

Lake Elsinore and Canyon Lake TMDL Water Quality Monitoring 2023-2024 Summary

Lake Elsinore / Canyon Lake TMDL Task Force Meeting
September 30, 2024

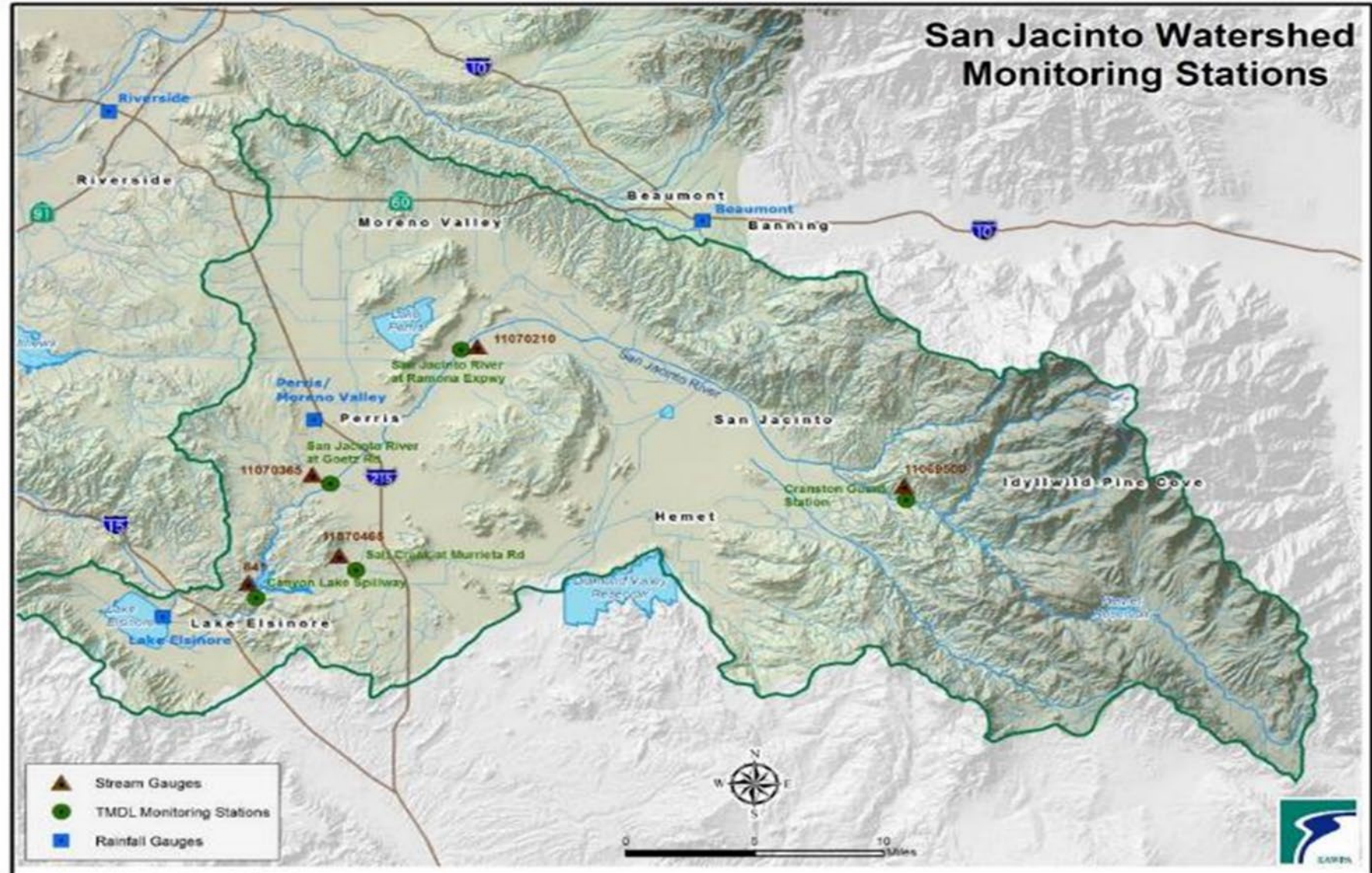
Nicholas Jernack
WSP

Garth Engelhorn
NV5 Alta

John Rudolph / Chris Stransky
GEI Consultants



Watershed Monitoring



Watershed Monitoring

Summary of 2023-2024 Rainfall

Monthly Rainfall (inches)	Lake Elsinore	Perris CDF	Pigeon Pass	Hemet / San Jacinto	Winchester
Jul	0.02	0	0	0	0
Aug	2.09	2.18	3.02	1.54	1.87
Sep	0.02	0.02	0.11	0	0.05
Oct	0.02	0.02	0.28	0.02	0.16
Nov	0.26	0.49	0.54	1.16	0.64
Dec	0.73	1.08	1.26	0.81	0.75
Jan	1.51	1.99	2.04	2.33	2.3
Feb	5.06	7.71	9.67	5.2	5.95
Mar	2.52	2.89	2.55	1.83	1.9
Apr	1.05	0.92	0.67	0.67	1.06
May	0.06	0	0.22	0.13	0.05
Jun	0	0	0	0	0
Annual Rainfall (inches)	13.34	17.30	20.36	13.69	14.73

Watershed Monitoring

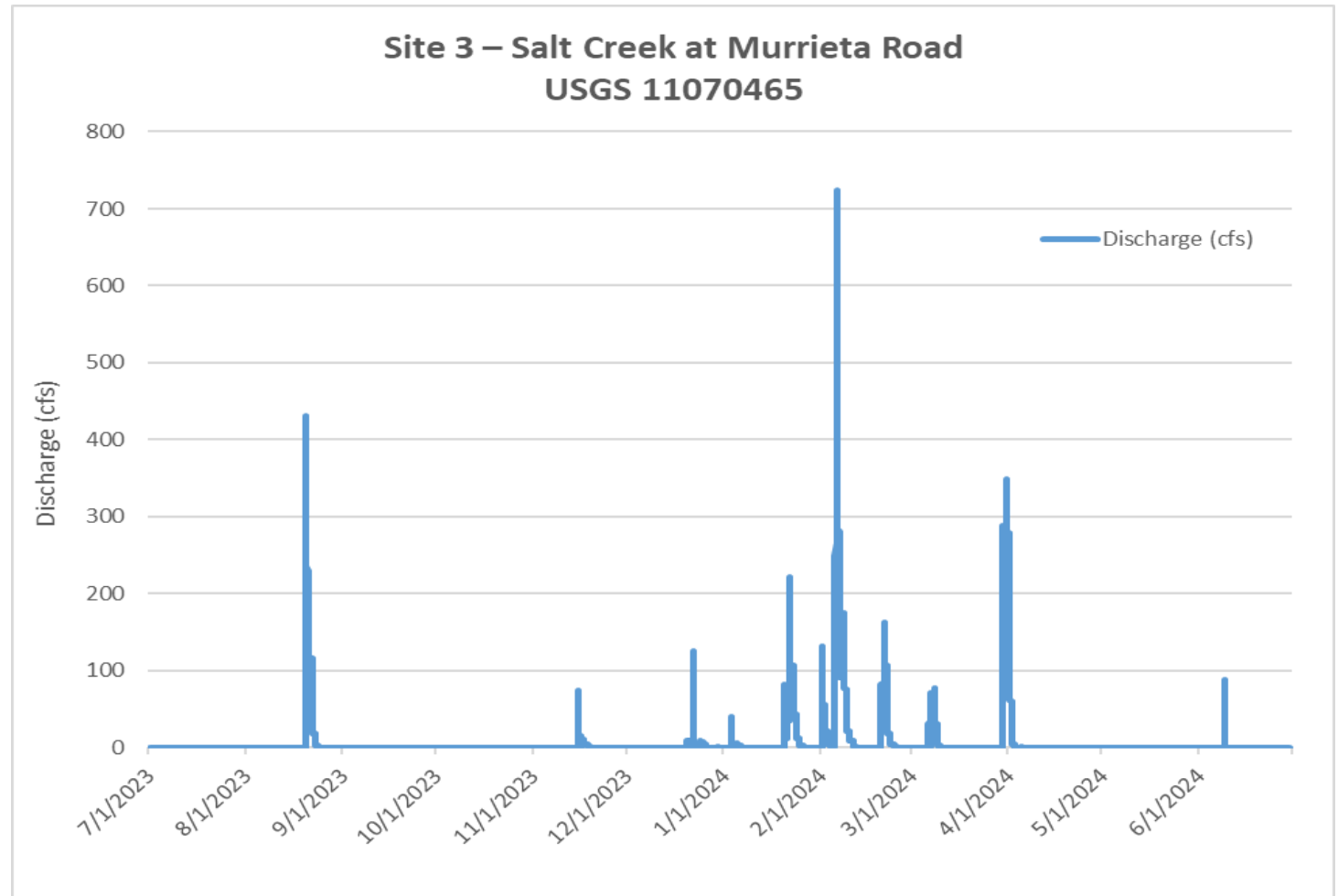
Summary of 2023-2024 Monitoring

Number and Location Description	Total Annual Flow ^a (Mgal)	Annual Event Mean Storm Concentration (mg/L)		Estimated Annual Load (kg)	
		Total Nitrogen	Total Phosphorus	Total Nitrogen	Total Phosphorus
Site 3 - Salt Creek at Murrieta Road (USGS 11070465)	1,663	2.10	0.42	13,312	2,668
Site 4 - San Jacinto River at Goetz Road (USGS 11070365)	5,137	1.37	0.38	26,684	7,371
Site 6 - San Jacinto River at Ramona Expressway	3	Not Measured	Not Measured	Not Measured	Not Measured
Site 30 - Canyon Lake Spillway (USGS 11070500)	6,274	1.15	0.15	27,399	3,459
Site 1 - San Jacinto River at Cranston Guard Station	3,241	Not Measured	Not Measure	Not Measured	Not Measured



