Specific conductance had a smaller range of variation across sites in the interior delta regions (Central Delta, Northern Interior Delta, and Southern Interior Delta) and ranged from 108 (Northern Interior Delta, April) to 1468 (Northern Interior Delta, November) $\mu\text{S}/\text{cm}$.

In comparison to 2018, 2017 had lower specific conductance values in most regions, which was likely due to increased precipitation and runoff during a record-breaking wet year, keeping the Bay-Delta fresher throughout the year.

Turbidity (Figure 2):

Turbidity values ranged from 1.5 NTU (Central Delta, October) to 45.4 NTU (Grizzly and Suisun Bays, May) during 2018. The year 2017 had much higher levels of turbidity, especially in the northern and western regions when rain and snowpack runoff occurred more frequently and to a much larger degree in the watershed.

Dissolved Ammonia (Figure 3):

Dissolved ammonia levels in 2018 ranged from 0.03 mg/L (Southern Interior, June) to 0.72 mg/L (Northern Interior Delta, November). Dissolved ammonia levels are typically higher at C3A in the Northern Interior Delta due to its location downstream of the effluent discharge from Sacramento Regional Sanitation District. The Northern Interior Delta experienced a period of elevated dissolved ammonia concentrations in November 2018 than compared to historical levels, which was supported by other interagency investigations. Ammonia levels are typically lower throughout the Delta and Bays, likely due to dilution and nitrification.

Chlorophyll *a* (Figure 4):

The highest levels of chlorophyll *a* were observed during late spring or summer in most regions in 2018. The western regions (San Pablo, Grizzly and Suisun Bays, and Confluence) experienced the highest levels of chlorophyll *a* during spring. The Southern Interior Delta region experienced elevated levels of chlorophyll *a* during summer and early fall, with the highest value reaching 24.1 $\mu\text{g}/\text{L}$ (July). This time of

year typically has increased temperatures and decreased flow to allow for increased phytoplankton production. More information about the phytoplankton genera is described in the phytoplankton section.

Nitrate+nitrite (Figure 5):

Dissolved nitrate + nitrite values ranged from 0.12 mg/L (Northern Interior Delta, April) to 1.3 mg/L (Southern Interior Delta, December) in 2018. The Southern Interior Delta region had the highest fluctuation of nitrate and nitrite concentrations and had the highest levels compared to the rest of the Bay-Delta, likely due to influence from nearby agricultural land use and wastewater treatment effluent.

Total phosphorus (Figure 6):

In 2018, total phosphorous levels ranged from 0.04 mg/L (Northern Interior Delta, April) to 0.20 mg/L (Southern Interior Delta, September). The Southern Interior typically has the highest levels of total phosphorous due to nearby agriculture and was higher than in 2017 when increased flow and dilution likely contributed to lower concentrations.

Tables and Figures:

Table 1: Station grouping of the six regions and metadata.

EMP Discrete Water Quality Station	Dissolved Ammonia, Total Phosphorus, Dissolved Nitrate+ Nitrite	Specific Conductance, Turbidity, Chlorophyll <i>a</i>
Grizzly Bay/Suisun Bay		
D7	Yes	Yes
NZ032	Beginning February 2017	Yes
NZS42	Beginning February 2017	Yes
D8	Yes	Yes
Confluence		
D10	Beginning February 2017	Yes
D4	Yes	Yes
D12	Yes	Yes
D22	Yes	Yes
Central Delta		
D28A	Yes	Yes
D19	Yes	Yes
D16	Yes	Yes
D26	Yes	Yes
San Pablo Bay		
D41	Yes	Yes
D41A	Yes	Yes
D6	Yes	Yes
NZ002	Beginning February 2017	Yes
NZ004	Beginning February 2017	Yes
NZ325	Beginning February 2017	Yes
Southern Interior Delta		
P8	Yes	Yes
MD10A	Yes	Yes
C10A	Yes	Yes
C9	Yes	Yes
Northern Interior Delta		
C3A	Yes	Yes
D24*	January 2017 - April 2017	January - April 2017
NZ068*	Beginning May 2017	Beginning May 2017
*D24 and NZ068 are located close to one another near Rio Vista. D24 was accessed by land but NZ068 was established slightly downstream in May 2017 so that sampling could be conducted aboard a research		

