El Dorado Hydroelectric Project
FERC Project No. 184

2021 Water Quality Monitoring Report

EL DORADO IRRIGATION DISTRICT
2890 Mosquito Road
Placerville, CA 95667

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1.0 INTRODUCTION

The El Dorado Irrigation District (District) developed a water quality monitoring plan (Plan; EID 2007; amended 2018) to satisfy the water quality monitoring requirements as required by conditions of the Federal Energy Regulatory Commission (FERC) license for the El Dorado Hydroelectric Project (Project 184) . The monitoring plan was designed to provide information regarding overall water quality within the area of Project 184 (Project), identify potential water quality impacts related to the Project operations, and develop resource measures for the protection, mitigation, and enhancement of water quality where the District can control such factors.

2.0 SAMPLE LOCATIONS

The following sampling locations are identified in the Plan and depicted in Figure 1:

WQ1	Echo Creek downstream of Echo Lake Dam
WQ2	Pyramid Creek downstream of Lake Aloha Dam
WQ3	Caples Creek downstream of Caples Lake Dam
WQ4	Silver Fork American River downstream of Silver Lake Dam
WQ5	South Fork American River upstream of Kyburz Diversion Dam
WQ6	South Fork American River downstream of Kyburz Diversion Dam
WQ9	No Name Creek upstream of No Name Creek Diversion Dam
WQ10	No Name Creek downstream of No Name Creek Diversion Dam
WQ11	Alder Creek upstream of Alder Creek Diversion Dam
WQ12	Alder Creek downstream of Alder Creek Diversion Dam
WQ15	Bull Creek above Bull Creek Diversion Dam
WQ16	Bull Creek downstream of Bull Creek Diversion Dam
WQ17	Ogilby Creek above Ogilby Creek Diversion Dam
WQ18	Ogilby Creek downstream of Ogilby Creek Diversion Dam
WQ19	Esmeralda Creek above Esmeralda Creek Diversion Dam
WQ20	Esmeralda Creek downstream of Esmeralda Creek Diversion Dam

In accordance with the Water Quality Monitoring Plan, sampling sites WQ9 – WQ12 and WQ15 – WQ20 were not sampled in 2021 and are scheduled to be monitored every six years with the next monitoring cycled occurring in 2024.

3.0 SAMPLE COLLECTION

The 2021 in-situ and analytical water quality monitoring schedule was modified due to the Caldor Fire and associated Eldorado National Forest closure. Sampling events were

canceled starting in August and resumed to the sites that were accessible starting in late September. Date, time, site location and in-situ water quality data were recorded on a standard form and later transcribed to electronic format in a Microsoft Excel datasheet.

Temperature, dissolved oxygen, conductivity, and pH were measured in the field at each location using a YSI ProDSS Handheld Multi-Probe Meter. The meter was calibrated prior to the sampling event per manufacturer's specifications.

Water samples were collected for laboratory analysis of the following parameters: turbidity, total suspended solids, alkalinity, hardness, nitrate, copper, and aluminum. California Laboratory Services (CLS) in Rancho Cordova, California, a state certified laboratory, analyzed water samples collected for this effort. All the samples were analyzed pursuant to methodologies approved by the United States Environmental Protection Agency (USEPA), the California Department of Public Health, or Environmental Laboratory Accreditation Program (ELAP) and results were certified to be in compliance for accuracy and for completeness.

4.0 PARAMETERS AND RESULTS

4.1 Temperature

Average, minimum, and maximum temperatures measured at each water quality monitoring site during the 2021 monitoring effort are reported in Table 1. Graphs depicting all in-situ parameters measured at each monitoring site are provided in Figures 2 - 8.

Table 1. Average, minimum, and maximum water temperature (°C)

Site	AVG	MIN	MAX
WQ1	9.8	1.3	21.5
WQ2	16.6	13.4	19.7
WQ3	8.2	3.6	19.0
WQ4	10.5	2.9	20.8
WQ5	9.6	3.7	18.9
WQ6	9.6	3.7	19.0

A total of 31 water temperature measurements were recorded in 2021. Water temperatures for the Project ranged from a minimum of 1.3 °C at Echo Creek below Echo Lake Dam (WQ1) to 21.5 °C also recorded at Echo Creek below Echo Lake Dam (WQ1). The average water temperature measured throughout the Project area in 2021 was 9.9 °C. Water temperatures measured at all water quality monitoring sites in 2021

were suitable for trout and other coldwater species throughout the study period. A detailed evaluation of water temperatures in the stream reaches within the vicinity of the Project is provided in the Project No. 184 2021 Water Temperature Monitoring Report (EID 2021).

4.2 Dissolved Oxygen

Average, minimum, and maximum dissolved oxygen (DO) concentrations measured at each water quality monitoring site during the 2021 monitoring effort are reported in Table 2. Graphs depicting all in-situ parameters measured at each monitoring site are provided in Figures 2 - 8.

Table 2. Average, minimum, and maximum dissolved oxygen (mg/L)

Site	AVG	MIN	MAX
WQ1	9.1	7.8	10.5
WQ2	7.4	7.8	6.9
WQ3	9.0	6.6	10.5
WQ4	8.2	6.5	10.5
WQ5	9.8	7.3	12.1
WQ6	9.8	7.2	12.2

The Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins states "The DO concentrations shall not be reduced below the following minimum levels at any time…waters designated COLD 7.0 mg/L" (CVRWQCB, 1998; Fourth Edition revised October 2011).