Watershed Monitoring

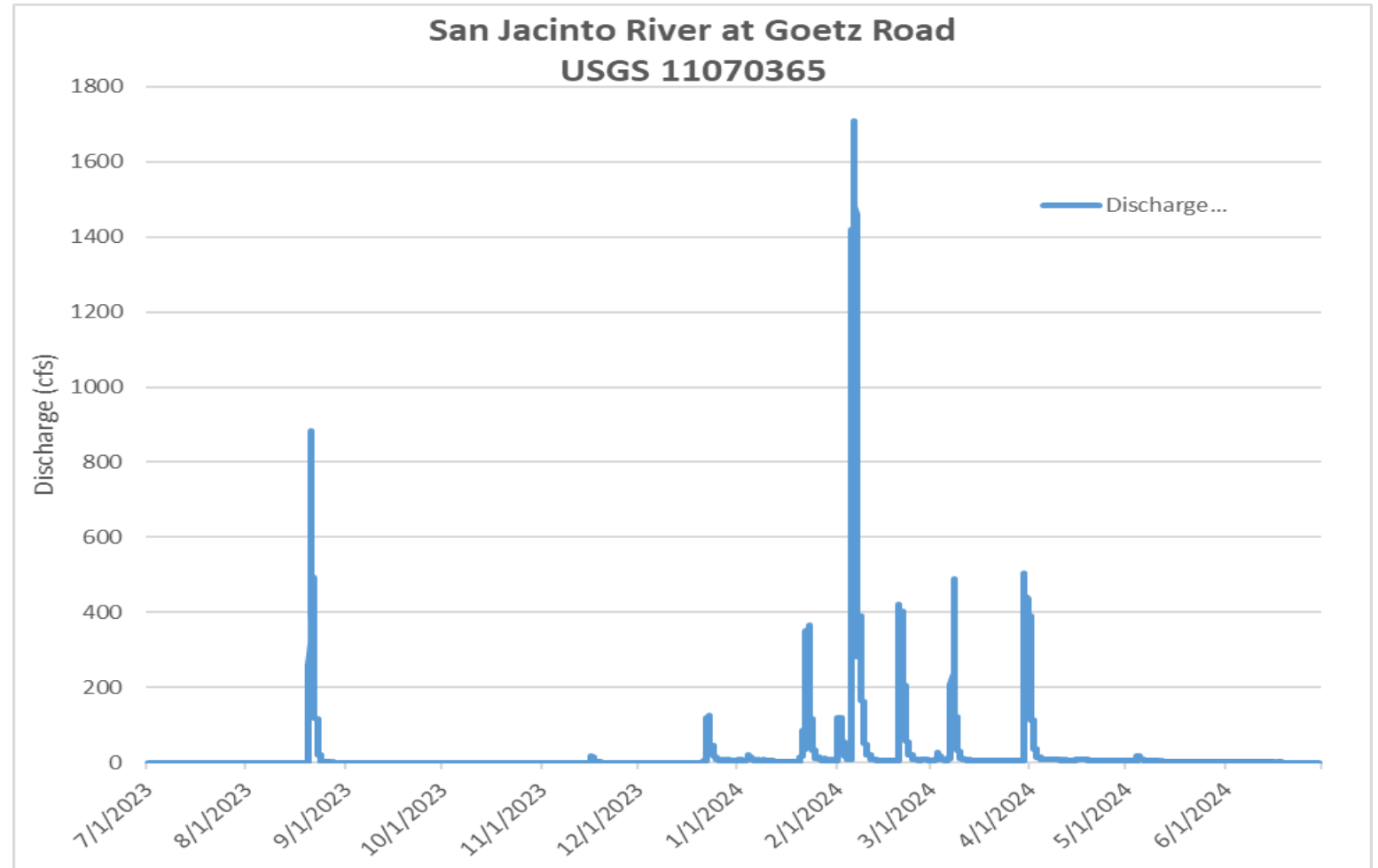
2023-2024 Annual Hydrograph





Watershed Monitoring

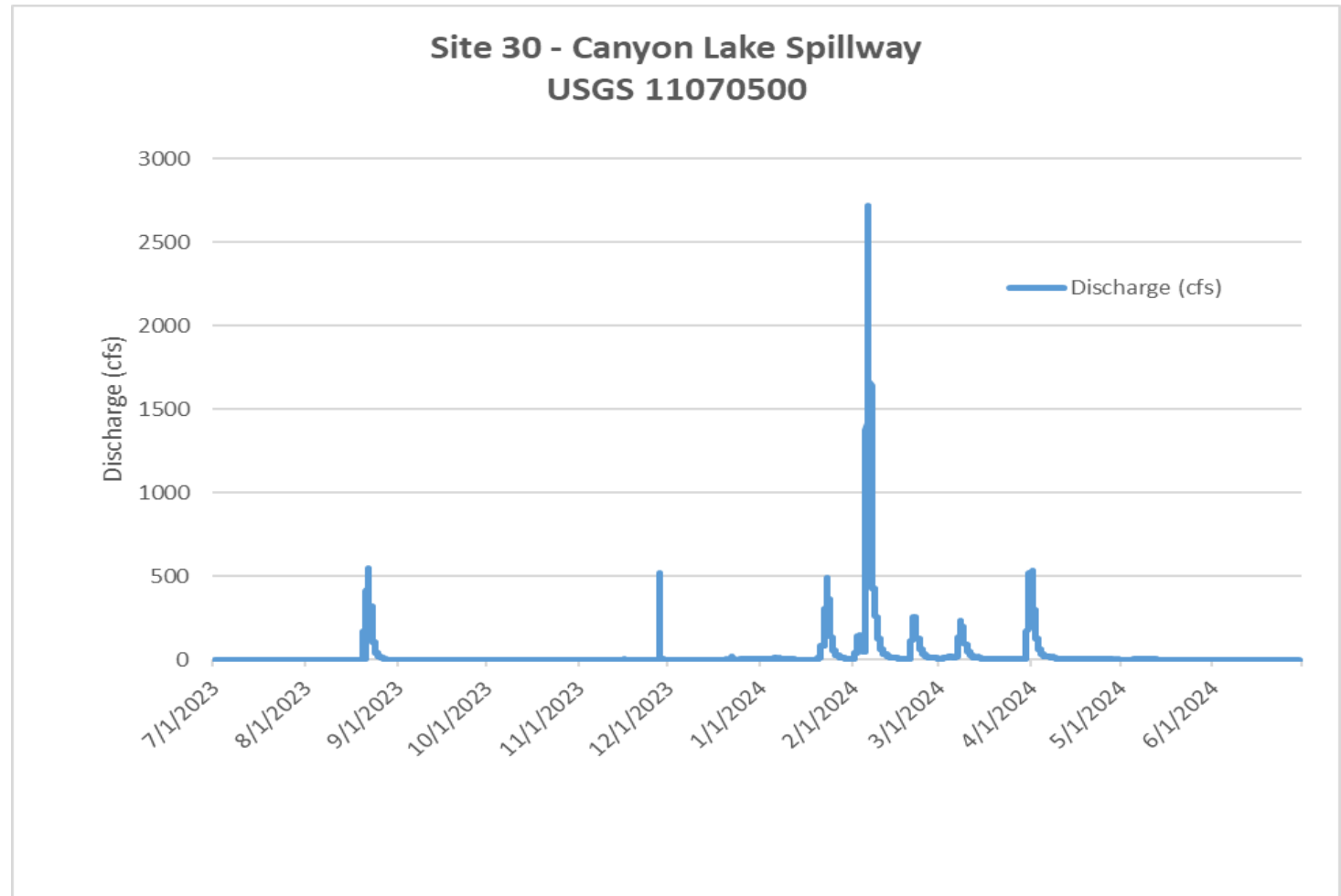
2023-2024 Annual Hydrograph





Watershed Monitoring

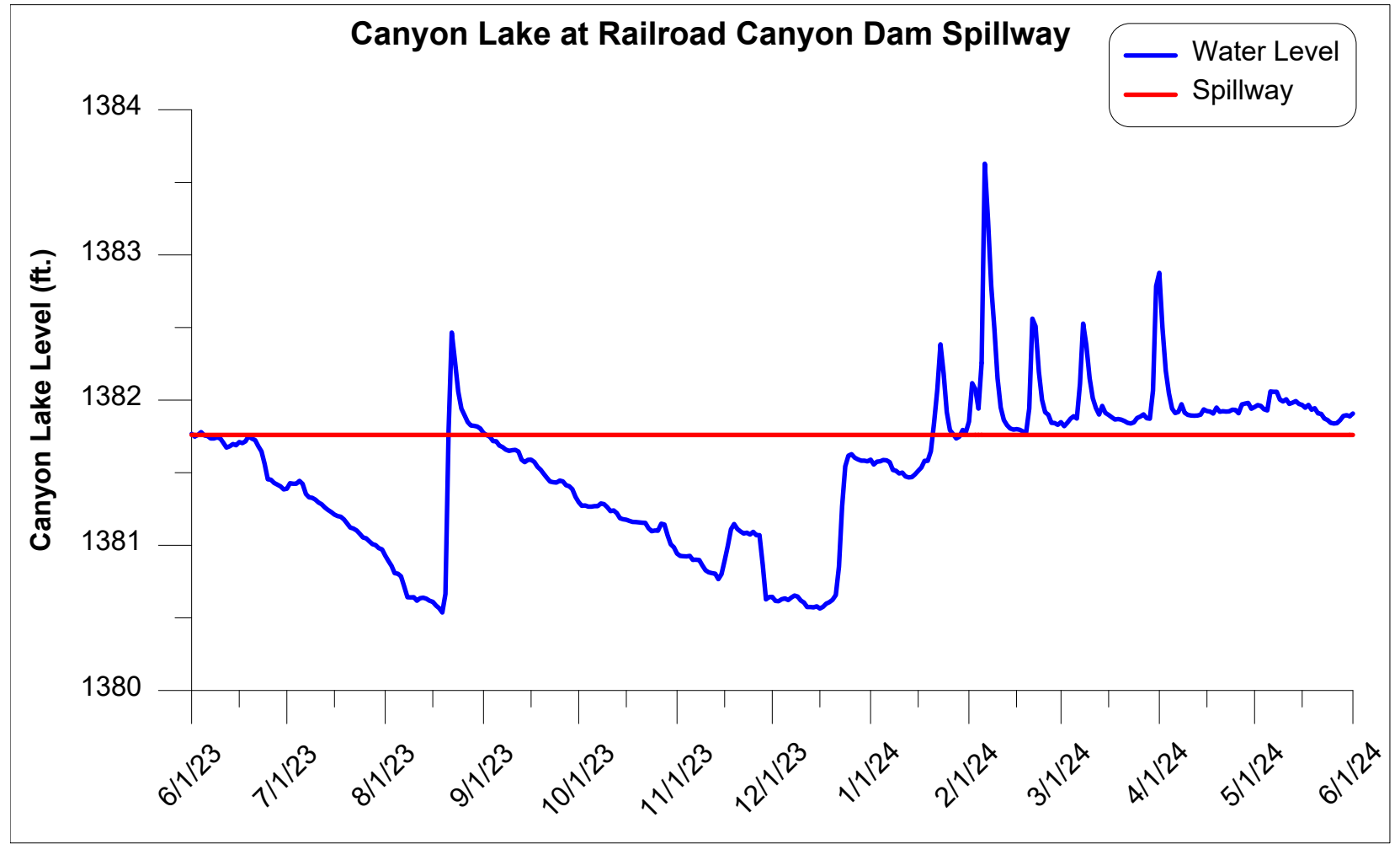
2023-2024 Annual Hydrograph





Watershed Monitoring

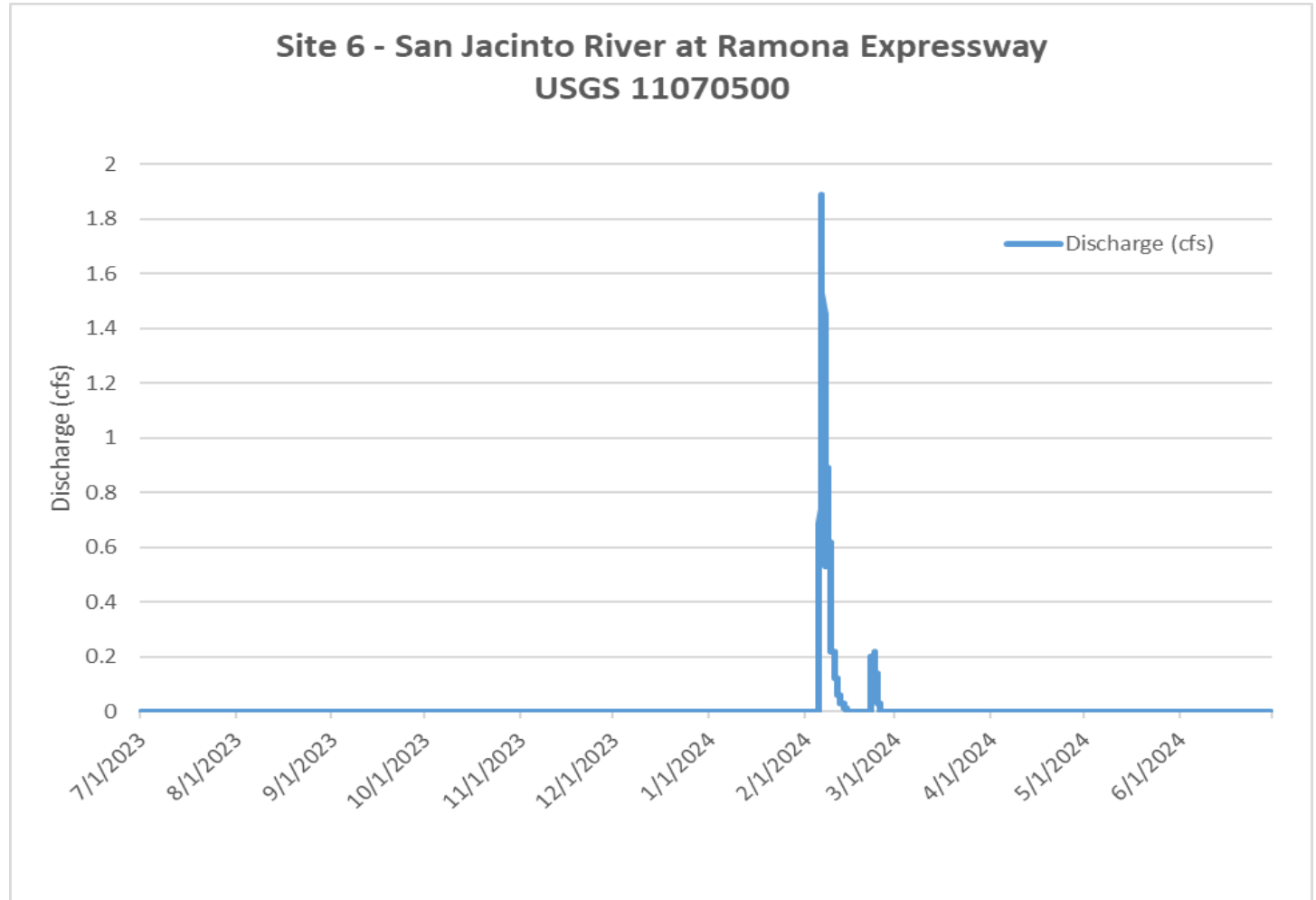
2023-2024 Annual Hydrograph





Watershed Monitoring

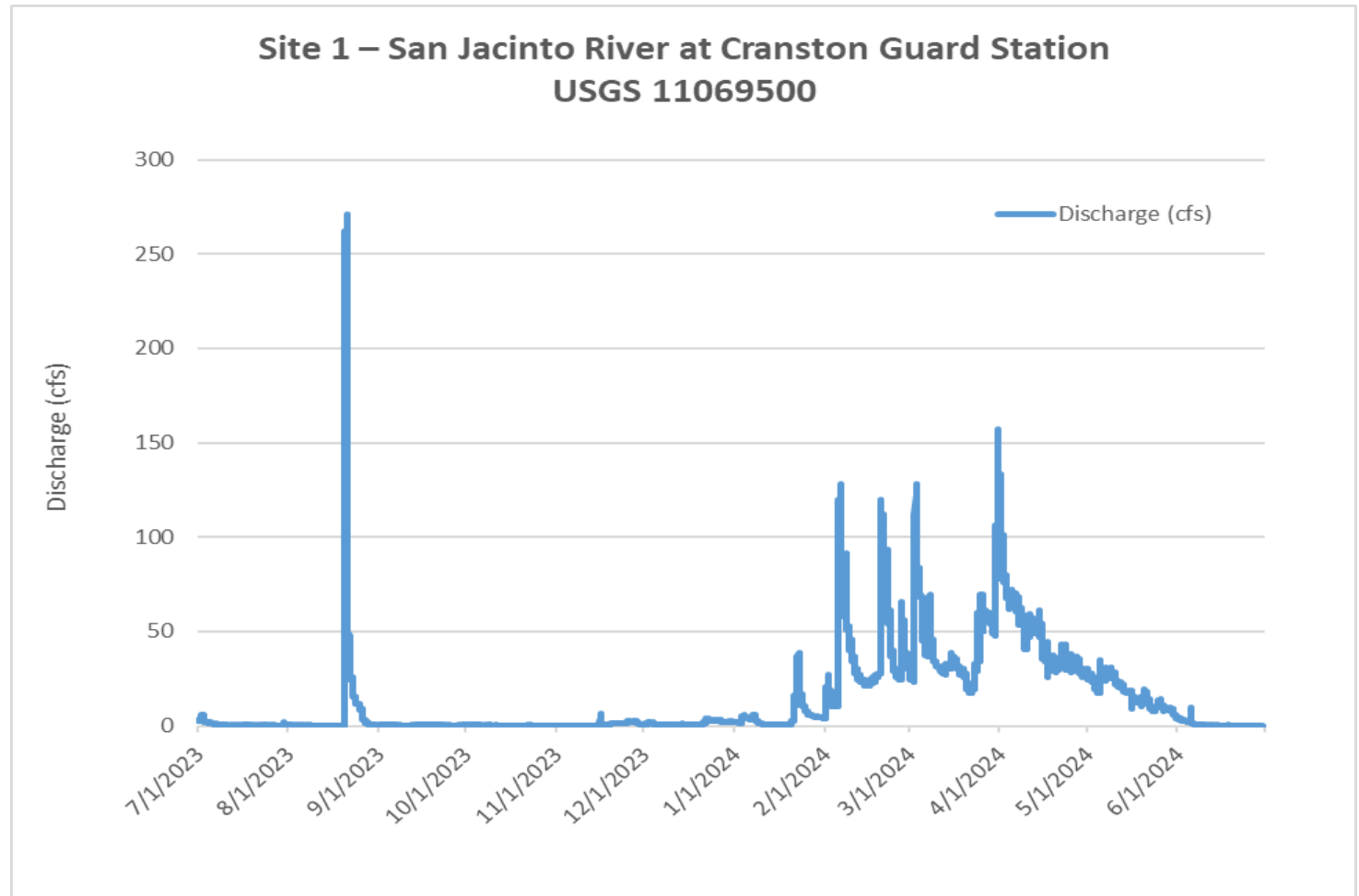
2023-2024 Annual Hydrograph



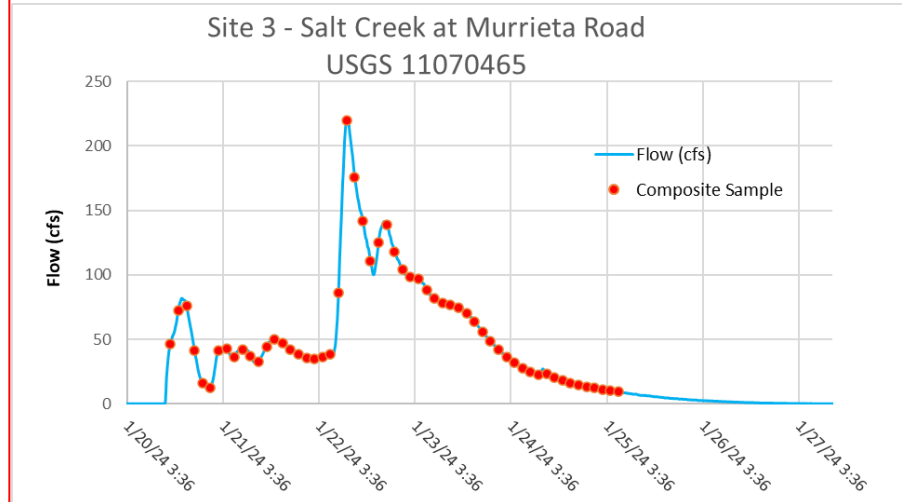


Watershed Monitoring

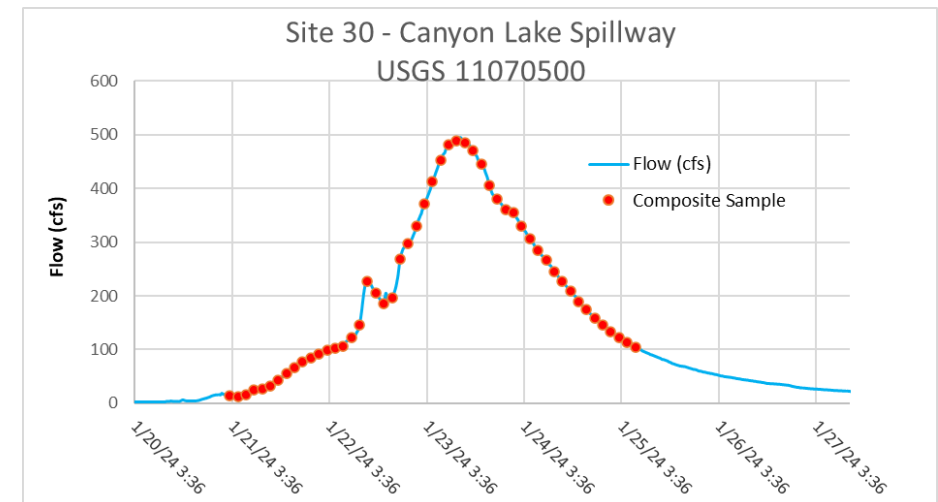
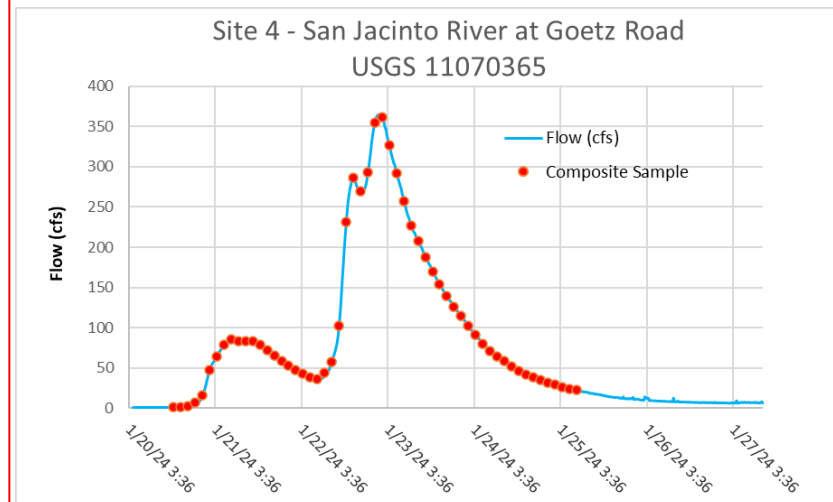
2023-2024 Annual Hydrograph



Watershed Monitoring



Wet Event #1
January 20-26, 2024
Watershed Rainfall: 1.26 to 1.98 inches
Sites: Salt Creek, San Jacinto, and Canyon Lake Spillway





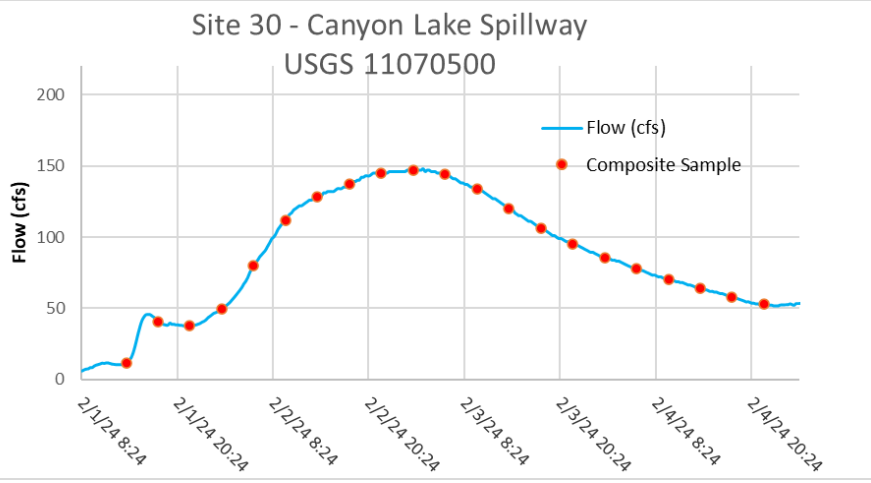
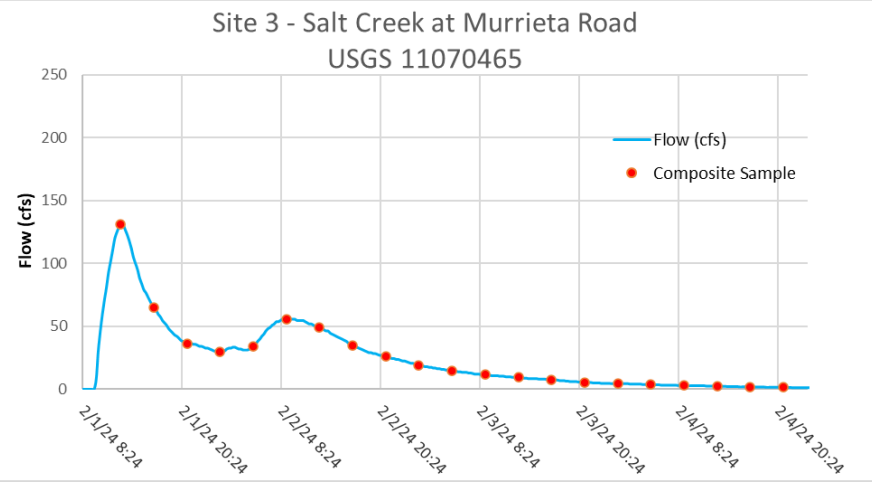
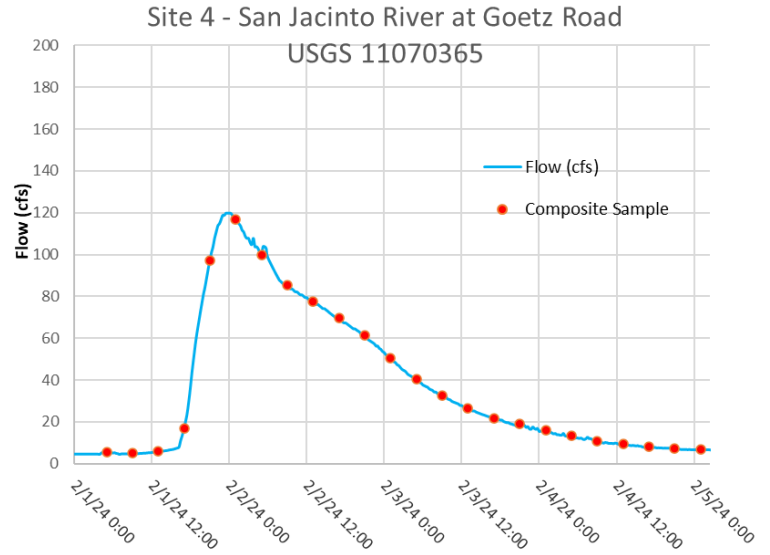
Watershed Monitoring

Wet Event #2

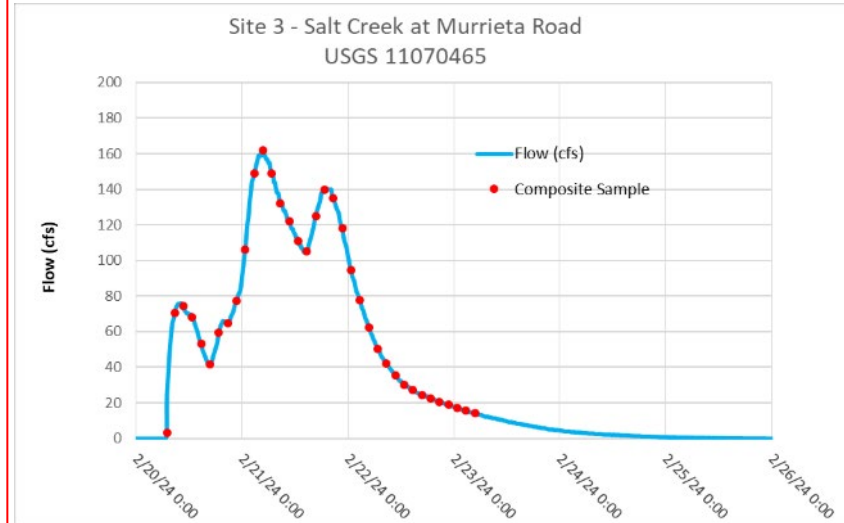
February 1-4, 2024

Watershed Rainfall: 0.79 to 1.03 inches

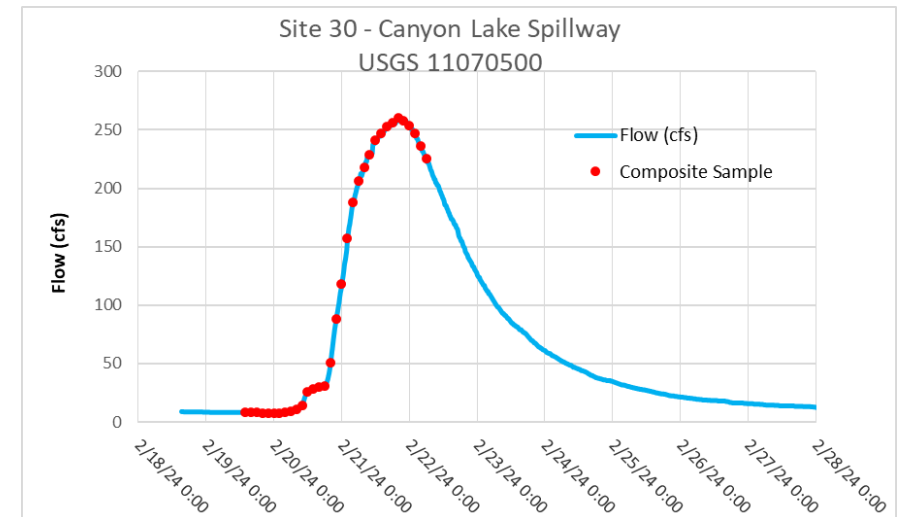
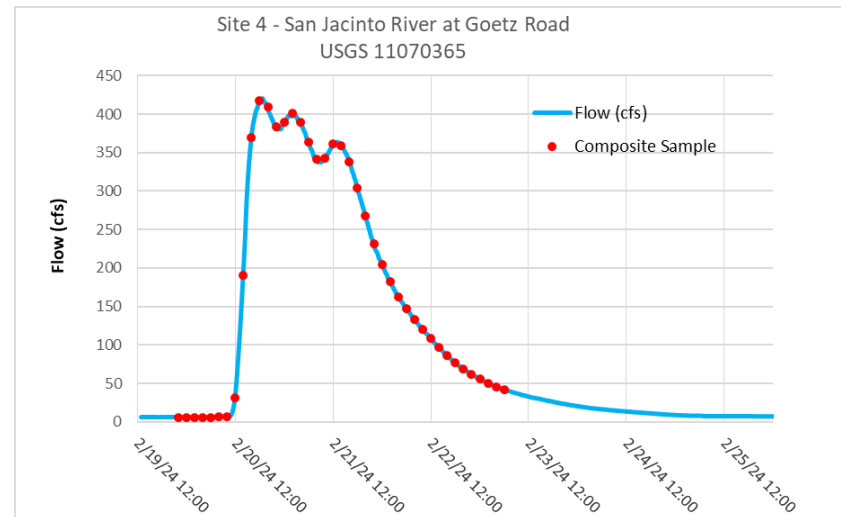
Sites: Salt Creek, San Jacinto, and Canyon Lake Spillway



Watershed Monitoring

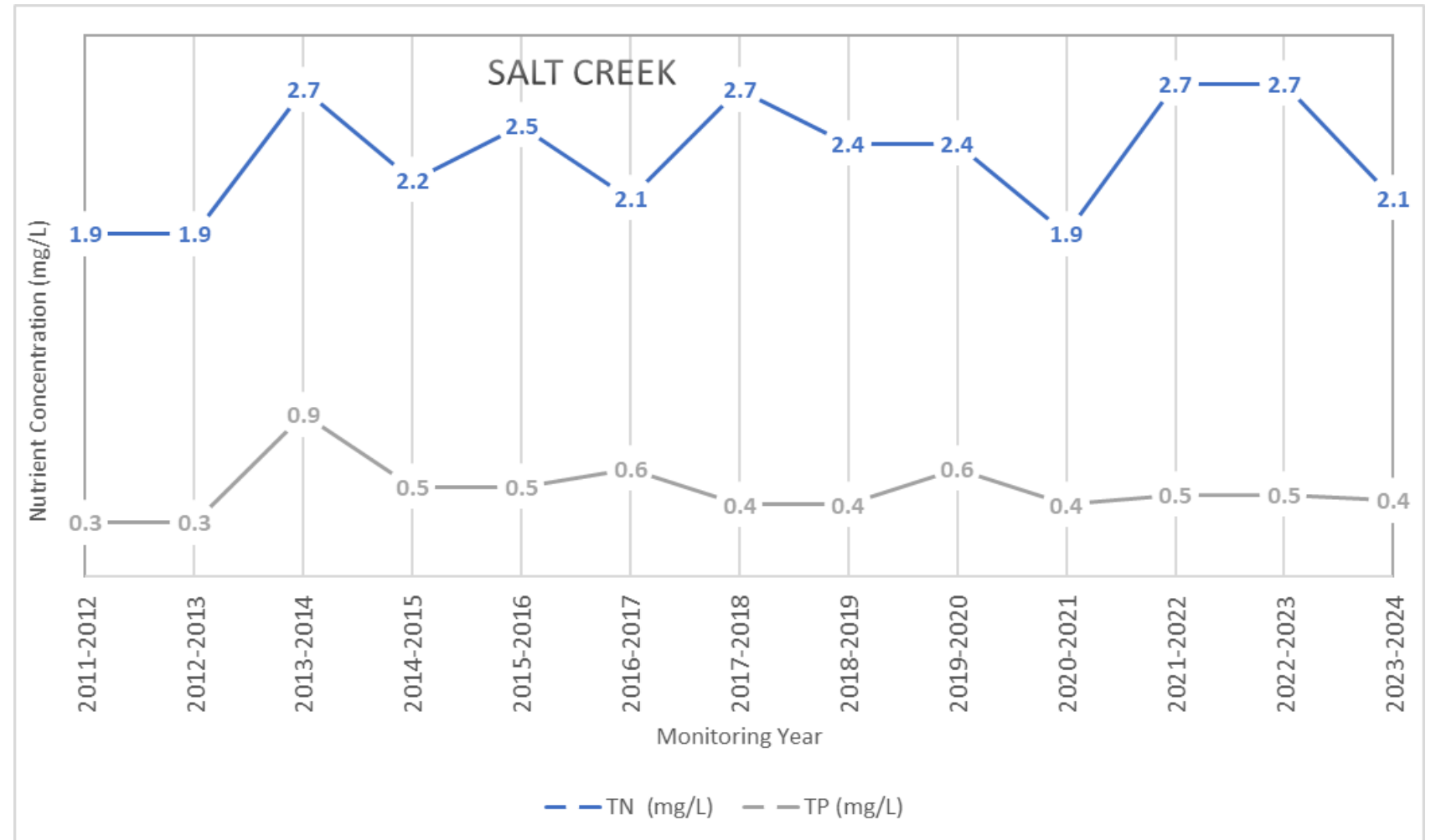


Wet Event #3
 February 20-24, 2024
 Watershed Rainfall: 0.69 to 2.32 inches
 Sites: Salt Creek, San Jacinto, and Canyon Lake Spillway