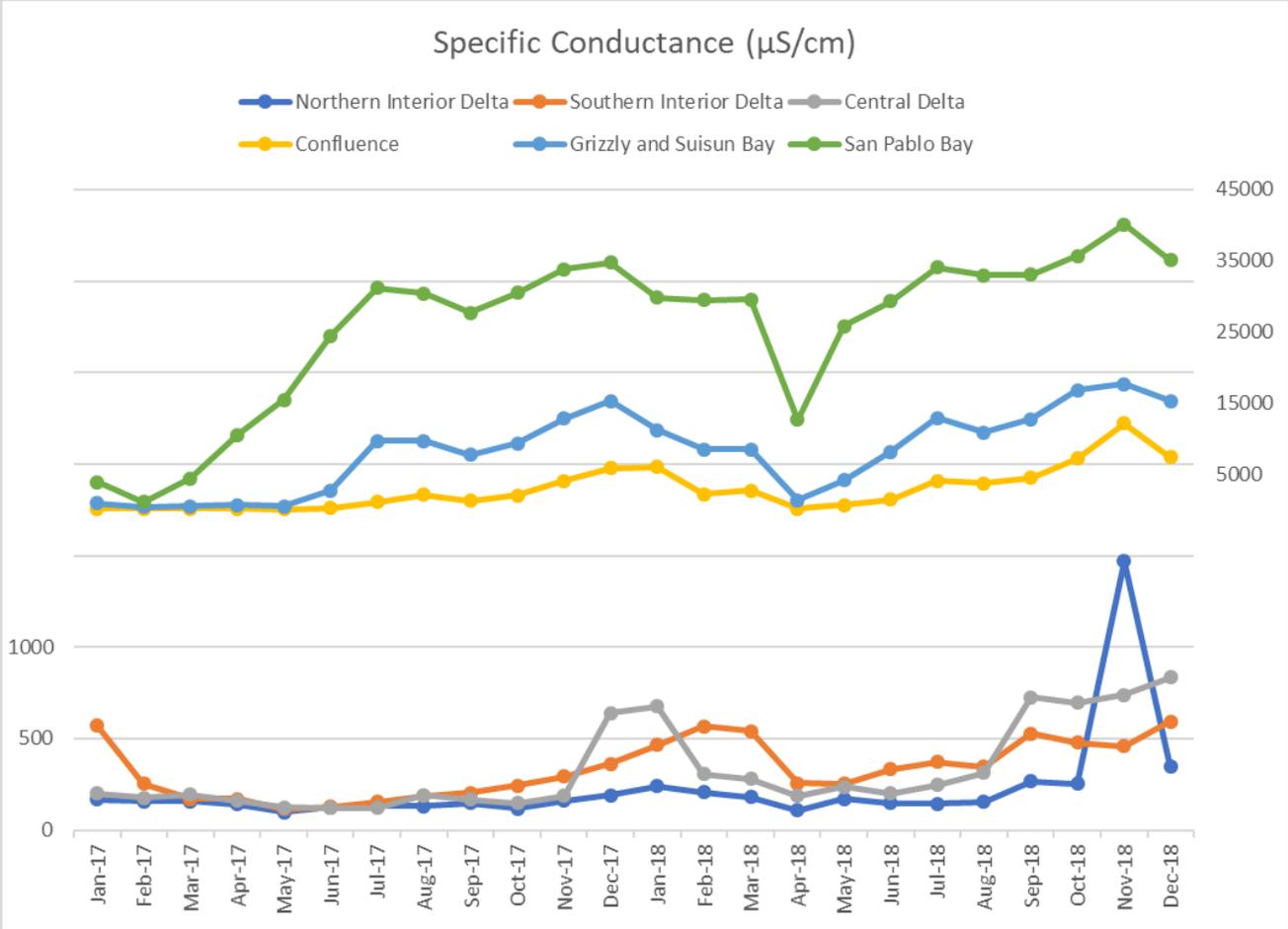


Figure 1: Average specific conductance at six regions during 2017-2018.