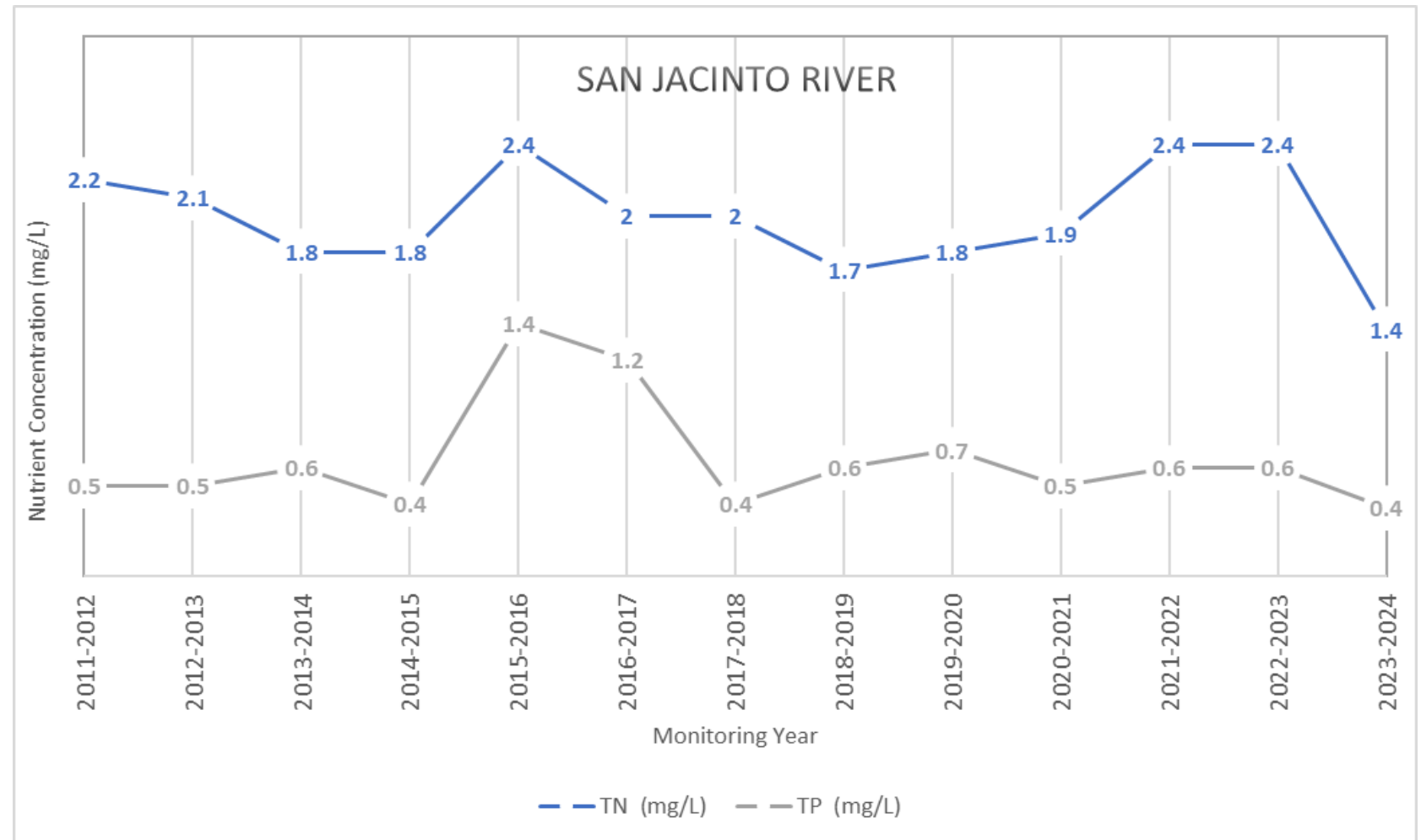
Watershed Monitoring

Salt Creek Historical Nutrient Concentrations



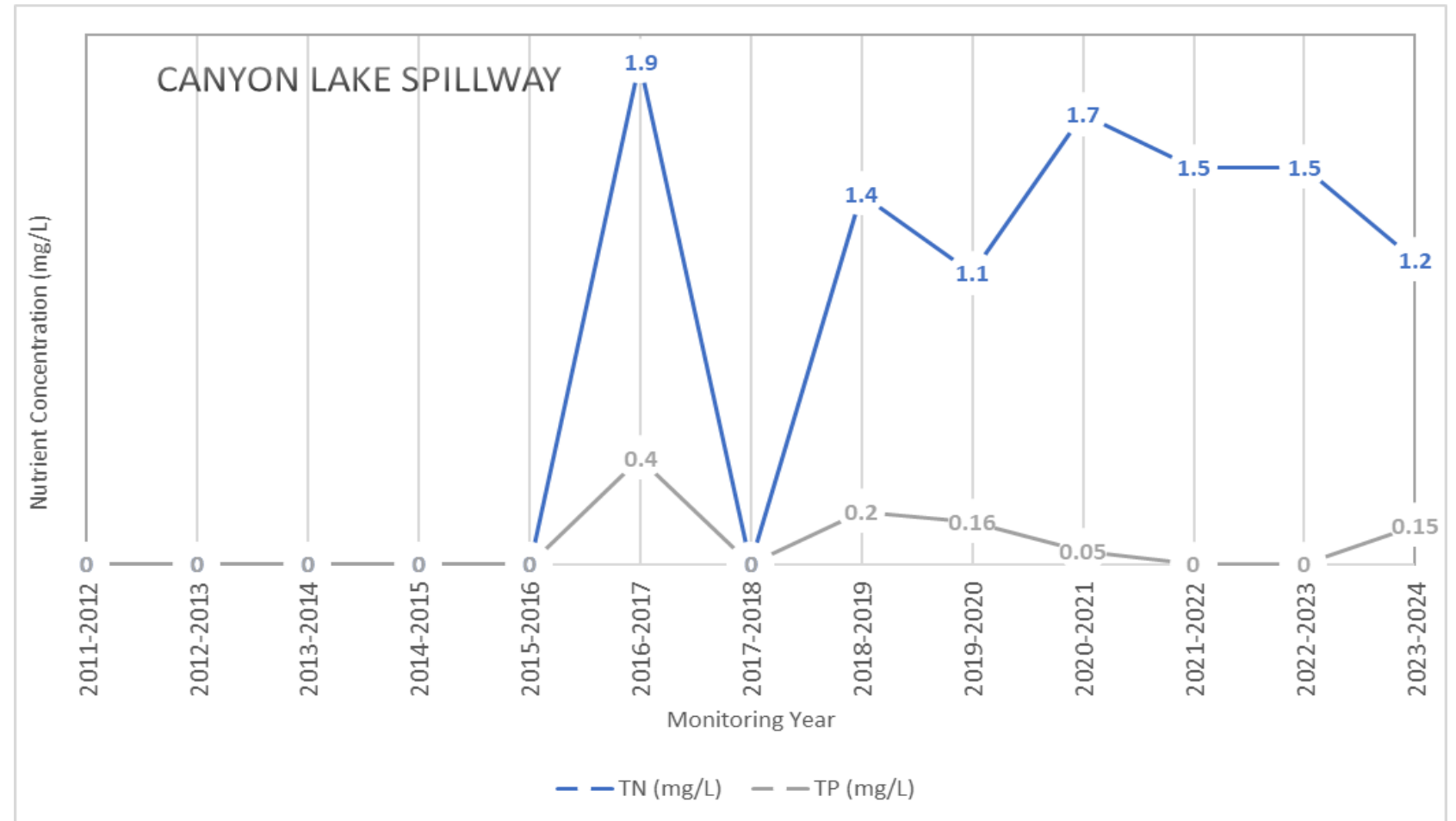
Watershed Monitoring

San Jacinto Historical Nutrient Concentrations



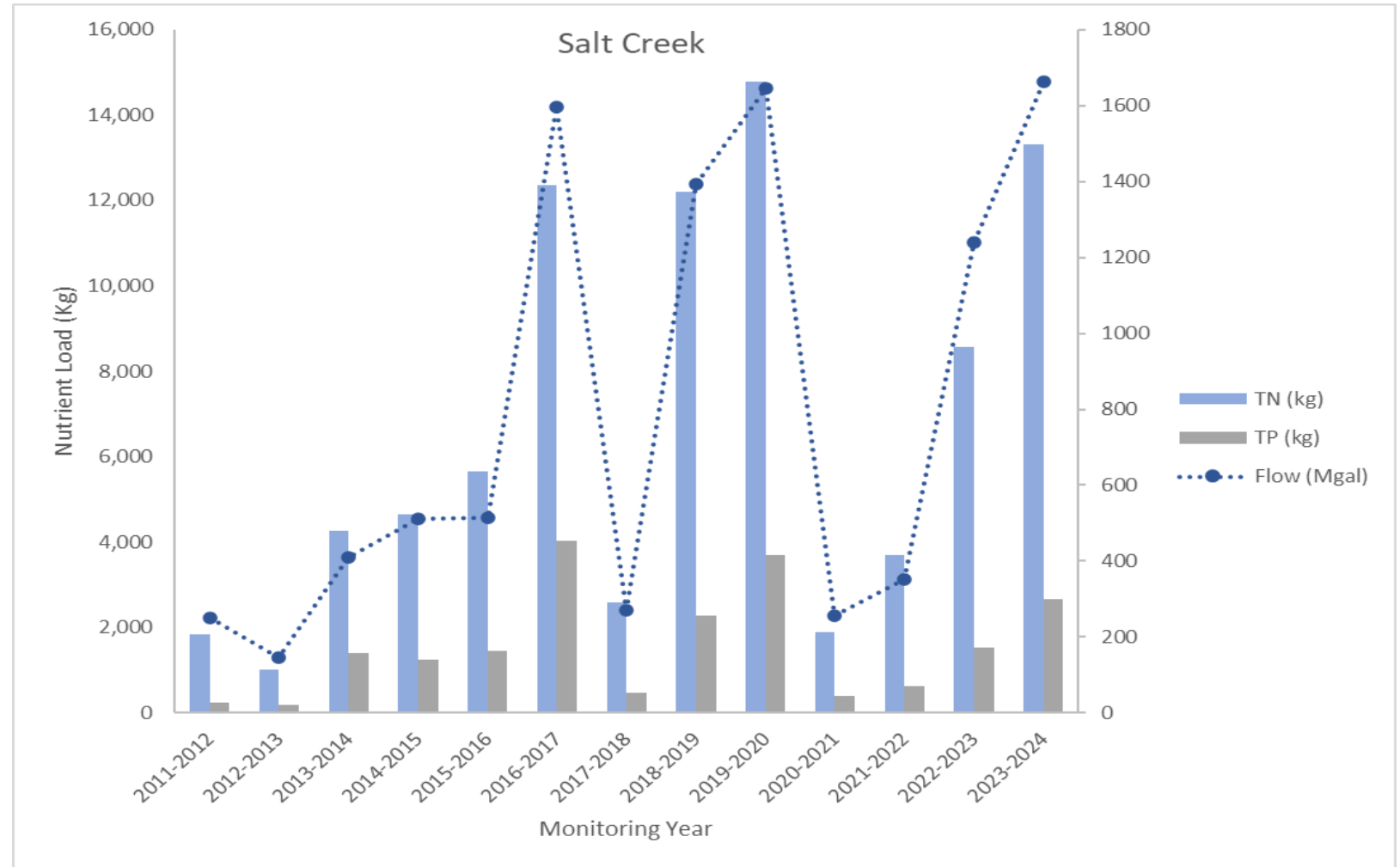
Watershed Monitoring

Canyon Lake Historical Nutrient Concentrations



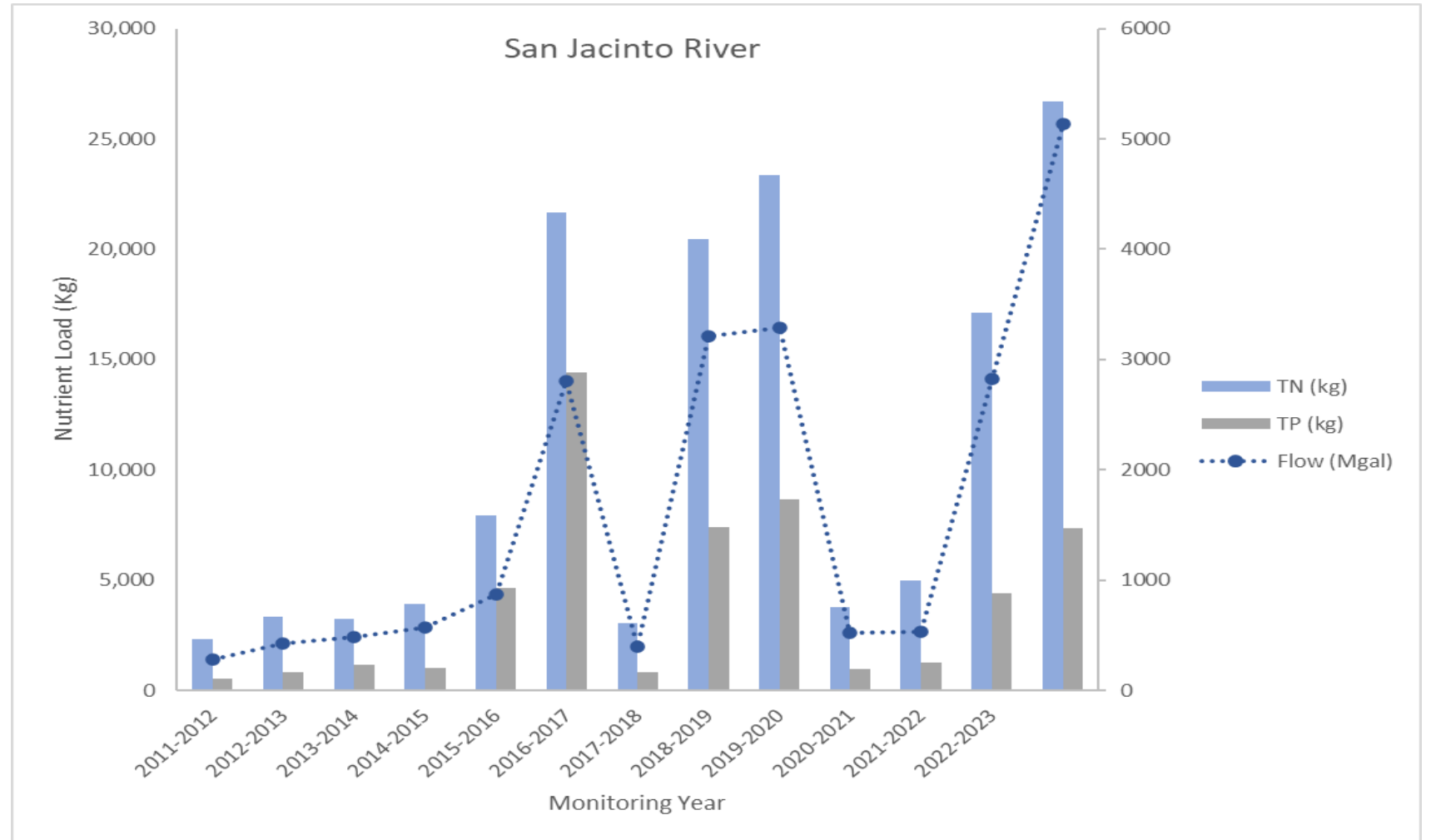
Watershed Monitoring

Salt Creek Historical Loads



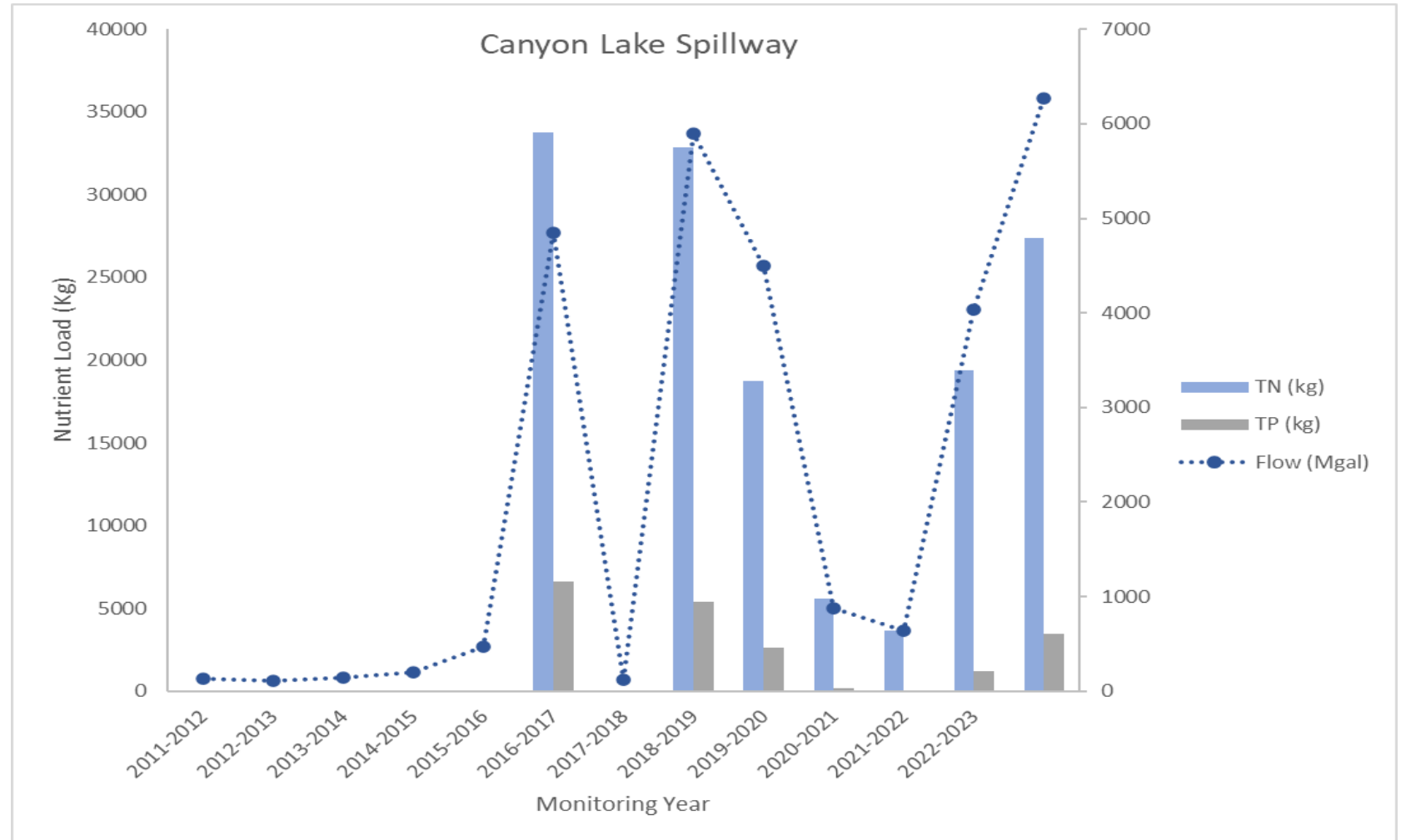
Watershed Monitoring

San Jacinto Historical Loads



Watershed Monitoring

Canyon Lake Historical Loads



Watershed Monitoring

Summary of Nutrient Concentrations

Monitoring Year	Site 3 - Salt Creek at Murrieta Road		Site 4 - San Jacinto River at Goetz Road		Site 30 - Canyon Lake Spillway	
	TN (mg/L)	TP (mg/L)	TN (mg/L)	TP (mg/L)	TN (mg/L)	TP (mg/L)
2014-2015	2.2	0.5	1.8	0.4	NS	NS
2015-2016	2.5	0.5	2.4	1.4	NS	NS
2016-2017	2.1	0.6	2	1.2	1.9	0.4
2017-2018	2.7	0.4	2	0.4	NS	NS
2018-2019	2.4	0.4	1.7	0.6	1.4	0.2
2019-2020	2.4	0.6	1.8	0.7	1.1	0.16
2020-2021	1.9	0.4	1.9	0.5	1.7	0.05
2021-2022	2.7	0.5	2.4	0.6	1.5	ND(<0.003)
2022-2023	2.7	0.5	2.4	0.6	1.5	ND(<0.003)
2023-2024	2.1	0.4	1.4	0.4	1.2	0.15

Watershed Monitoring

Summary of Nutrient Loads

Monitoring Year	Site 3 - Salt Creek at Murrieta Road			Site 4 - San Jacinto River at Goetz Road			Site 30 - Canyon Lake Spillway		
	Flow (Mgal)	TN (kg)	TP (kg)	Flow (Mgal)	TN (kg)	TP (kg)	Flow (Mgal)	TN (kg)	TP (kg)
2014-2015	908	8721	2610	831	5711	1634	316	NS	NS
2015-2016	515	5,647	1,447	872	7,926	4,624	476	NS	NS
2016-2017	1,596	12,366	4,026	2,802	21,651	14,403	4,850	33,759	6,637
2017-2018	271	2,586	482	393	3,055	810	117	NS	NS
2018-2019	1,394	12,213	2,266	3,208	20,457	7,409	5,893	32,832	5,416
2019-2020	1,645	14,792	3,705	3,290	23,337	8,660	4,497	18,762	2,635
2020-2021	255	1,902	396	519	3,794	992	878	5,626	175
2021-2022	351	3,698	625	537	4,976	1,282	640	3,632	0
2022-2023	1,240	8,576	1,533	2,821	17,132	4,388	4,037	19,391	1,231
2023-2024	1,663	13,312	2,668	5,137	26,684	7,371	6,274	27,399	3,459

Watershed Monitoring

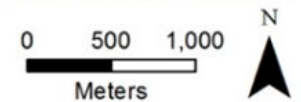
Historical Estimated Annual Loads as a 10-Year Running Average Relative to the 2004 TMDL Wasteload and Load Allocations

Lake	Analyte	10-yr Running Average (kg/yr) ^a	TMDL Load Allocation (kg/yr)	% of TMDL Load Allocation
Lake Elsinore	Total Nitrogen	11,736	29,953	39.2%
	Total Phosphorus	1,651	6,922	23.9%
Canyon Lake	Total Nitrogen	18,490	22,902	82.1%
	Total Phosphorus	6,292	3,797	196.6%
		-2,002 credit for alum application = 4,290		113.0%

In-Lake Monitoring



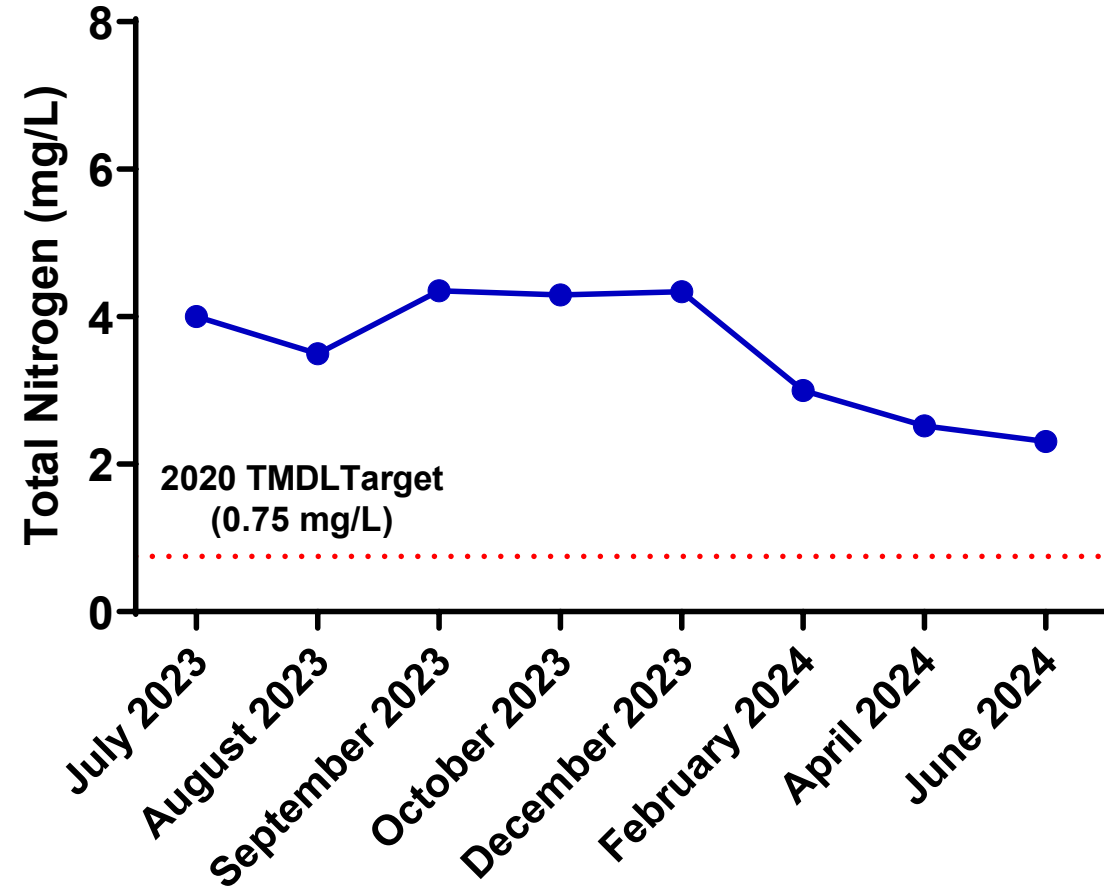
Sample Locations and Water Quality Data Sondes For Lake Elsinore