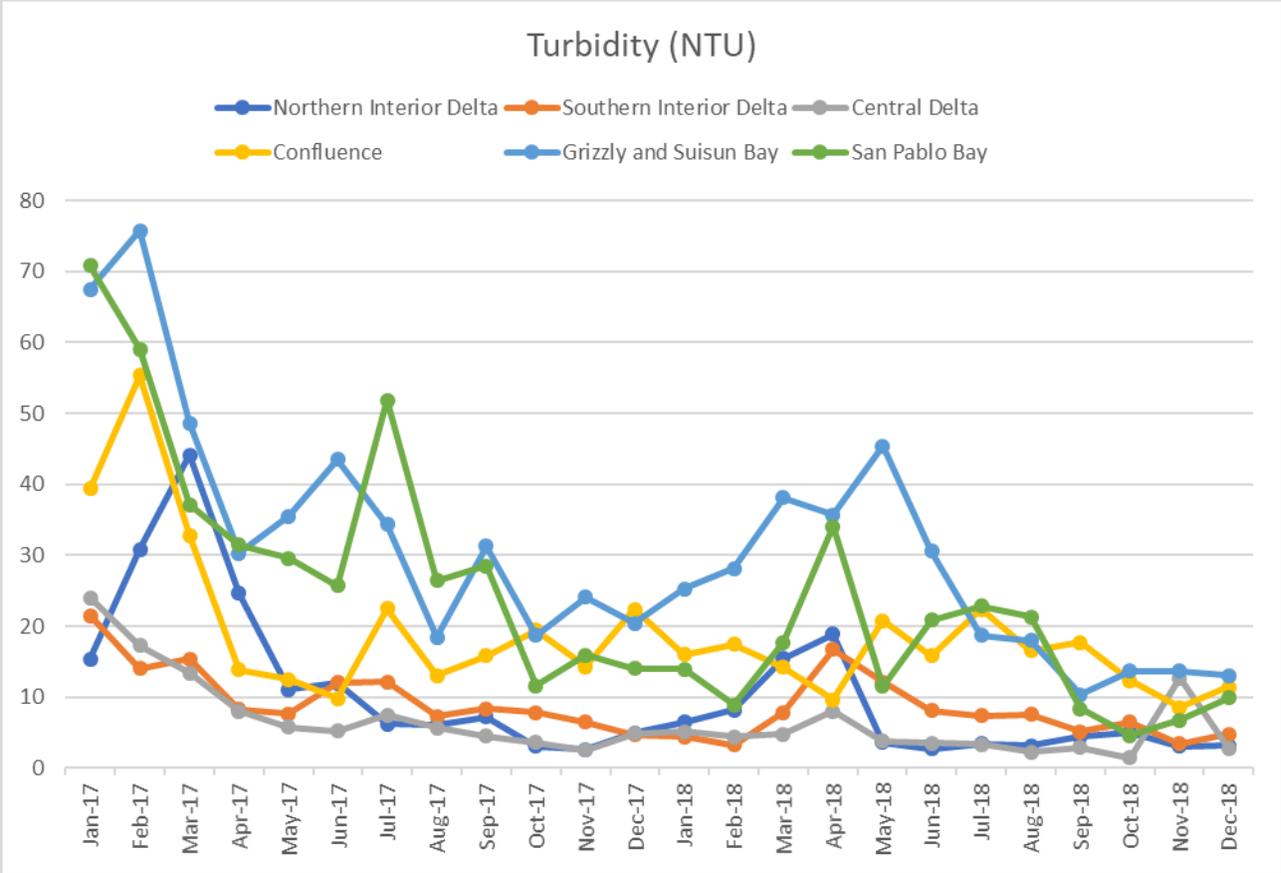


Figure 2: Average turbidity at six regions during 2017-2018.

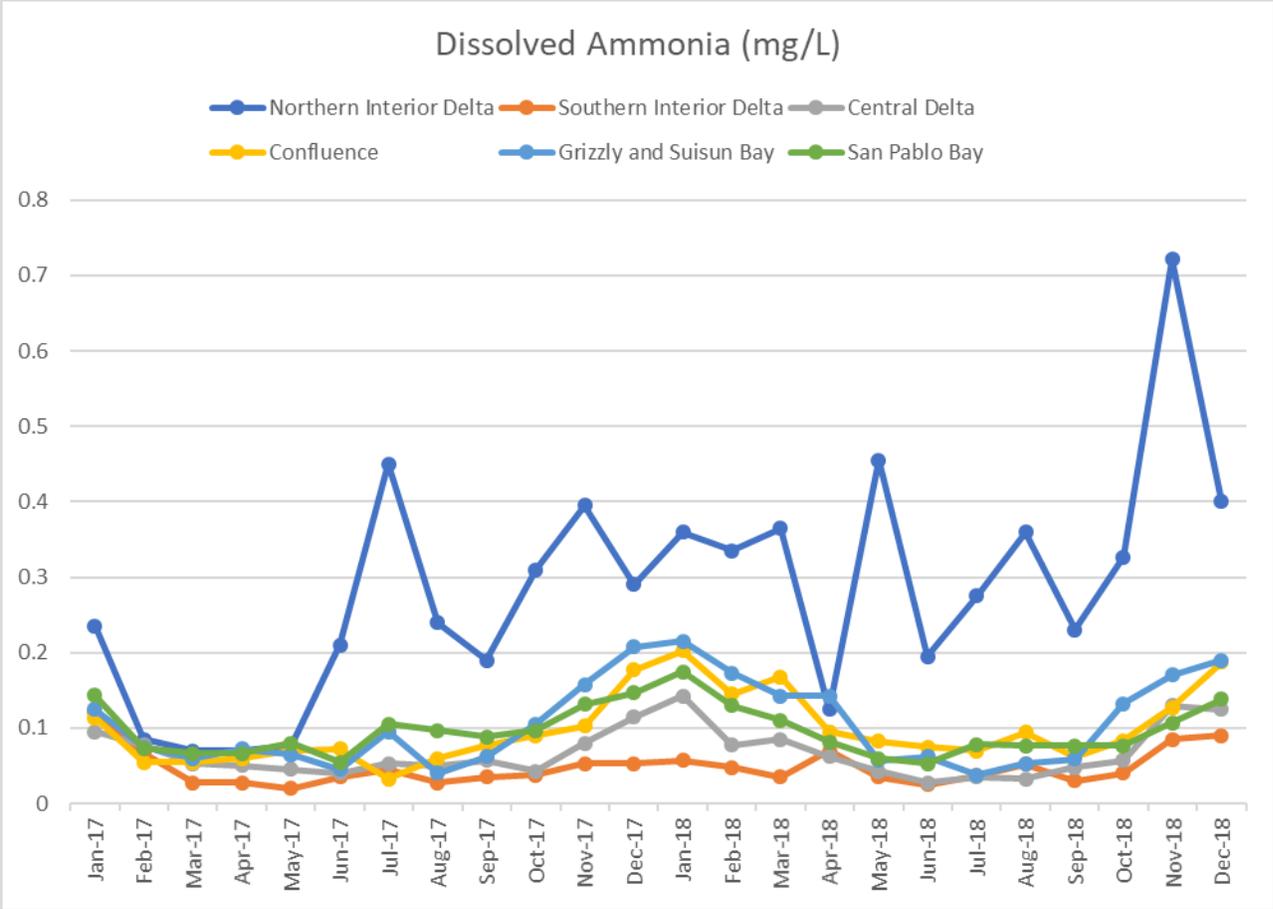


Figure 3: Average dissolved ammonia concentrations at six regions during 2017-2018.