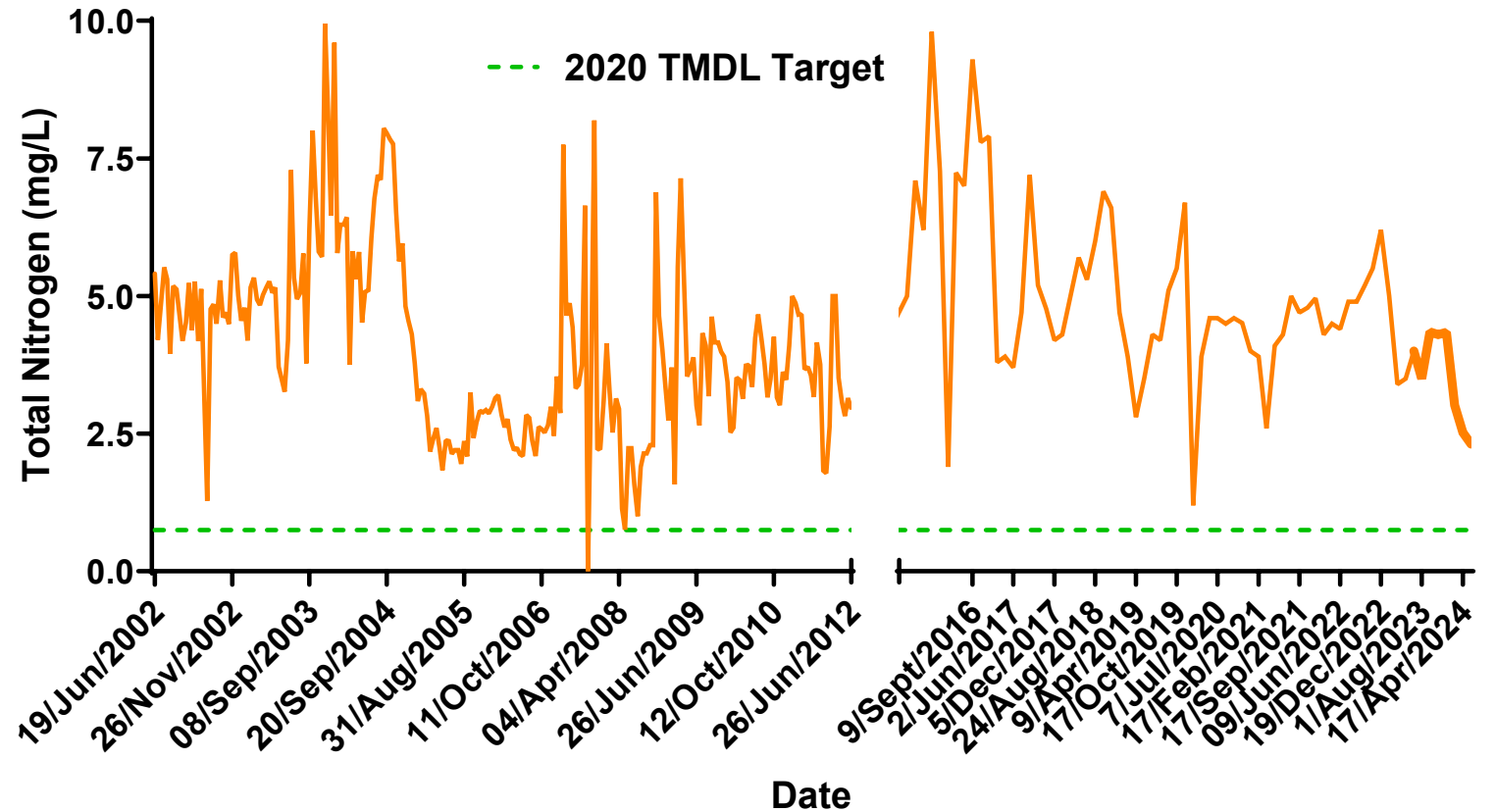
In-Lake Monitoring – Lake Elsinore

Total Nitrogen





In-Lake Monitoring - Lake Elsinore



No data available from June 2012-July2015

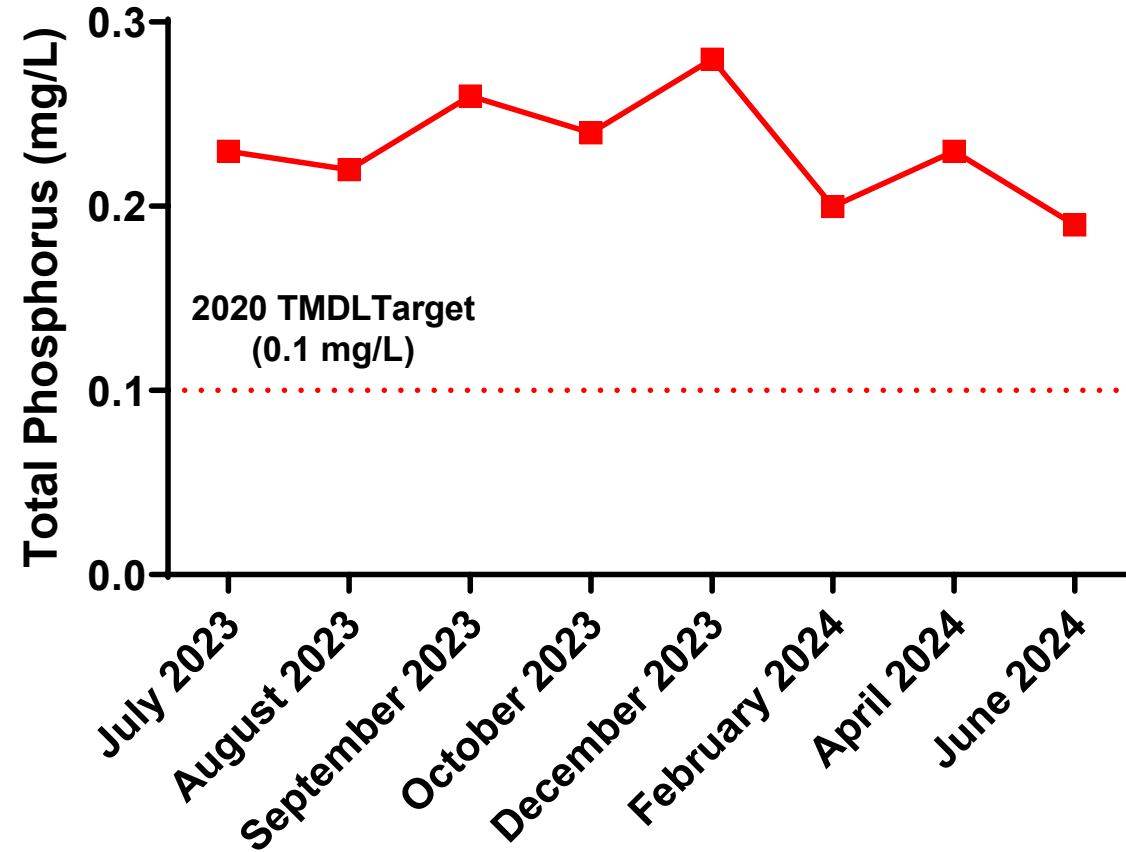
TMDL target of 0.75 mg/L is annual average to be attained by 2020

Bold represents current monitoring year July 2023-June 2024



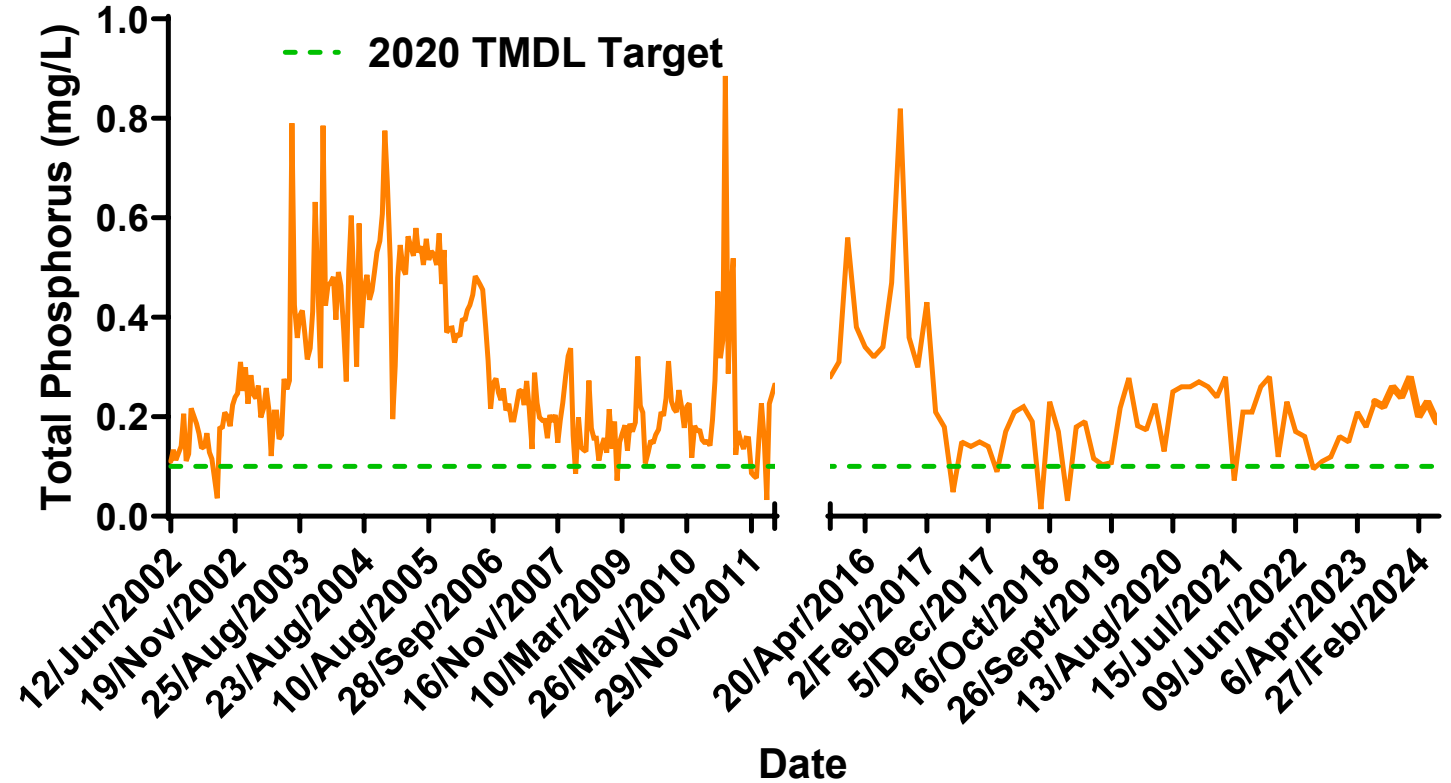
In-Lake Monitoring - Lake Elsinore

Total Phosphorus





In-Lake Monitoring - Lake Elsinore

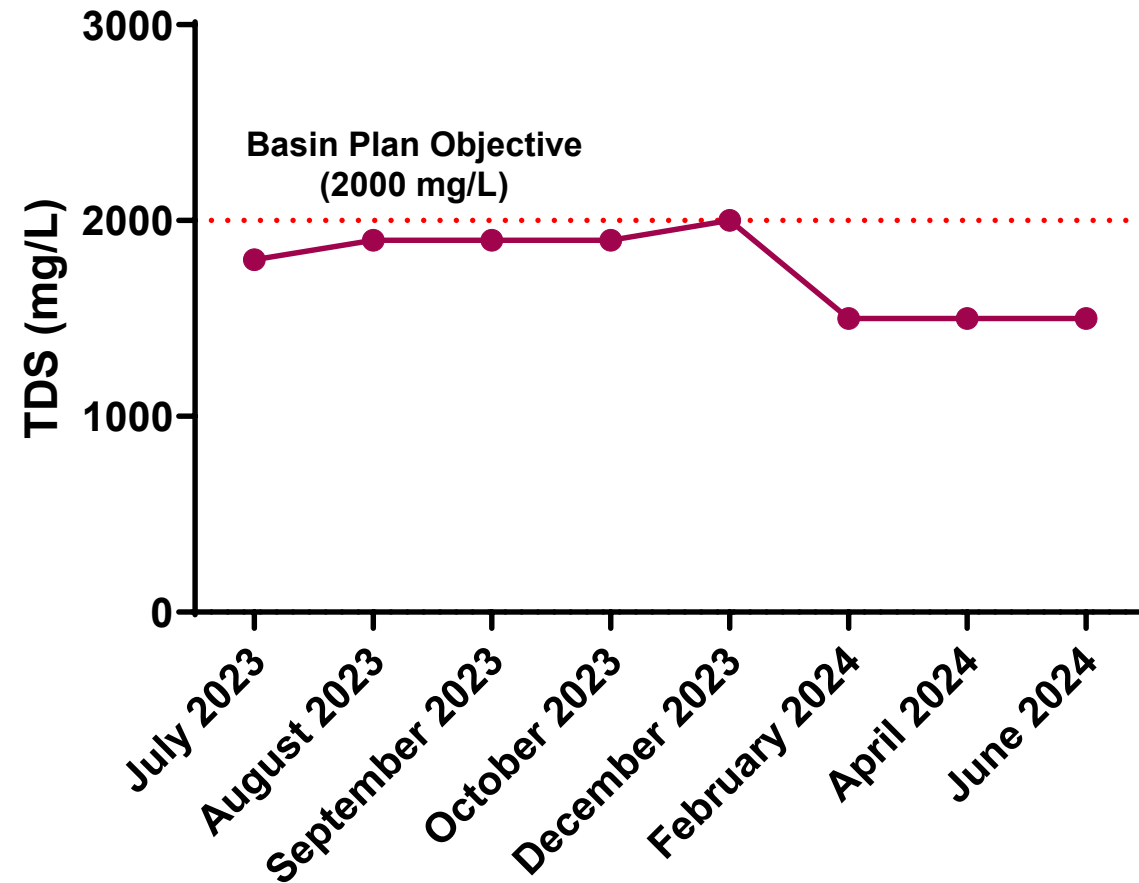


No data available from June 2012-July2015
 TMDL target of 0.1 mg/L is annual average to be attained by 2020
Bold represents current monitoring year July 2023-June 2024



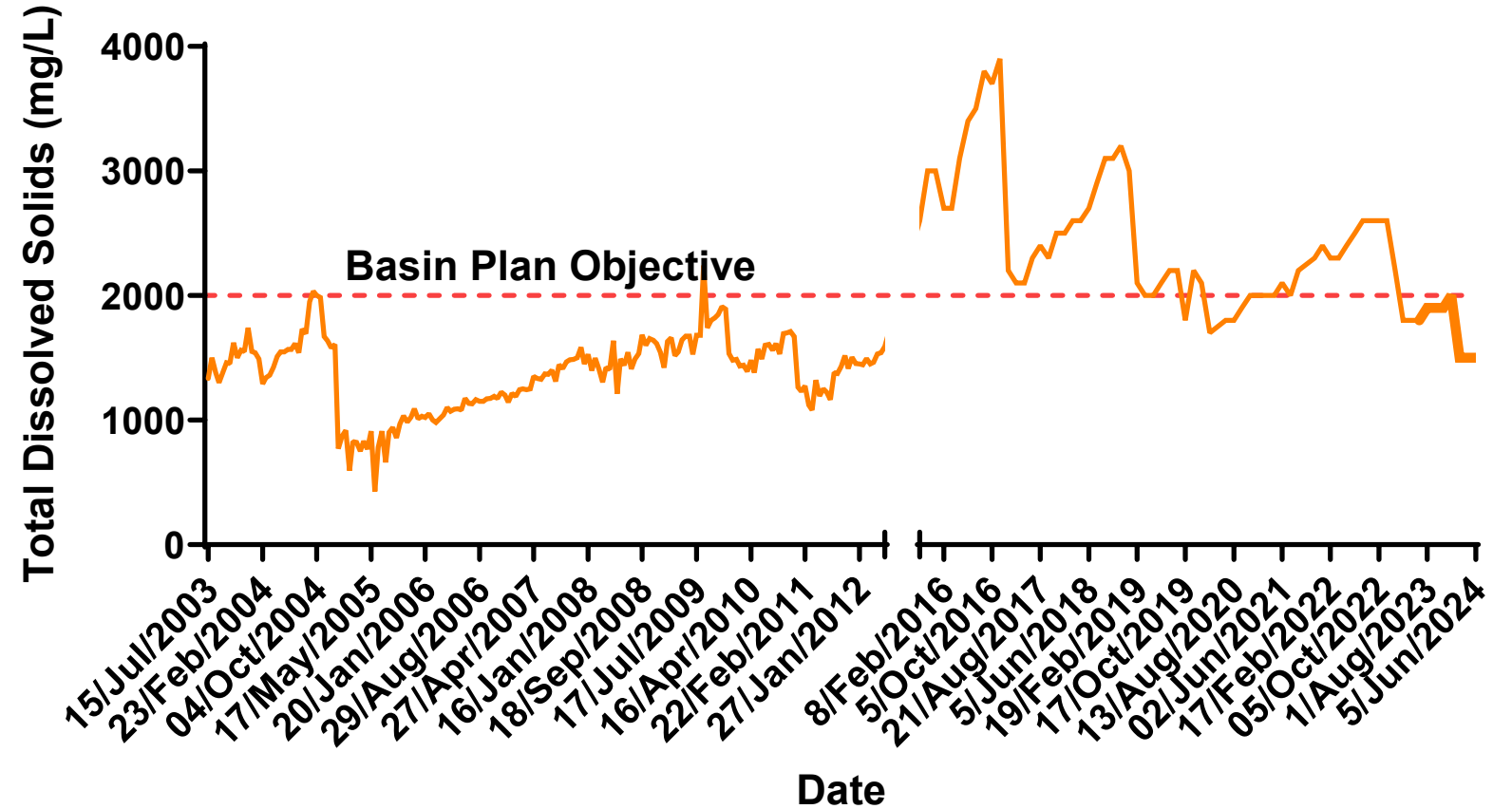
In-Lake Monitoring - Lake Elsinore

Total Dissolved Solids





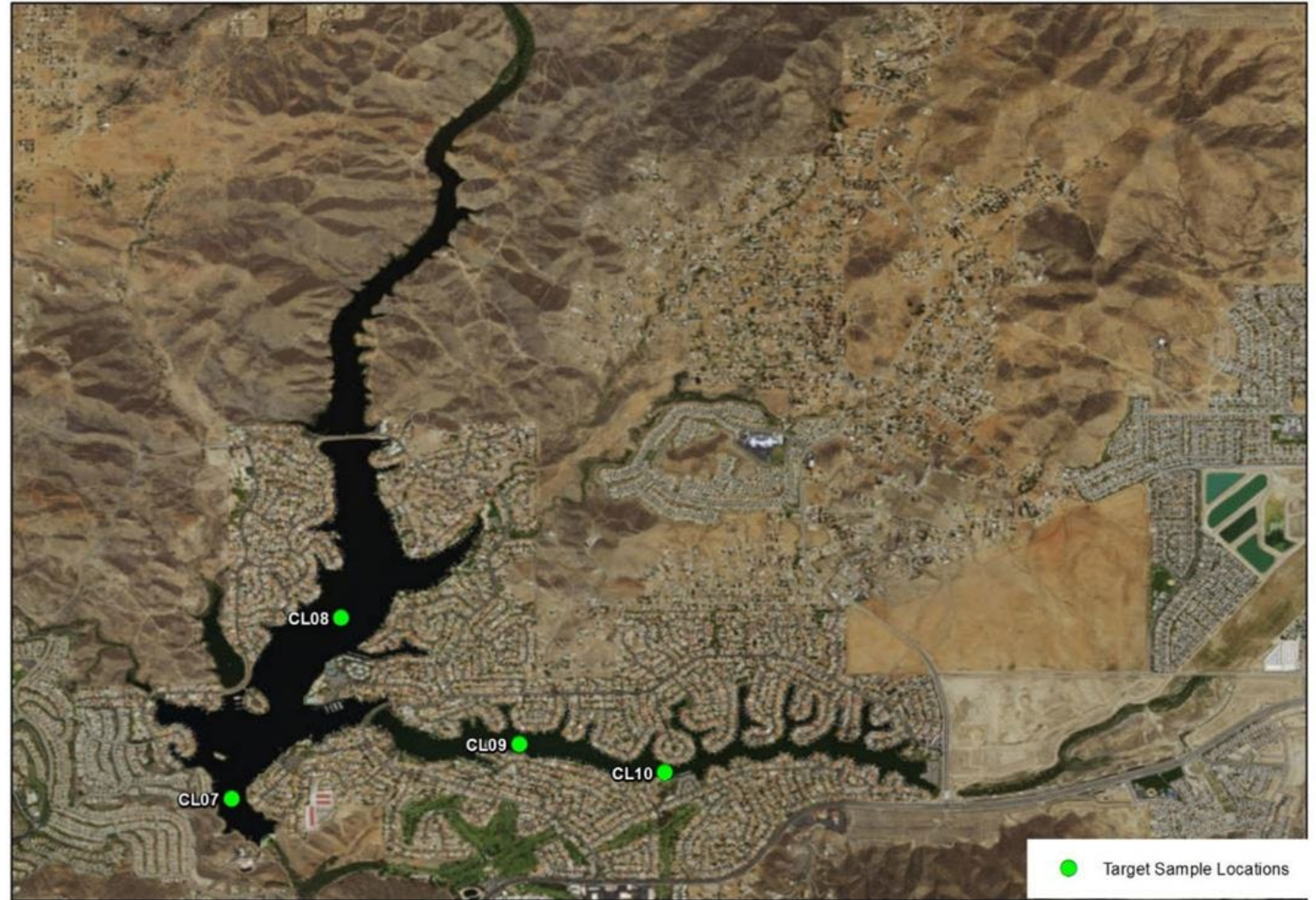
In-Lake Monitoring - Lake Elsinore



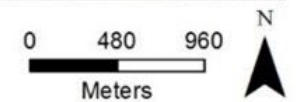
No data available from June 2012-July 2015