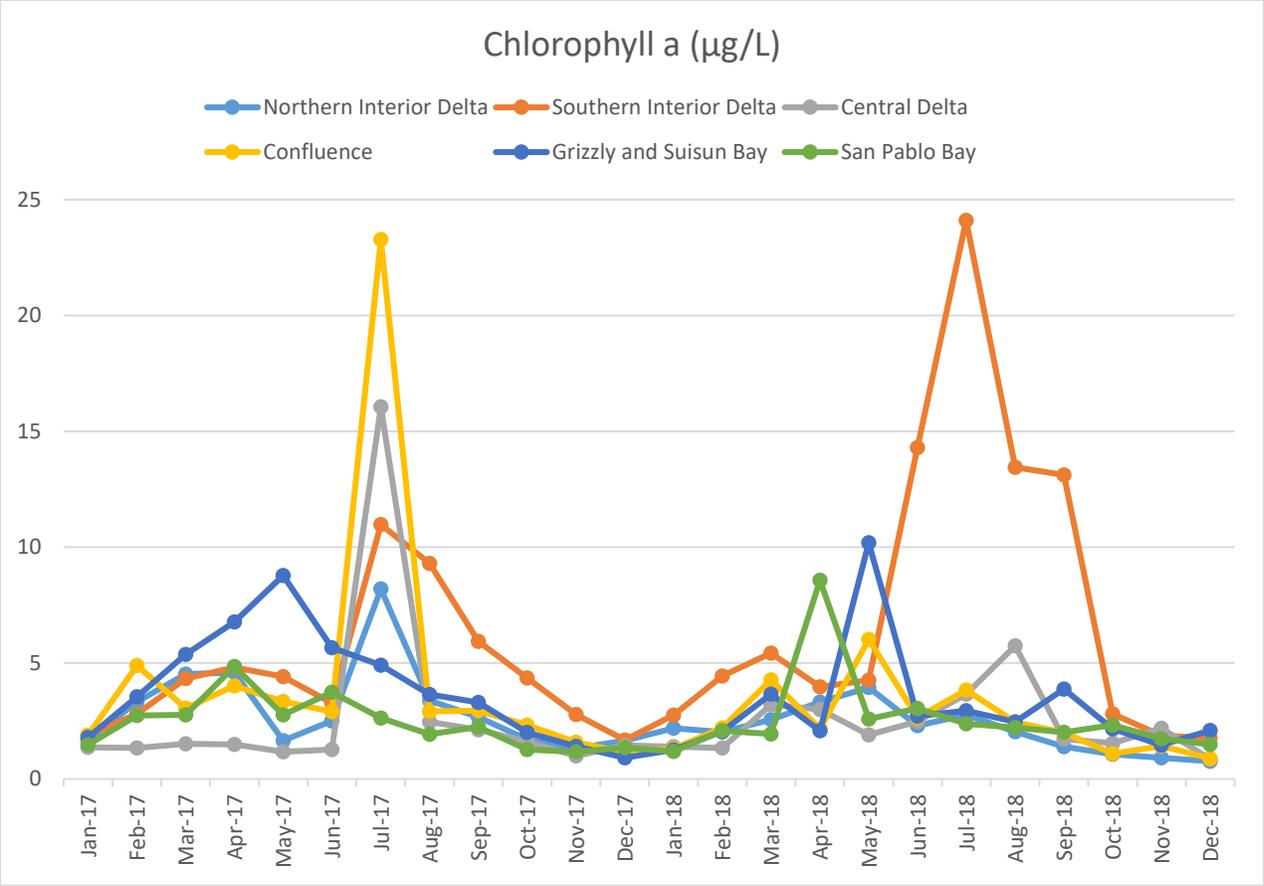


Figure 4: Average chlorophyll a concentrations at six regions during 2017-2018.