Bold represents current monitoring year July 2023-June 2024

In-Lake Monitoring



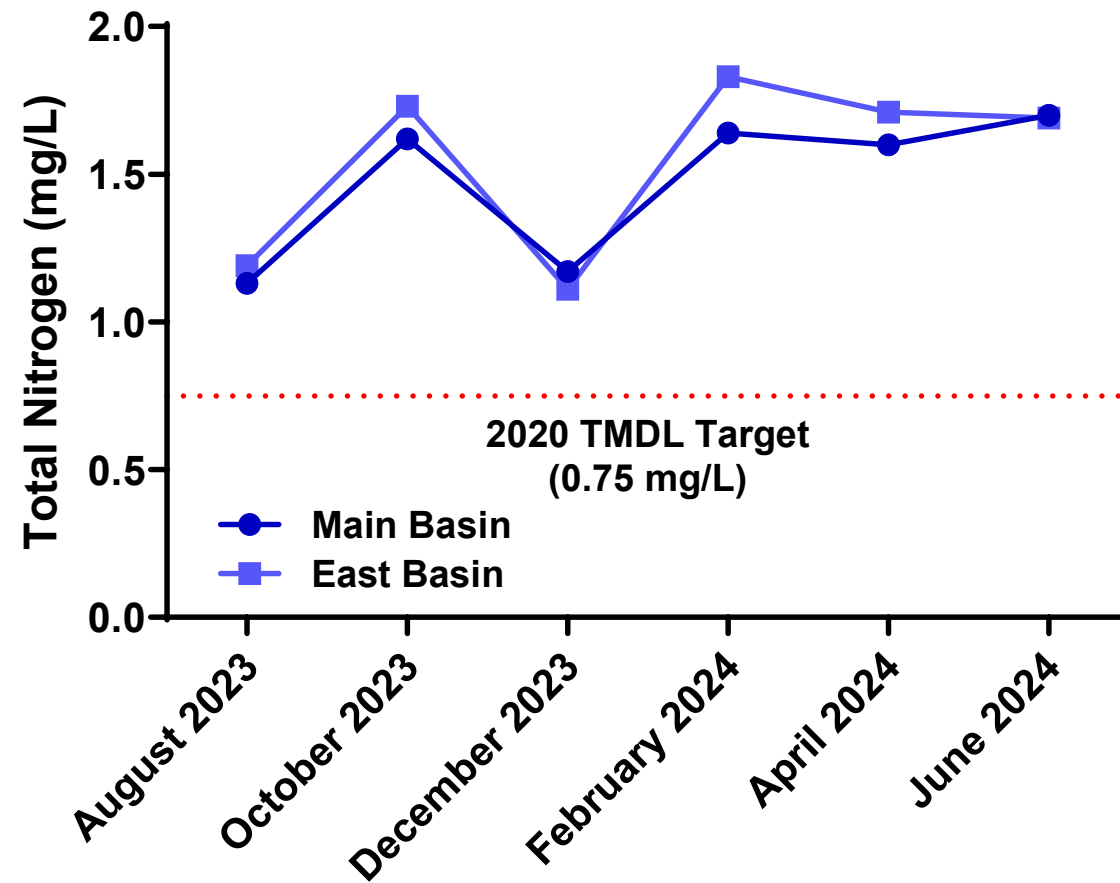
Sample Locations
For Canyon Lake



In-Lake Monitoring – Canyon Lake

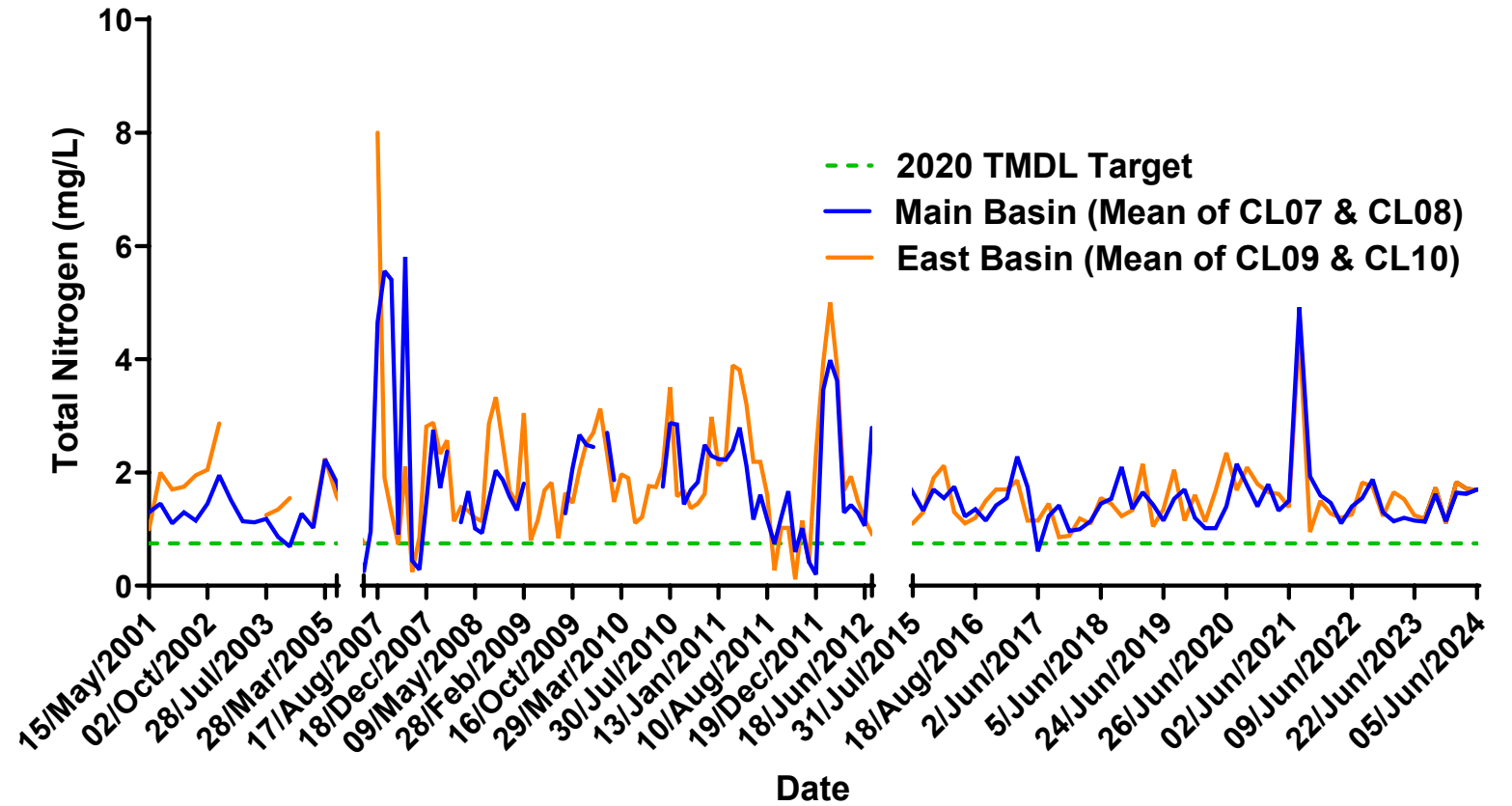


Total Nitrogen





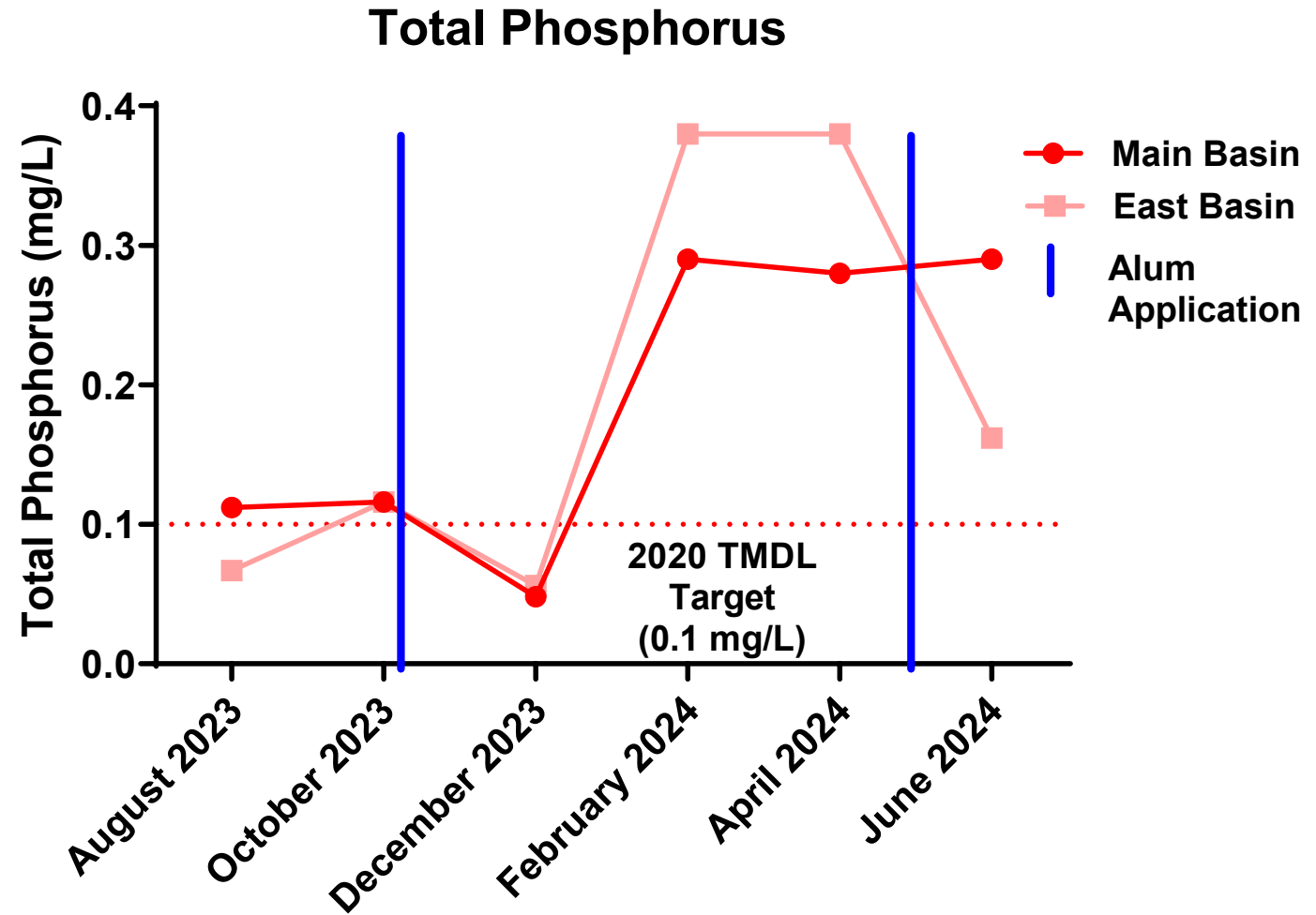
In-Lake Monitoring - Canyon Lake



No data available from May 2005-July 2007; June 2012-July 2015
 TMDL target of 0.75 mg/L is annual average to be attained by 2020
Bold represents current monitoring year July 2023-June 2024

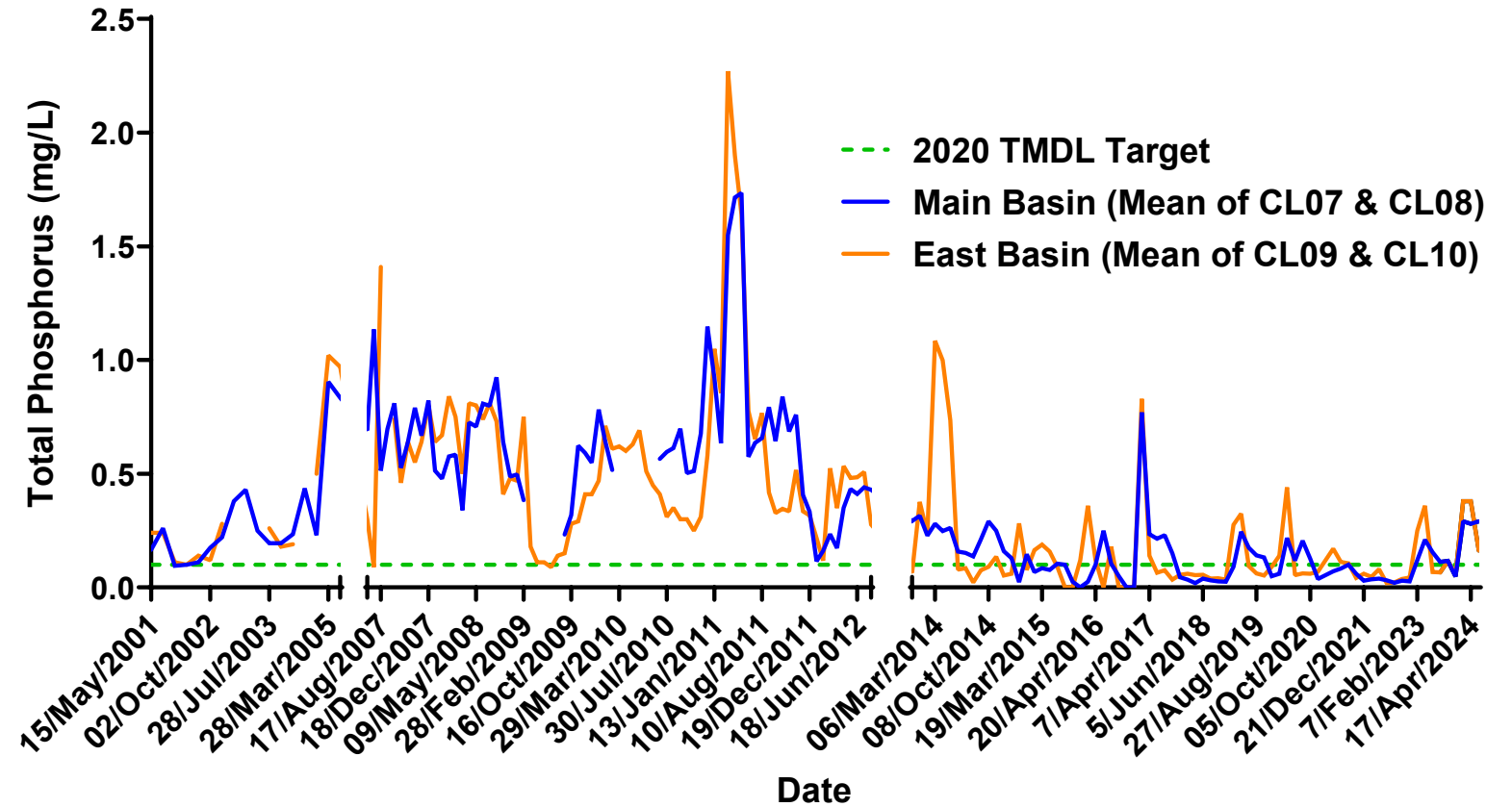


In-Lake Monitoring - Canyon Lake





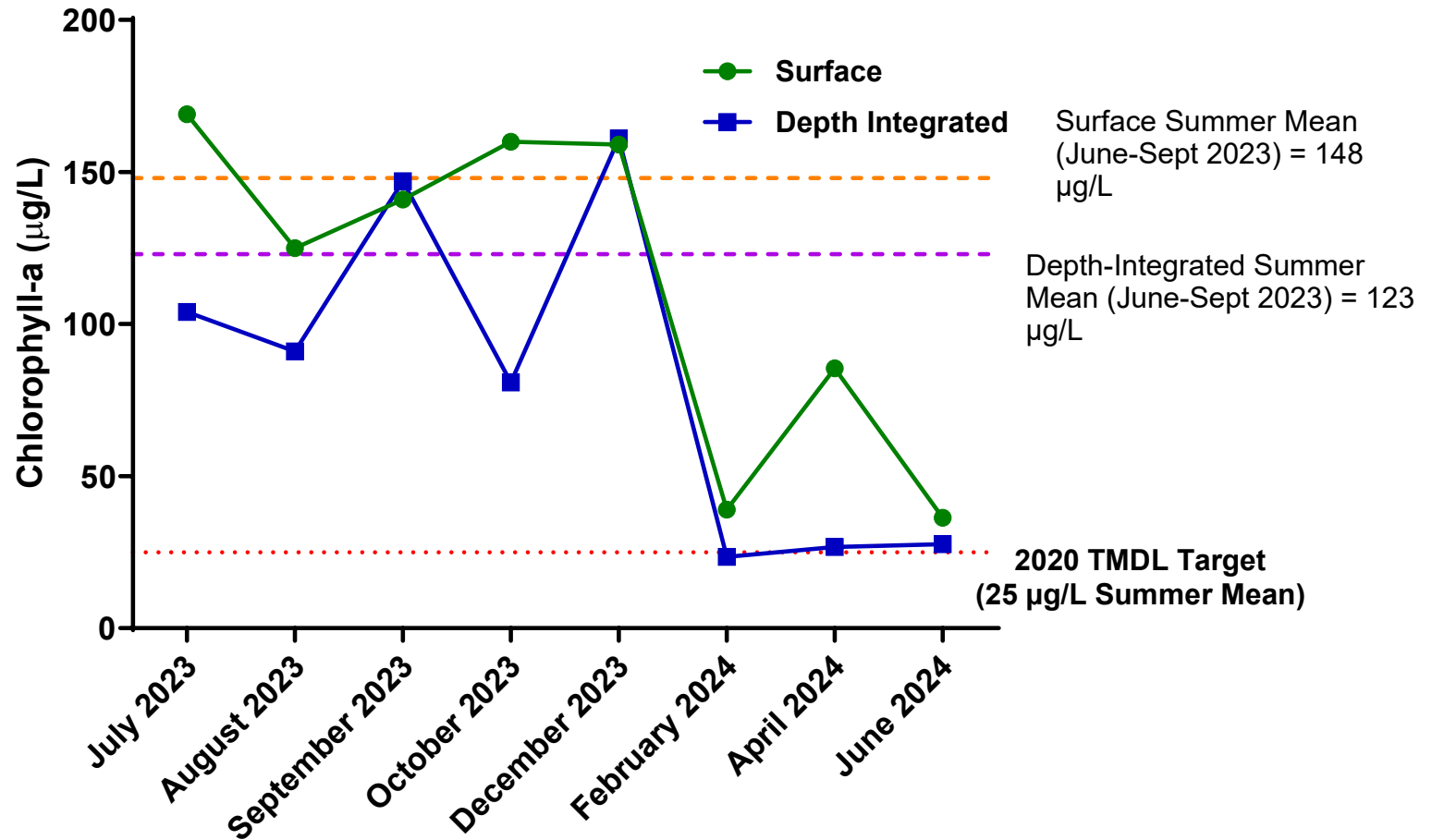
In-Lake Monitoring - Canyon Lake



No data available from May 2005-July 2007; June 2012-Sept 2013
 TMDL target of 0.1 mg/L is annual average to be attained by 2020
Bold represents current monitoring year July 2023-June 2024

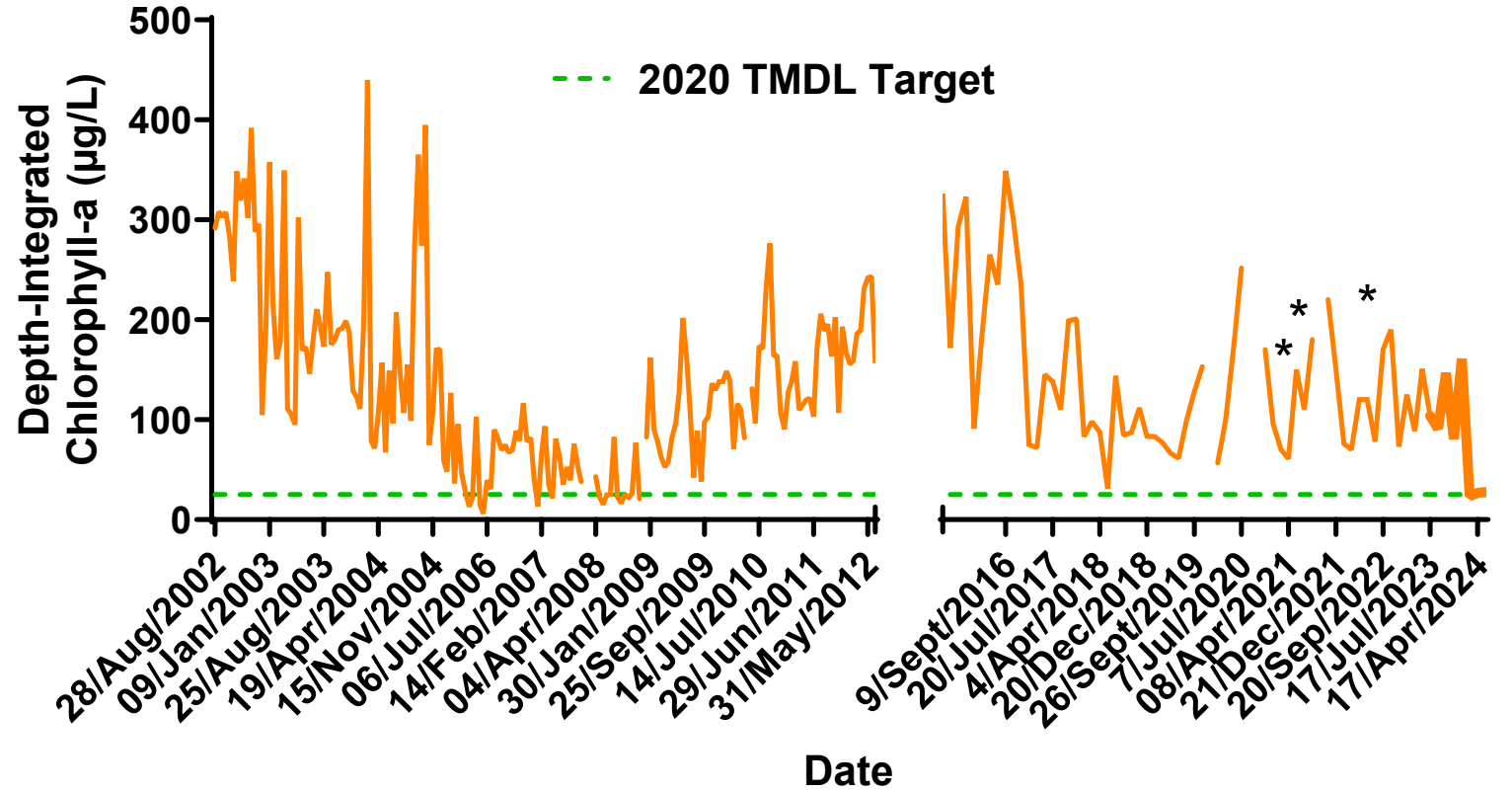


In-Lake Monitoring – Lake Elsinore





In-Lake Monitoring – Lake Elsinore



No data available from June 2012-July 2015

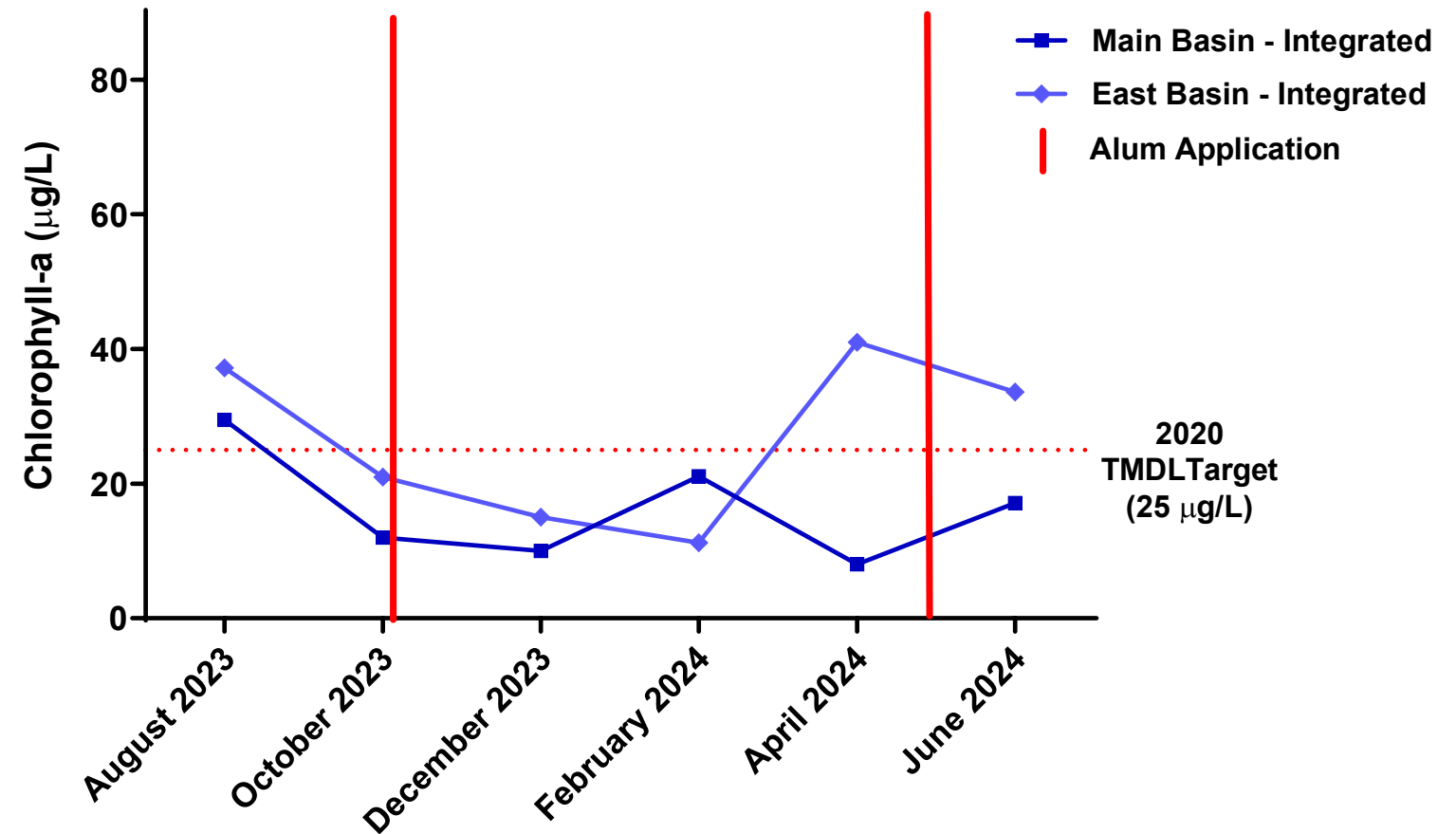
TMDL target of 25 µg/L is summer average to be attained by 2020

Bold represents current monitoring year July 2023- June 2024

*Not measured due to laboratory error. See report for details.

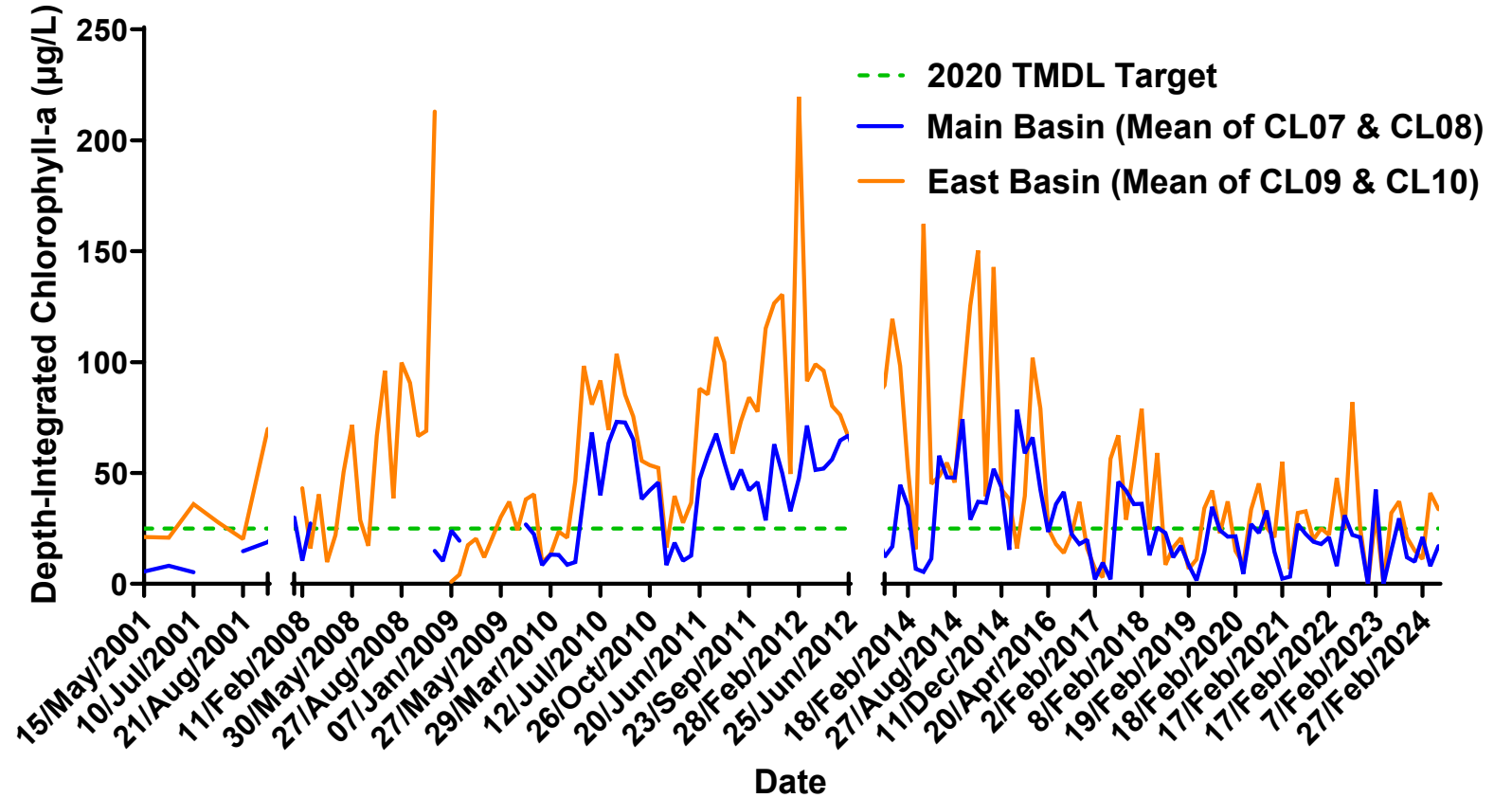


In-Lake Monitoring – Canyon Lake





In-Lake Monitoring – Canyon Lake



No data available from June 2012-July 2015

2020 TMDL target of 25 µg/L is annual average to be attained by 2020

Bold represents current monitoring year July 2023-June 2024

In-Lake Monitoring – Satellite July

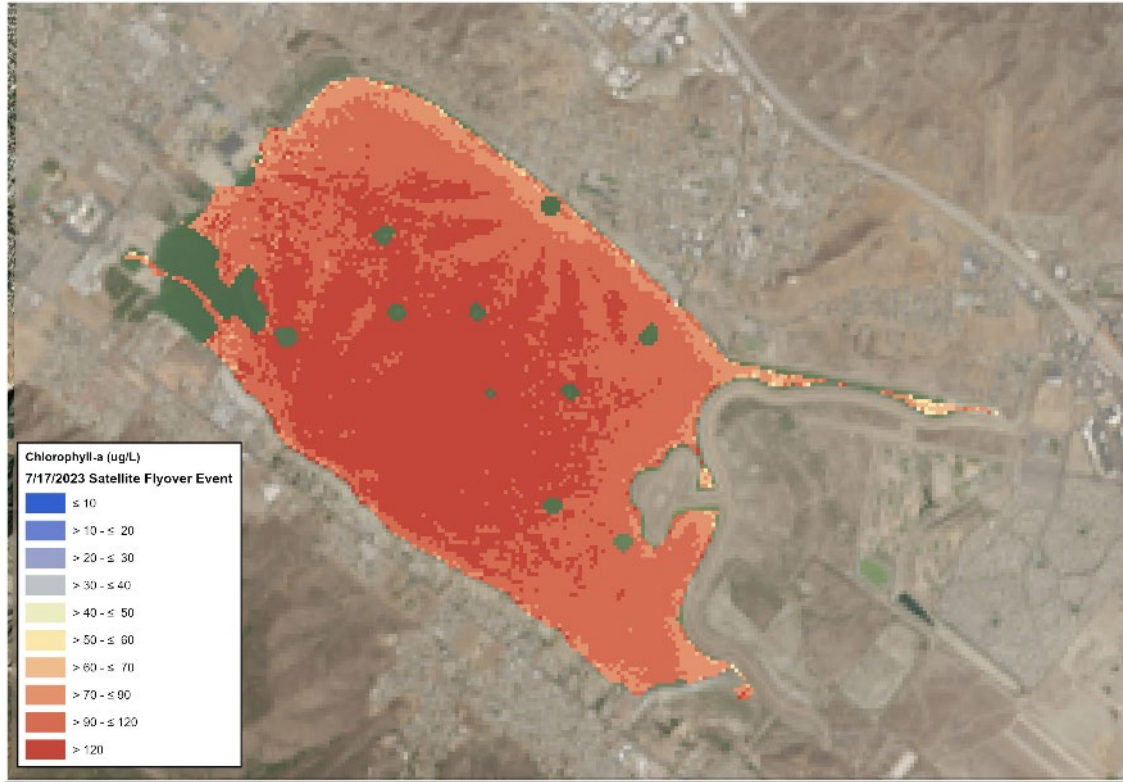


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**Chlorophyll-a Concentrations
Lake Elsinore
July 17, 2023 Satellite Flyover Event**

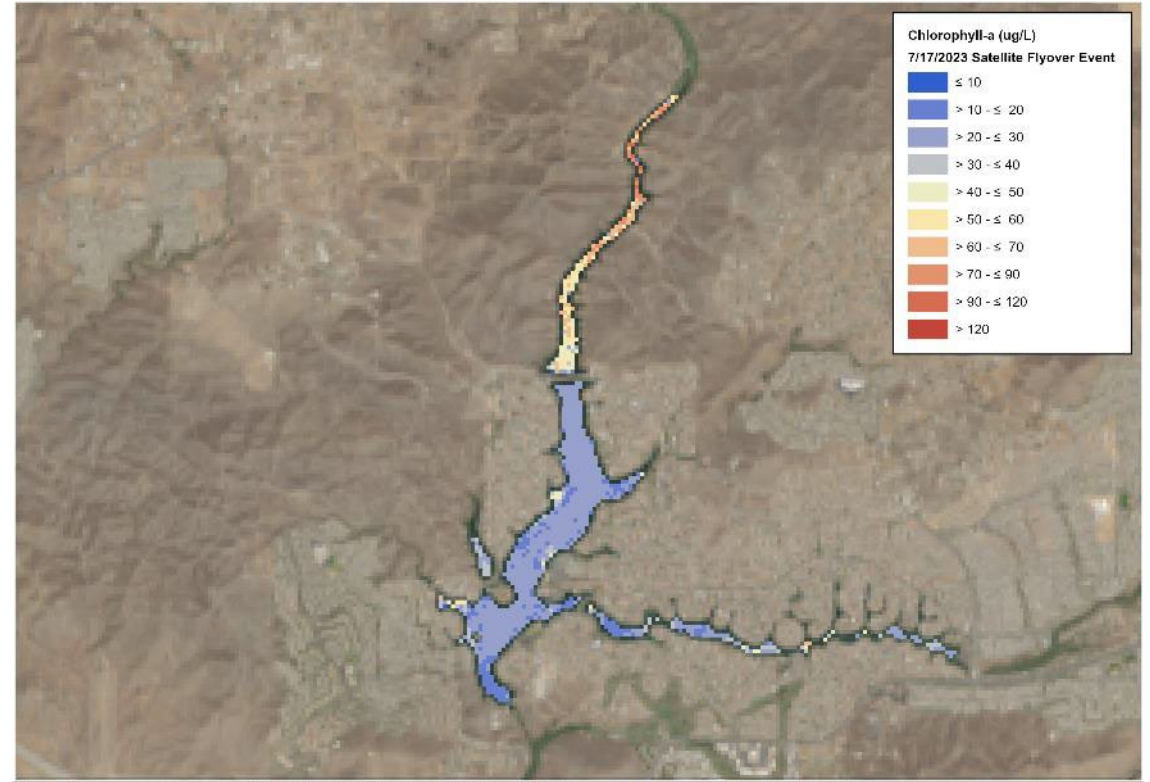
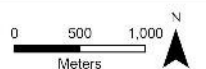


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**Chlorophyll-a Concentrations
Canyon Lake
July 17, 2023 Satellite Flyover Event**

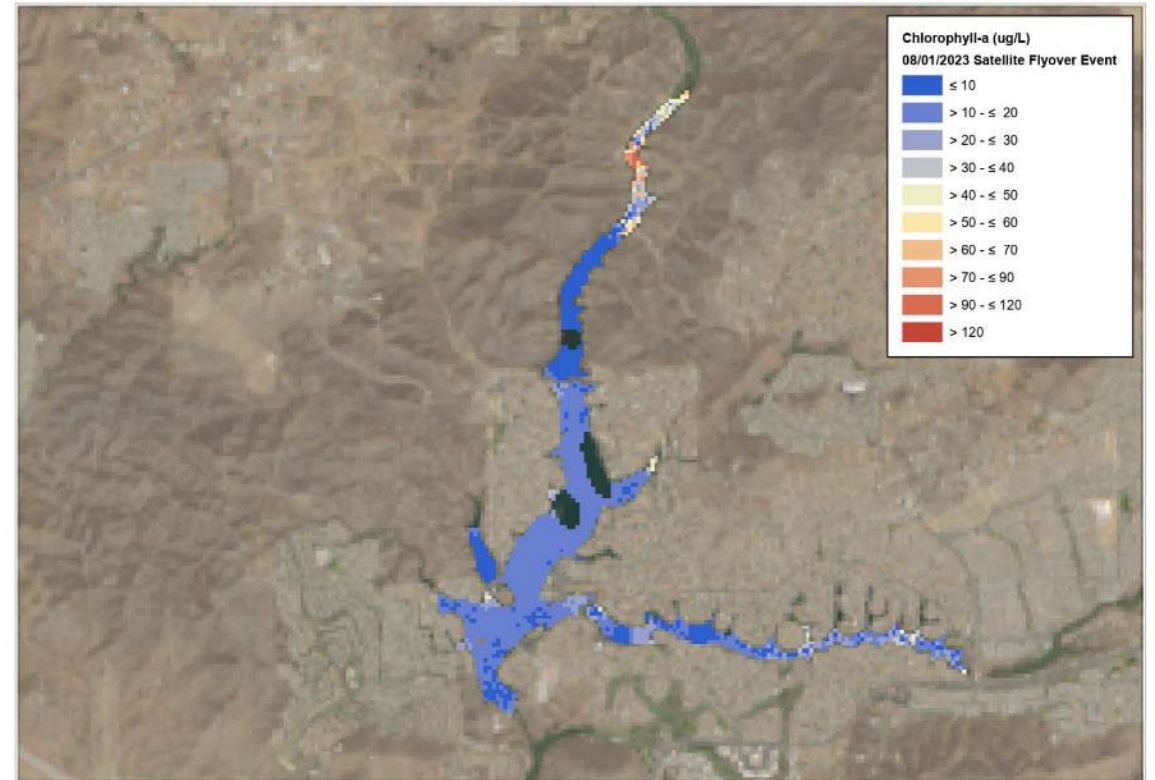
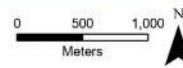


In-Lake Monitoring - Satellite August



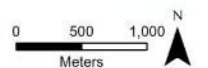
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Chlorophyll-a Concentrations
Lake Elsinore
August 01, 2023 Satellite Flyover Event

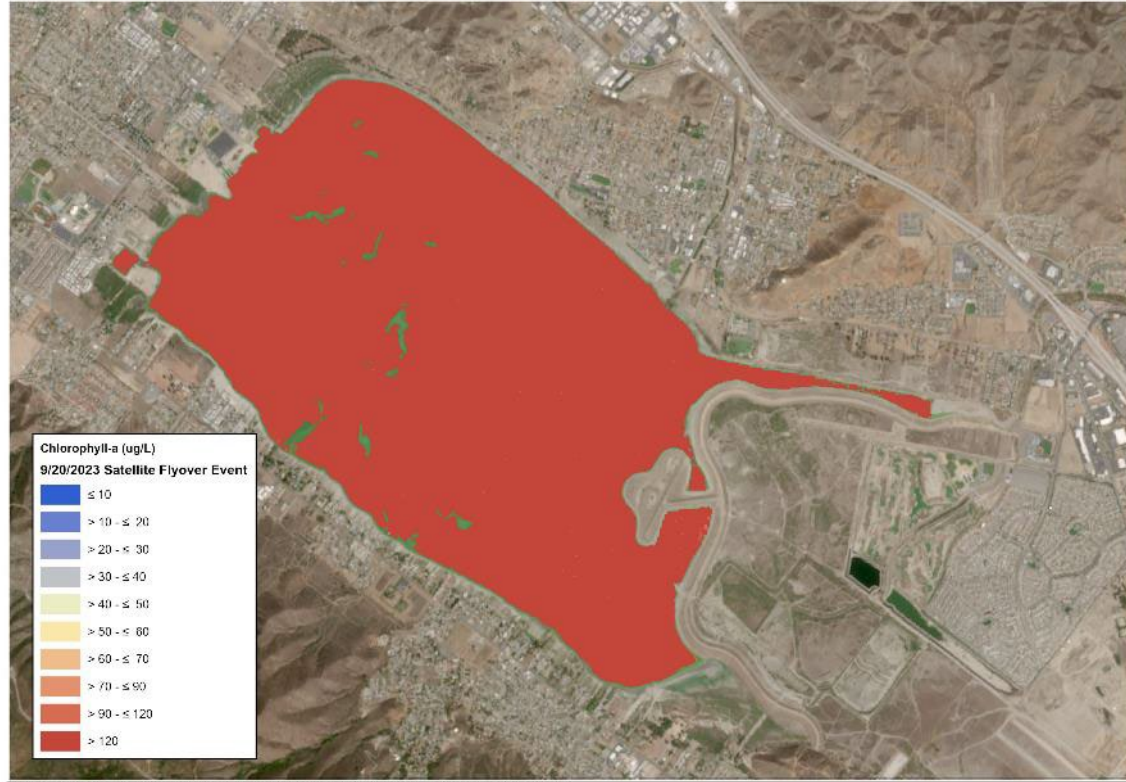


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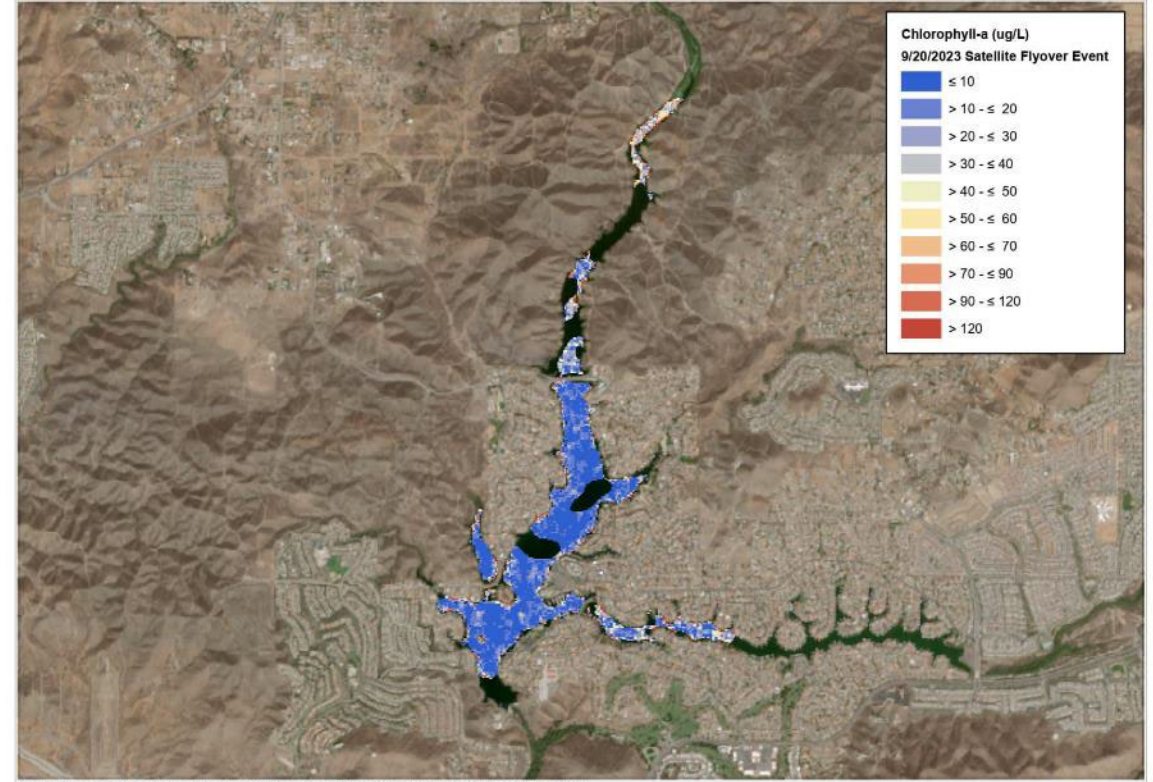
Chlorophyll-a Concentrations
Canyon Lake
August 1, 2023 Satellite Flyover Event



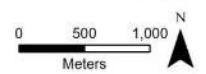
In-Lake Monitoring – Satellite September