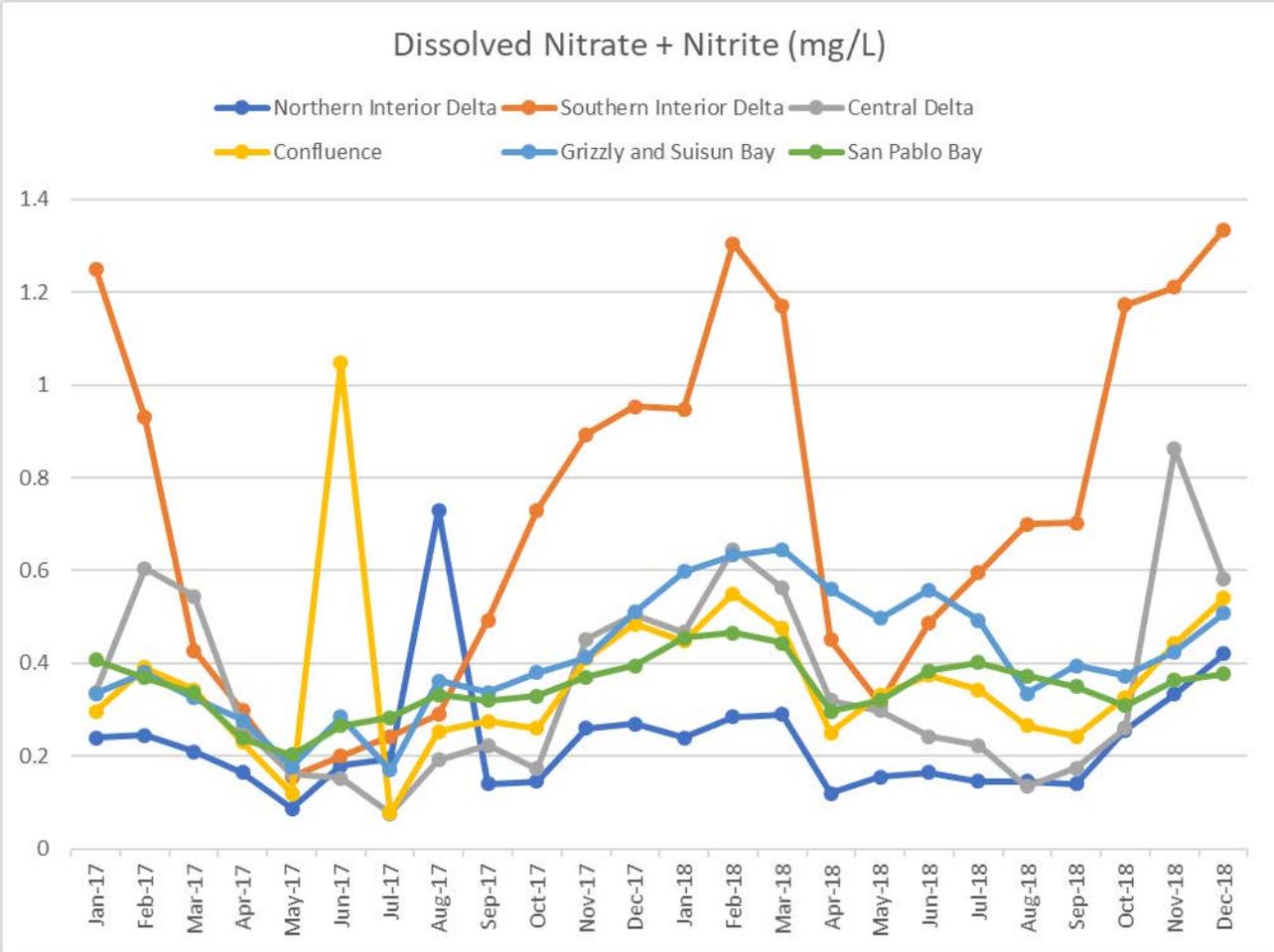


Figure 5: Average dissolved nitrate and nitrite concentrations at six regions during 2017-2018.