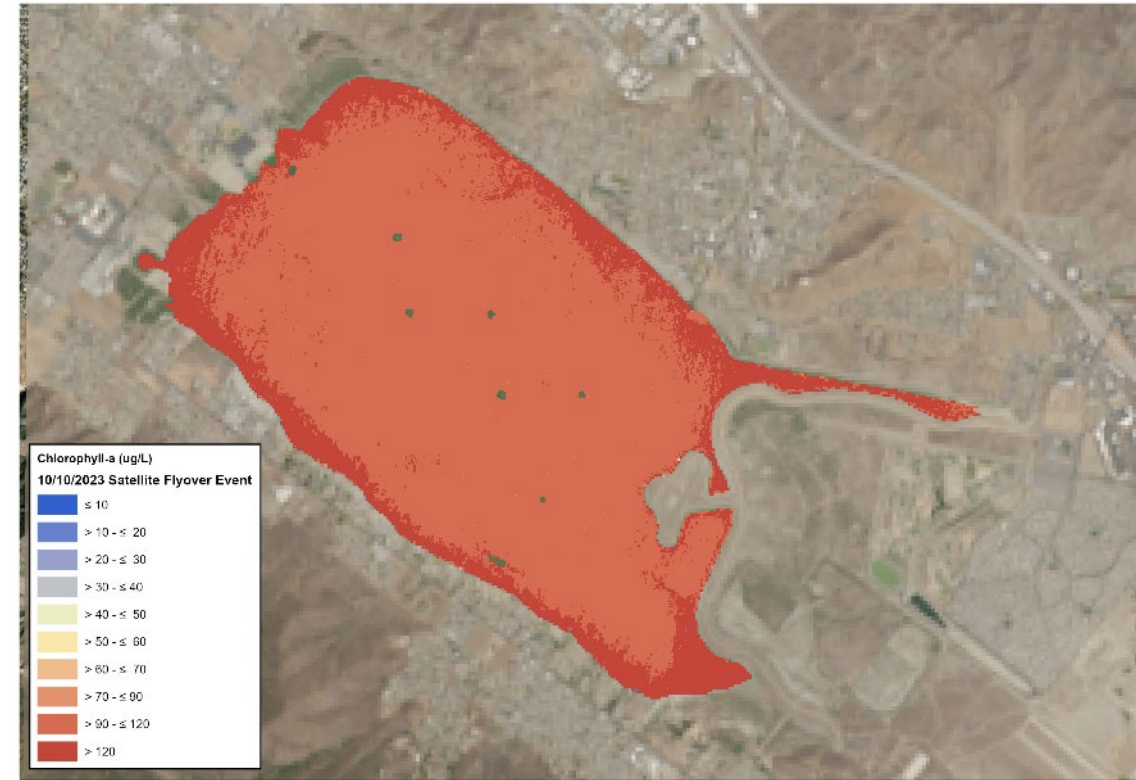
Satellite Imagery
Lake Elsinore
September 20, 2023 Satellite Flyover Event



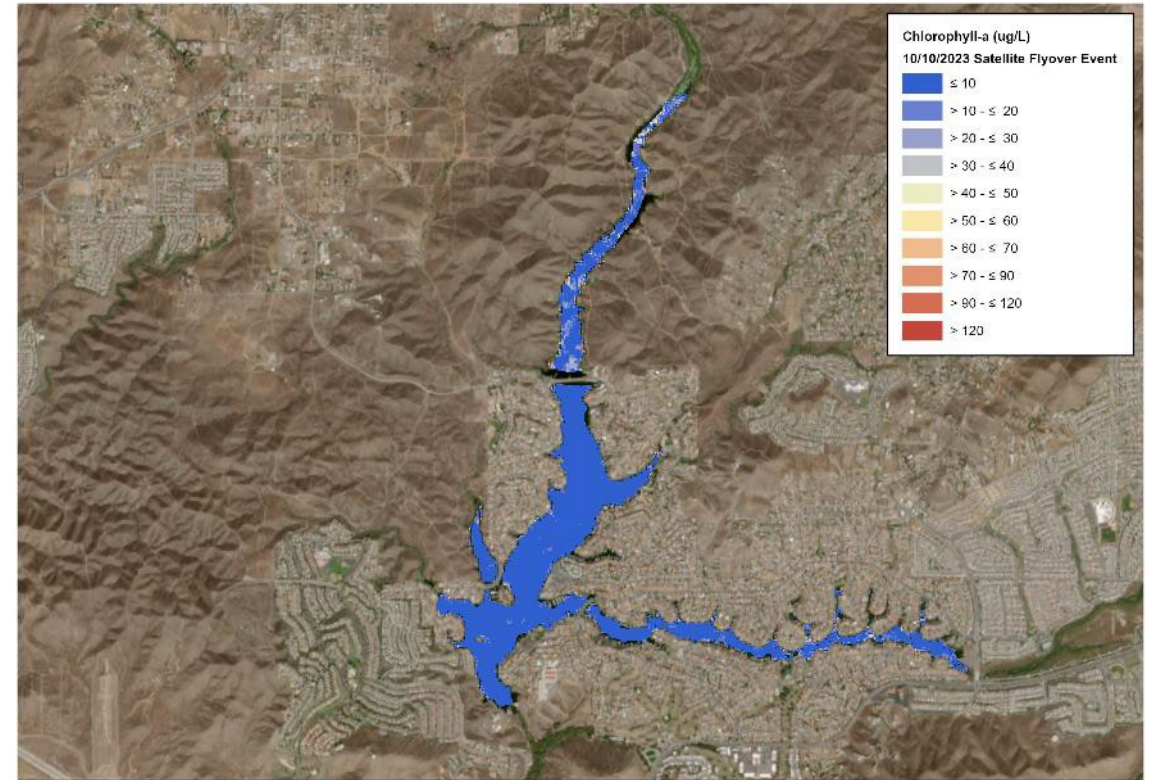
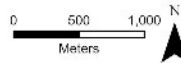
Satellite Imagery
Canyon Lake
September 20, 2023 Satellite Flyover Event



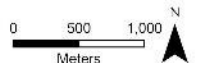
In-Lake Monitoring – Satellite October



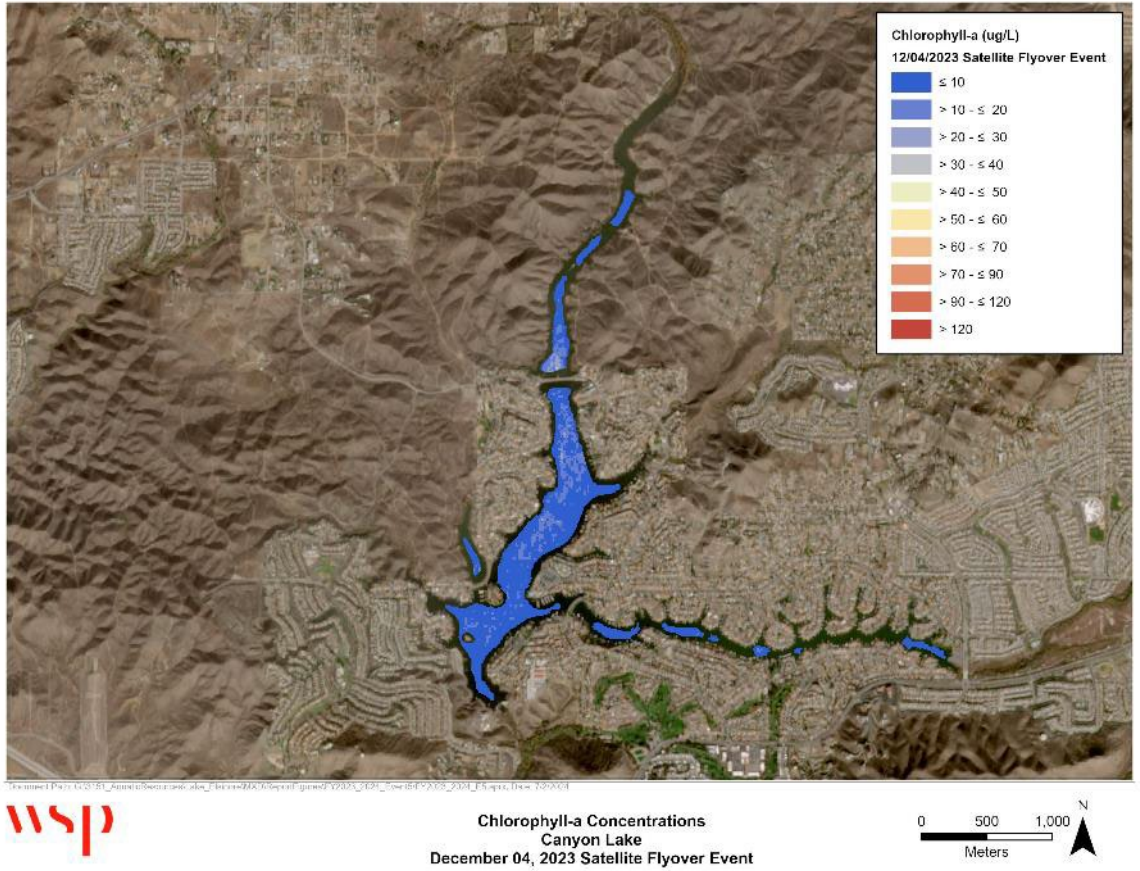
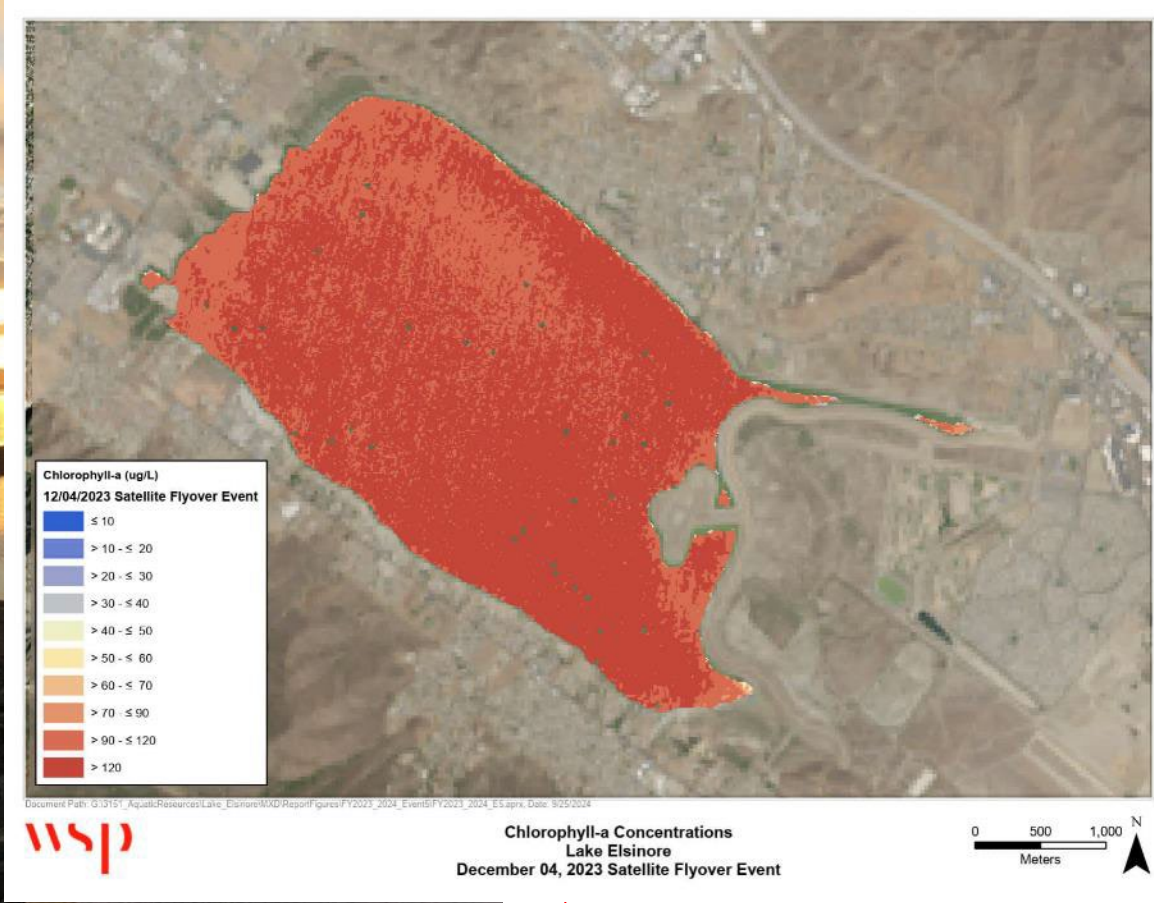
Chlorophyll-a Concentrations
Lake Elsinore
October 10, 2023 Satellite Flyover Event



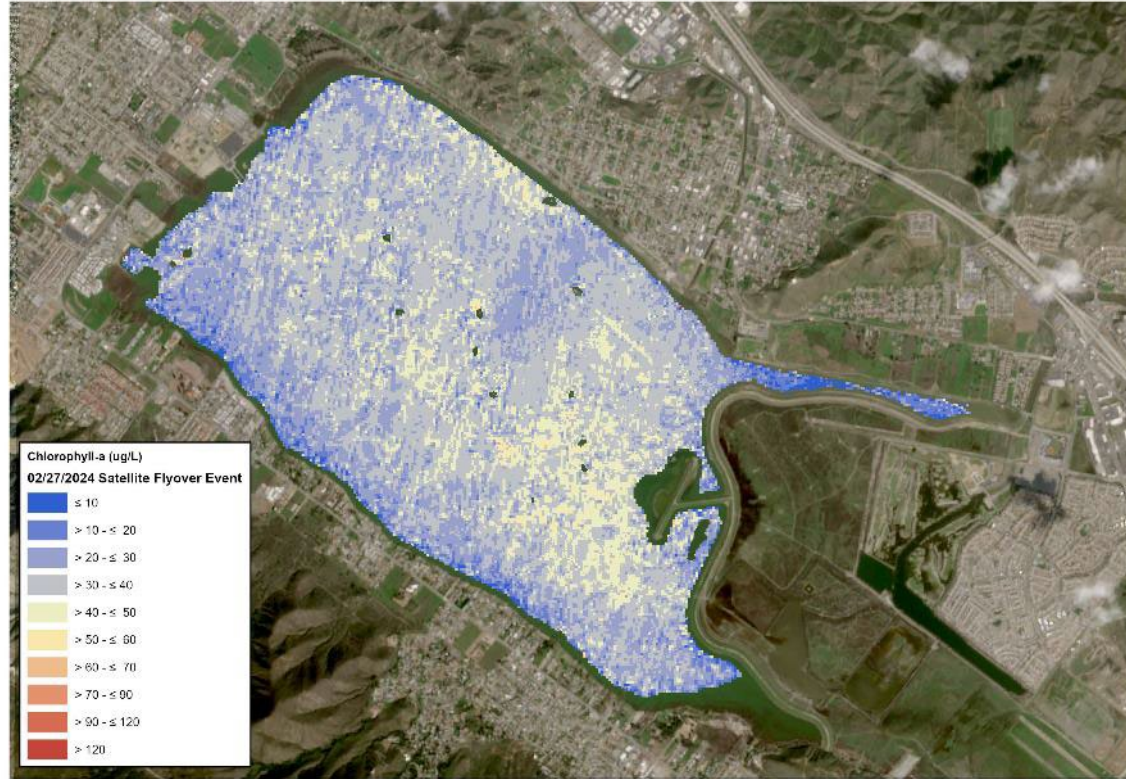
Chlorophyll-a Concentrations
Canyon Lake
October 10, 2023 Satellite Flyover Event



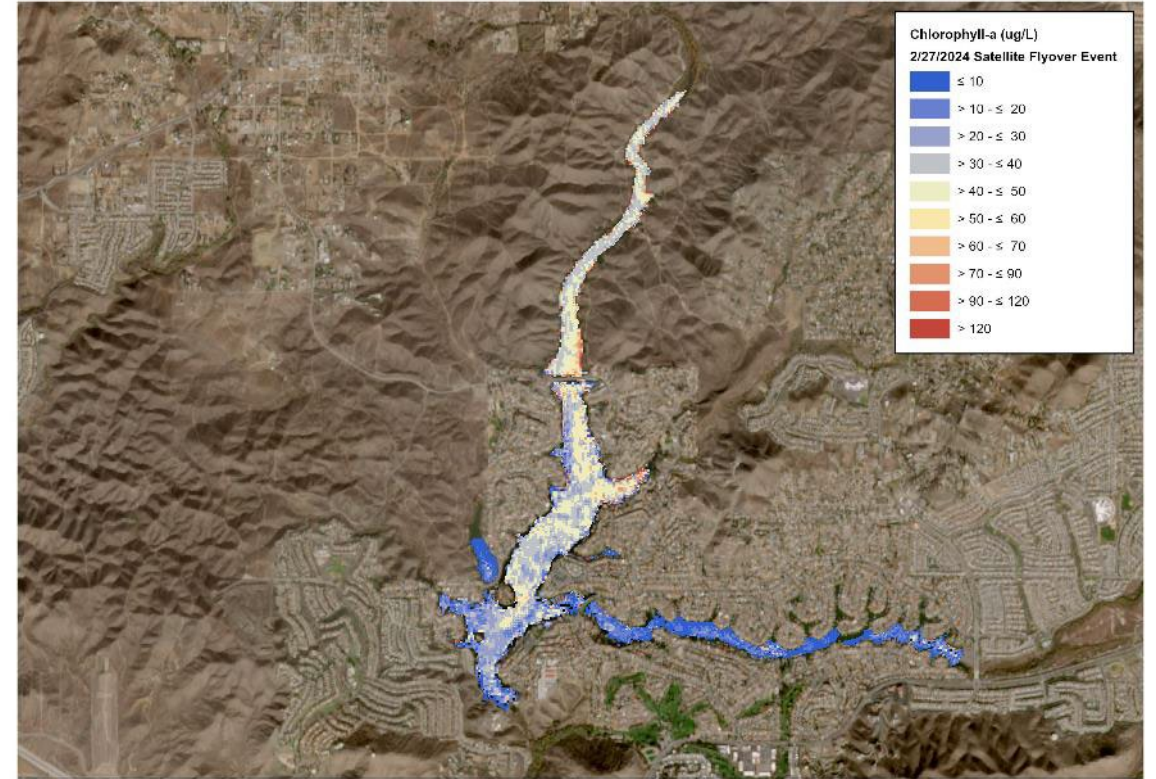
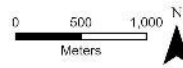
In-Lake Monitoring – Satellite December



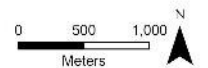
In-Lake Monitoring - Satellite February



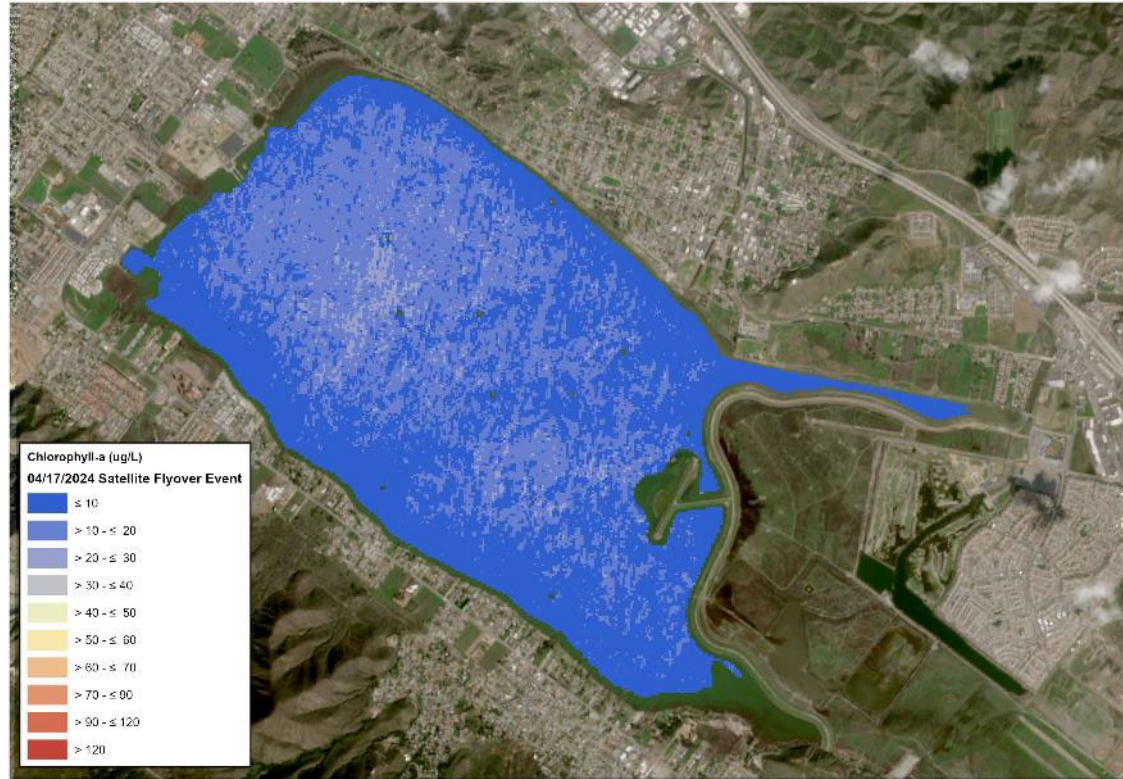
Chlorophyll-a Concentrations
Lake Elsinore
February 27, 2024 Satellite Flyover Event



Chlorophyll-a Concentrations
Canyon Lake
February 27, 2024 Satellite Flyover Event

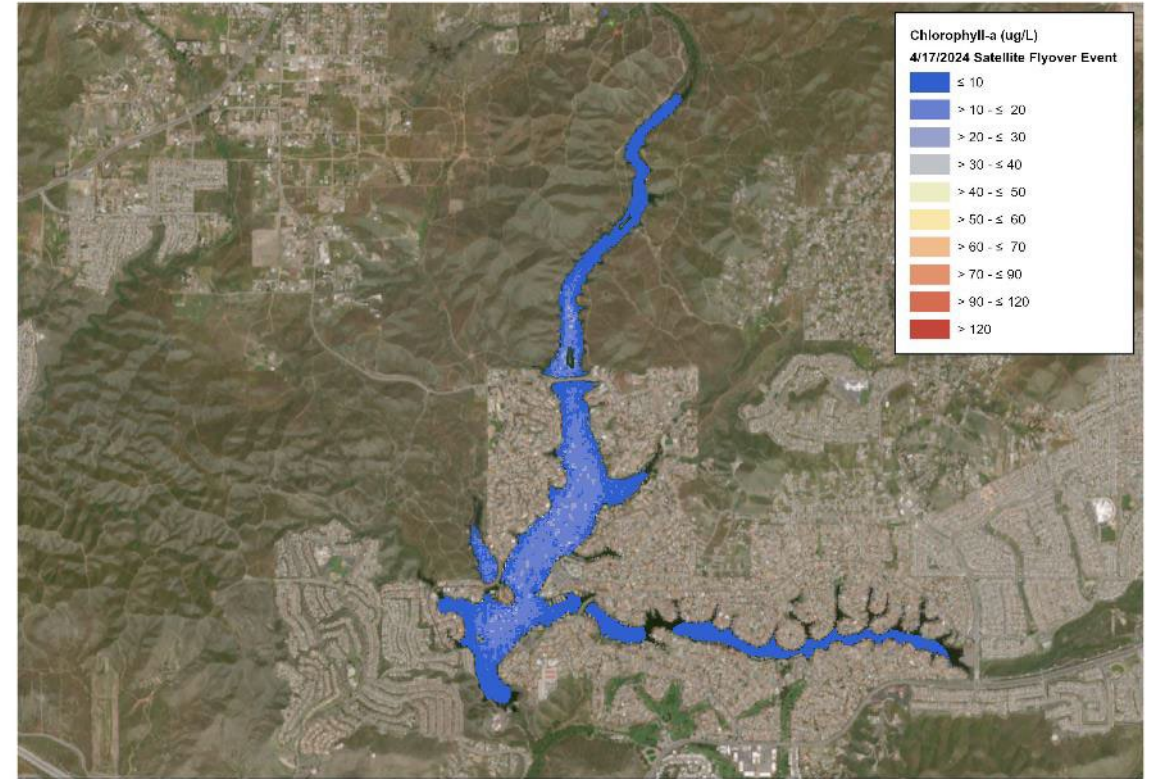


In-Lake Monitoring – Satellite April



Chlorophyll-a Concentrations
Lake Elsinore
 April 17, 2024 Satellite Flyover Event

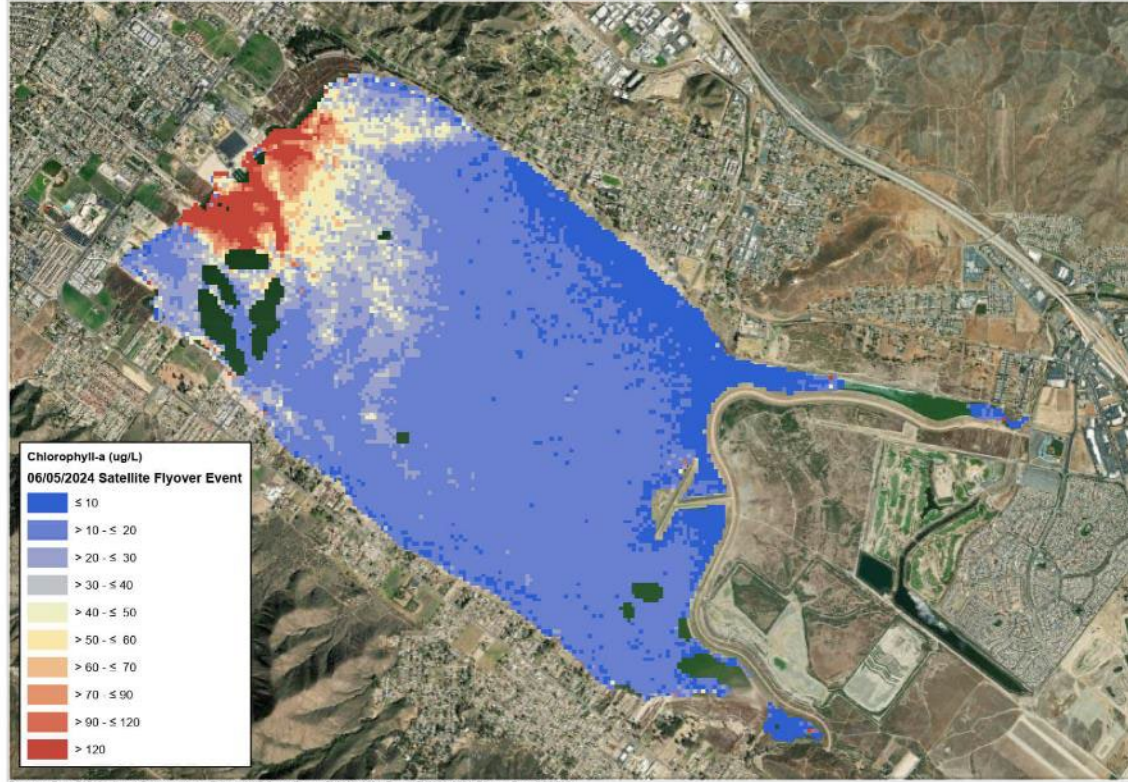
0 500 1,000
 Meters



Chlorophyll-a Concentrations
Canyon Lake
 April 17, 2024 Satellite Flyover Event

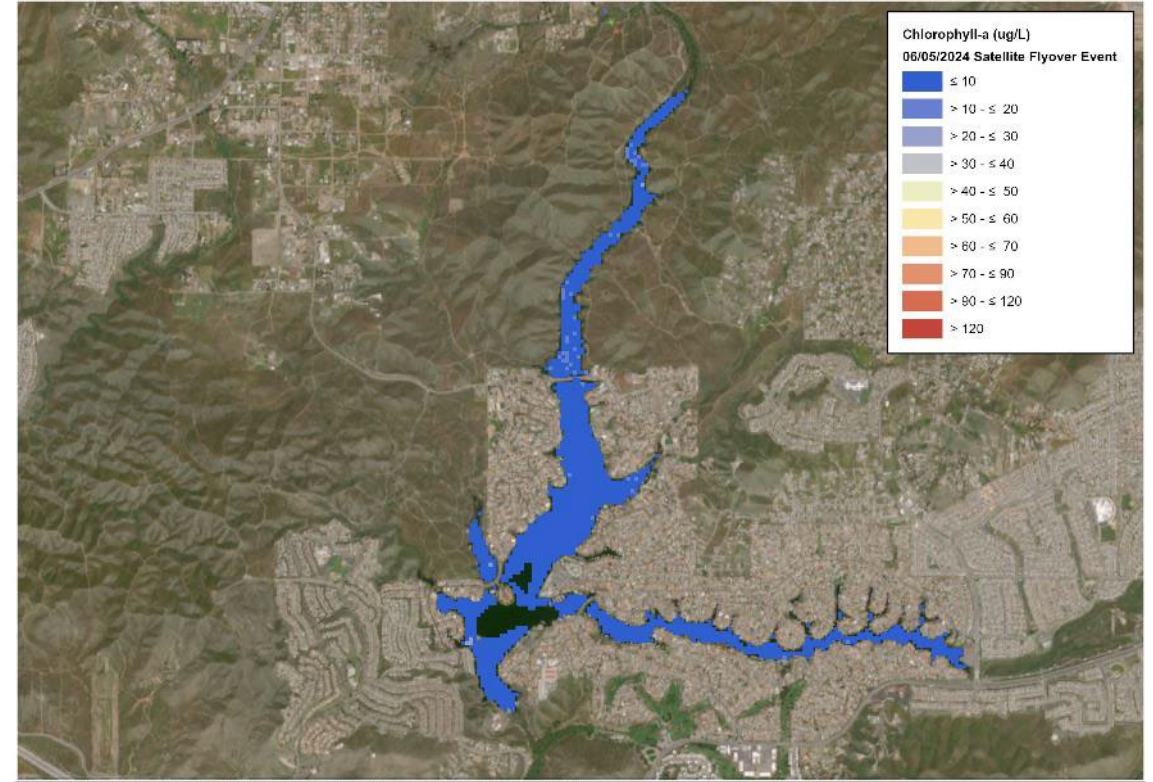
0 500 1,000
 Meters

In-Lake Monitoring – Satellite June



Chlorophyll-a Concentrations
Lake Elsinore
June 05, 2024 Satellite Flyover Event

0 500 1,000 Meters



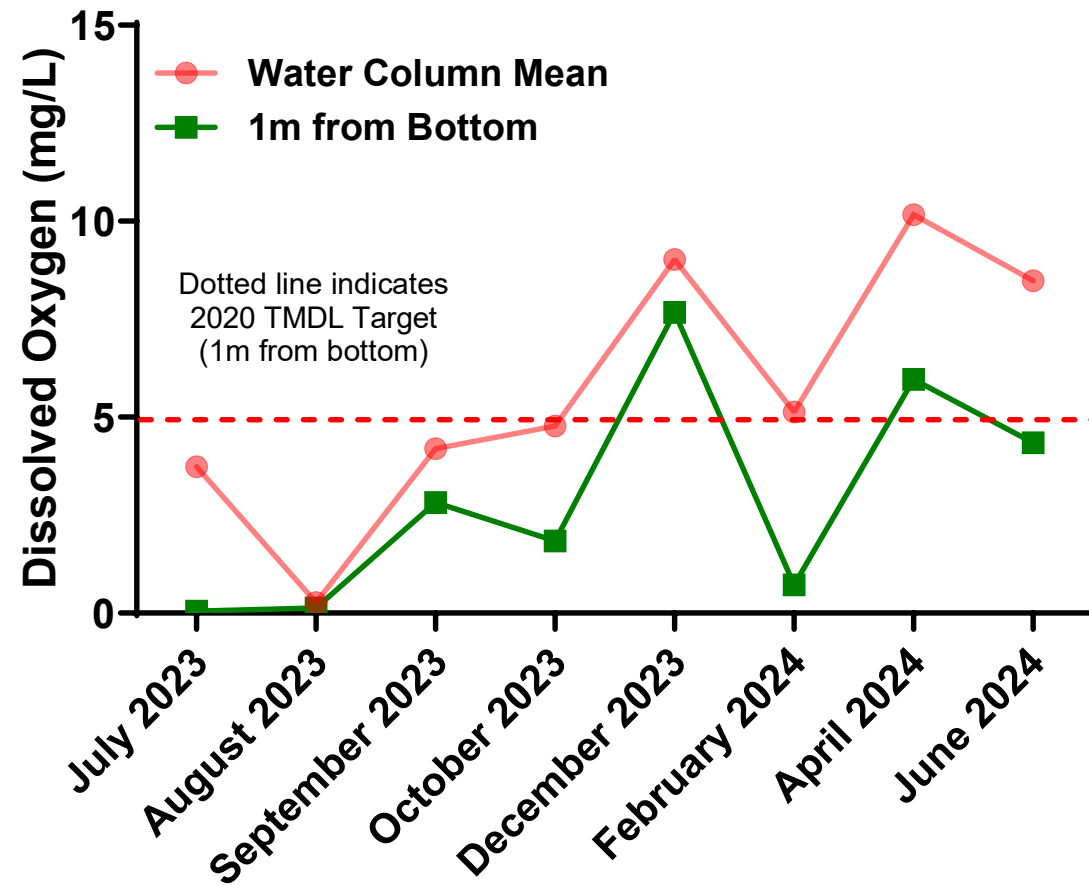
Chlorophyll-a Concentrations
Canyon Lake
June 05, 2024 Satellite Flyover Event

0 500 1,000 Meters



In-Lake Monitoring – Lake Elsinore

Dissolved Oxygen

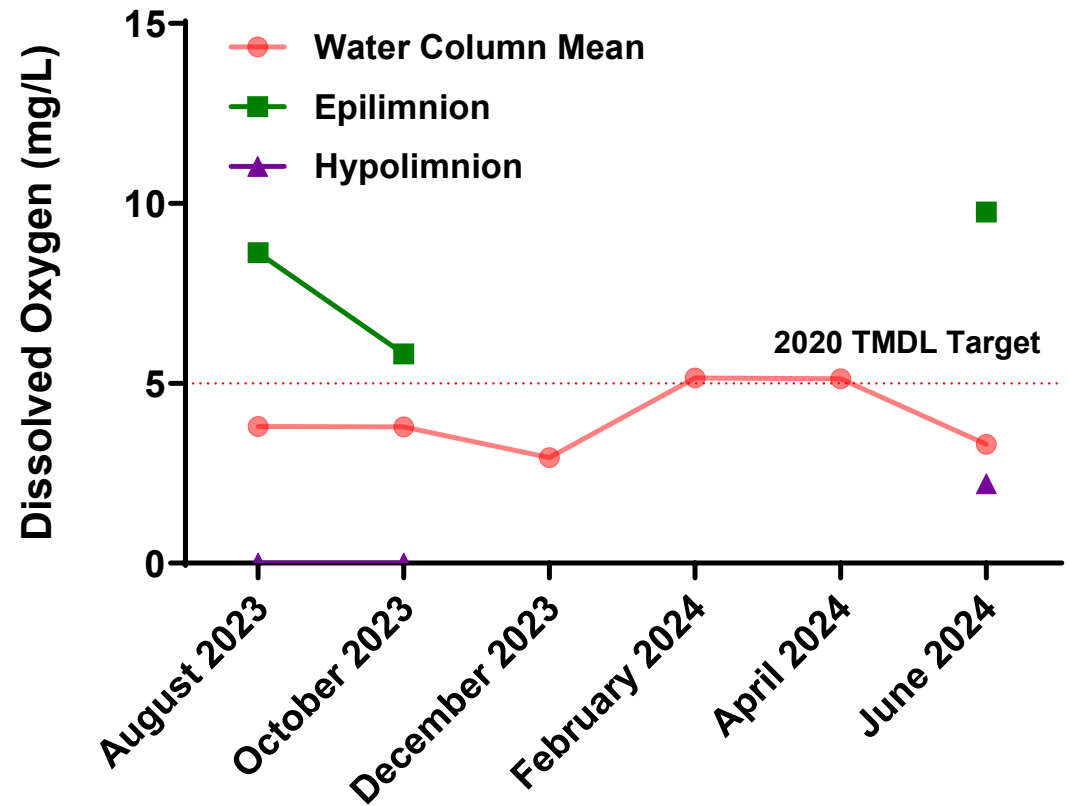




In-Lake Monitoring – Canyon Lake

**Main Basin
Mean of Sites
CL07 & CL08**

Dissolved Oxygen



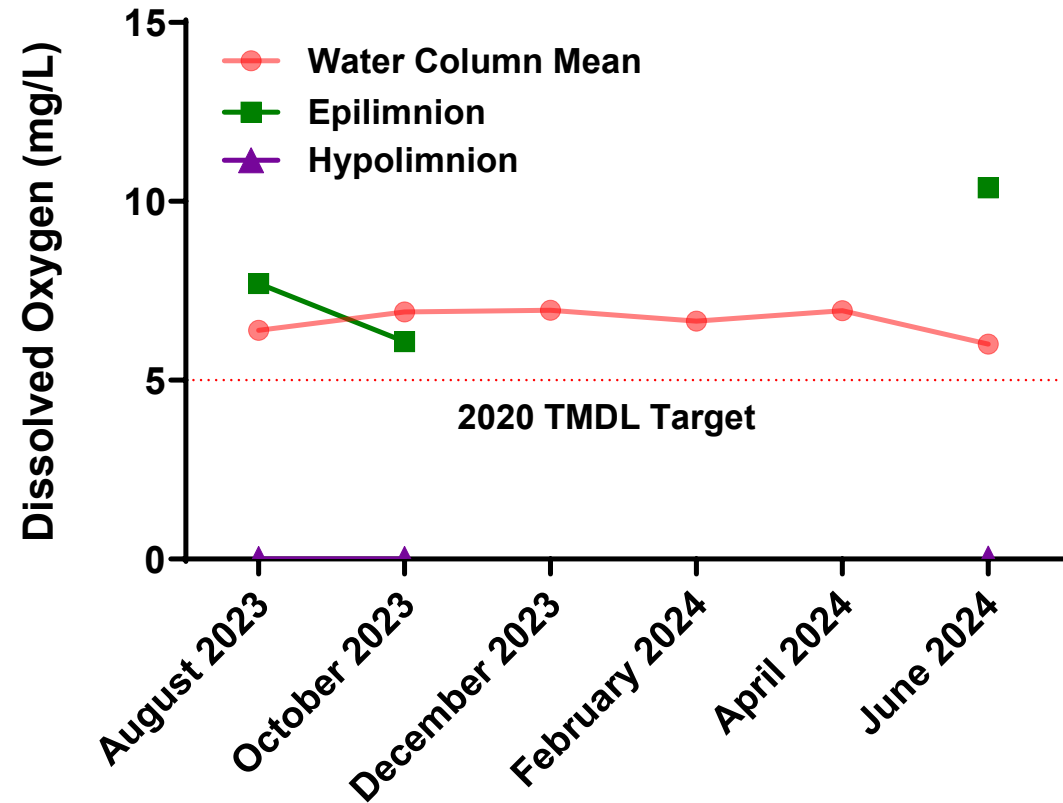
No stratification in December, February, and April



In-Lake Monitoring – Canyon Lake

**East Basin
Mean of Sites
CL09 & CL10**

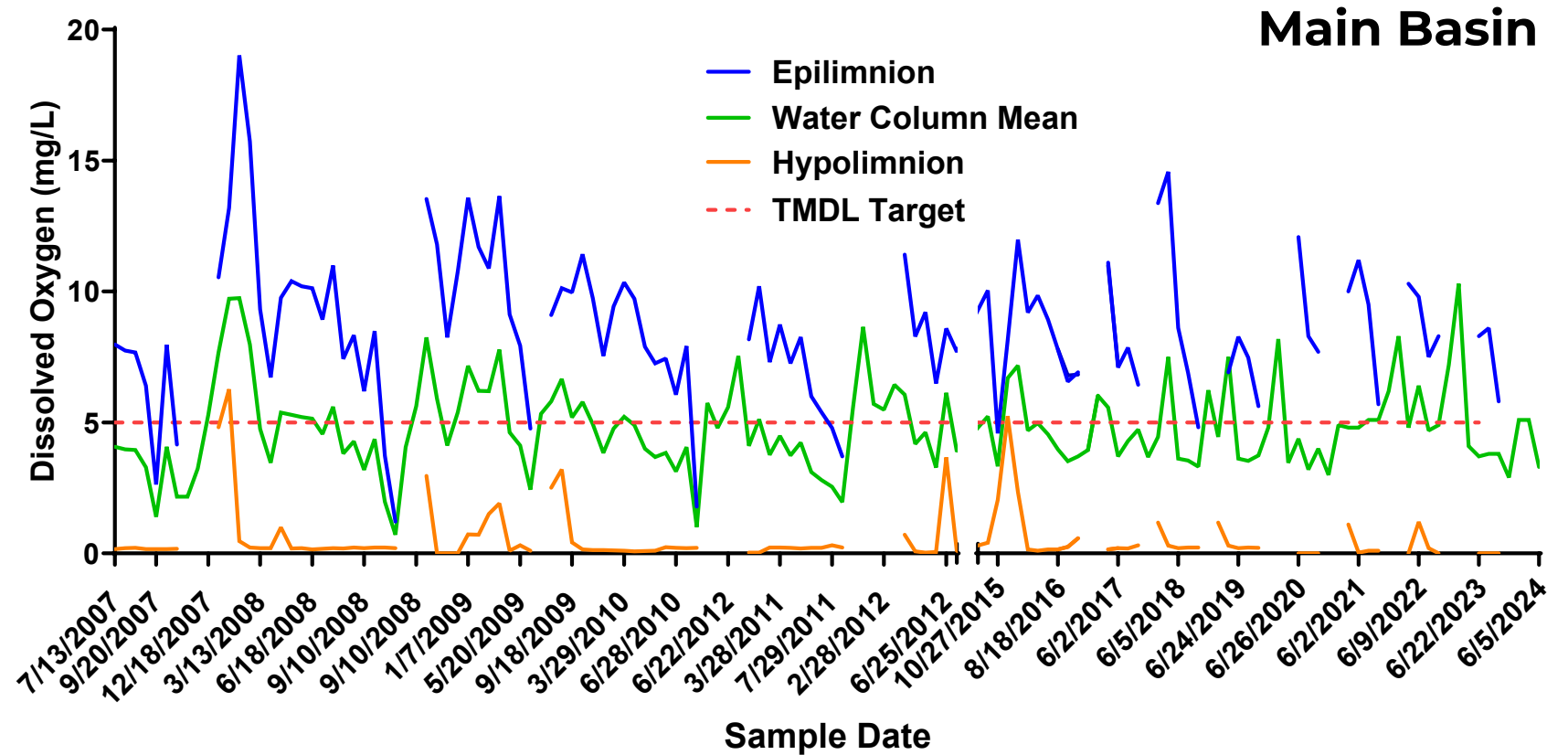
Dissolved Oxygen



No stratification in December, February, and April



In-Lake Monitoring – Canyon Lake



No data available from June 2012 - July 2015

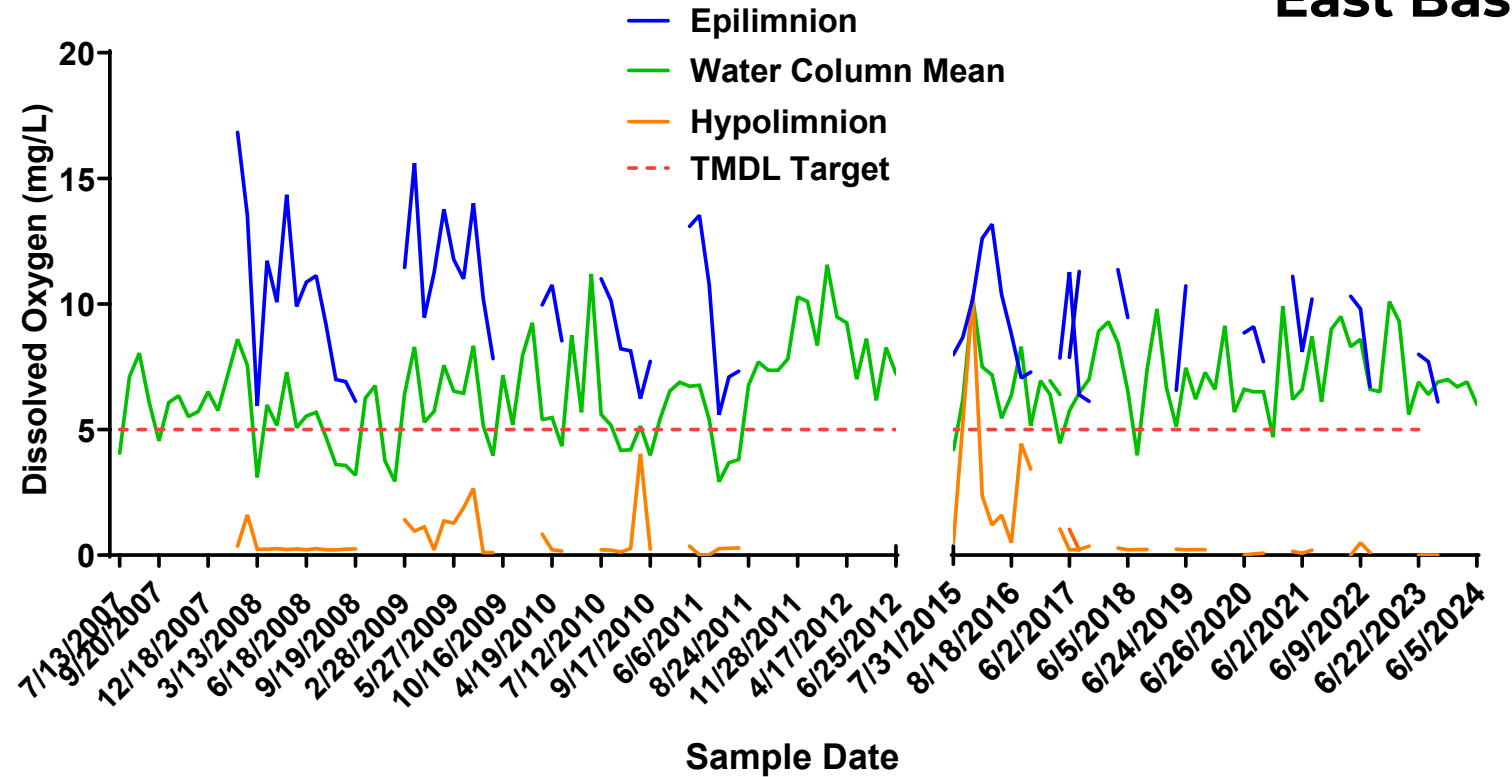
Data represents average values of sites CL07 and CL08

TMDL 2015 target >5 mg/L in Epilimnion, 2020 target >5 mg/L in Hypolimnion



In-Lake Monitoring – Canyon Lake

East Basin



No data available from June 2012 - July 2015

Data represents average values of sites CL09 and CL10

TMDL 2015 target >5 mg/L in Epilimnion, 2020 target >5 mg/L in Hypolimnion



Questions?



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