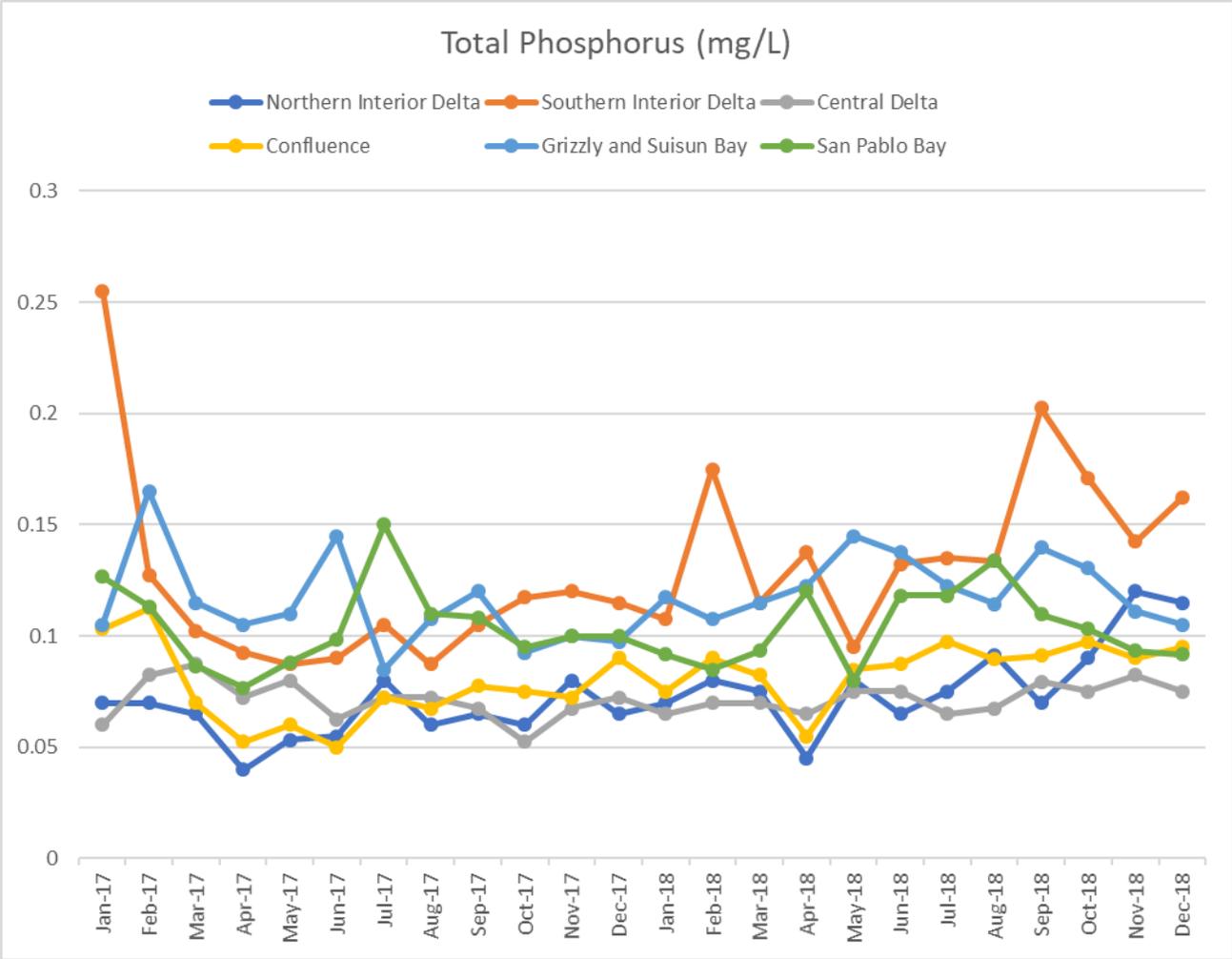


Figure 6: Average total phosphorous concentrations at six regions during 2017-2018.