A total of 31 DO measurements were recorded in 2021. DO ranged from 6.5 mg/L at Silver Fork American River below Silver Lake Dam (WQ4) to 12.2 mg/L at South Fork American River downstream of Kyburz Diversion Dam (WQ6). The average DO concentration throughout the Project area in 2021 was 9.1 mg/L.

Five DO measurements below 7.0 mg/L were recorded during the 2021 monitoring effort. The measurements below 7.0 mg/L are listed below:

June 8, 2021

- 6.7 mg/L at Silver Fork below Silver Lake Dam (WQ4)

July 1, 2021

- 6.7 mg/L at Echo Lake below Echo Lake Dam (WQ1)
- 6.9 mg/L at Pyramid Creek below Lake Aloha Dam (WQ2)

- 6.6 mg/L at Caples Creek below Caples Lake Dam (WQ3)
- 6.5 mg/L at Silver Fork below Silver Lake Dam (WQ4)

The Project measurements below the Basin Plan objective of 7.0 mg/L were recorded at high elevation sites (Echo Lake below Echo Lake Dam (WQ1), Pyramid Creek below Lake Aloha Dam (WQ2), Caples Creek below Caples Lake Dam (WQ3), and Silver Fork below Silver Lake Dam (WQ4). These measurements were not substantially below the Basin Plan standard and do not indicate a water quality issue. Because 4 of the 5 measurements were recorded during the same monitoring event in July, it is suspect that the low dissolved oxygen measurements may be the result of an inaccurate calibration of the meter. These measurements may also be affected in part because of the sensitivity of dissolved oxygen level measurements to conductivity levels. The calibration guide for the YSI ProDSS[1] states that "Salinity [or conductivity] affects the ability of water to hold oxygen and is used by the instrument to calculate DO mg/L (ppm)." All of the high elevation sample sites had relatively low conductivity levels (range 2.8 – 17.1 µmhos/cm) compared to the lower watershed sites.

4.3 Conductivity (Specific Conductance)

Average, minimum, and maximum conductivity levels recorded at each water quality monitoring site during the 2021 monitoring effort are reported in Table 3. Graphs depicting all in-situ parameters measured at each monitoring site are provided in Figures 2 - 8.

Table 3. Average, minimum, and maximum conductivity (µmhos/cm)

Site	AVG	MIN	MAX
WQ1	9.2	6.5	12.3
WQ2	2.8	2.8	2.8
WQ3	19.8	17.1	26.0
WQ4	15.2	12.5	20.0
WQ5	47.3	22.3	66.5
WQ6	47.1	22.4	63.5

Currently there are no criteria or water quality objectives for conductivity for the American River watershed. A total of 31 conductivity measurements were recorded in 2021. Conductivity levels ranged from 2.8 µmhos/cm in Echo Creek (WQ2) to 66.5 µmhos/cm in South Fork American River upstream of Kyburz Diversion Dam (WQ5). The average conductivity level throughout the Project area in 2021 was 28.6 µmhos/cm.

[1] https://www.ysi.com/File%20Library/Documents/Guides/W89_YSI_ProDSS_Calibration_Guide.pdf

4.4 pH

Average, minimum, and maximum pH levels recorded at each water quality monitoring site during the 2021 monitoring effort are reported in Table 4. Graphs depicting all in-situ parameters measured at each monitoring site are provided in Figures 2 - 8.

Table 4. Average, minimum, and maximum pH

Site	AVG	MIN	MAX
WQ1	7.6	6.9	8.5
WQ2	6.3	6.1	6.4
WQ3	7.7	7.3	7.9
WQ4	7.4	7.1	7.8
WQ5	8.0	7.3	8.6
WQ6	7.9	7.3	8.5

The Basin Plan states that "pH shall not be depressed below 6.5 nor raised above 8.5 and that changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD beneficial uses" (CVRWQCB, 1998; Fourth Edition revised October 2011).

A total of 31 pH measurements were recorded in 2021. pH levels ranged from 6.1 at Pyramid Creek below Lake Aloha dam (WQ2) to 8.6 at South Fork American River upstream of Kyburz Diversion Dam (WQ5). The average pH throughout the project area in 2021 was 7.6.

Two pH measurements below the Basin Plan objective of 6.5 were recorded at Pyramid Creek below Lake Aloha dam (WQ2) as follows:

- June 8, 2021- pH = 6.1
- July 1, 2021- pH = 6.4

Average pH results from WQ2 located at the upper reach of the watershed have historically been lower than the lower sections of the watershed. Acidic soils and runoff associated with granitic drainages may be contributing to the lower pH levels in upper Pyramid Creek (USDA/NRCS, 2019). These measurements were not substantially below the Basin Plan standard and do not indicate a water quality issue.

Two pH measurements above the Basin Plan objective of 8.5 were recorded at South Fork American River (SFAR) upstream of Kyburz Diversion Dam as follows:

- October 25, 2021- pH = 8.6
- December 6, 2021- pH = 8.6

These two results are within the accuracy range of the YSI meter of ± 0.2 pH units, were not substantially above the Basin Plan standard, and do not indicate a water quality issue.

4.5 Turbidity

Average, minimum, and maximum turbidity levels recorded during the 2021 monitoring effort at each water quality monitoring site are reported in Table 5. Turbidity measurements measured at each monitoring site in 2021 are presented with in-situ parameters in Figures 2 - 8.

Table 5. Average, minimum, and maximum turbidity (NTUs)

Site	AVG	MIN	MAX
WQ1	0.7	0.3	0.9
WQ2	0.7	0.3	1.0
WQ3	0.5	0.4	0.7
WQ4	0.7	0.4	1.0
WQ5	2.8	0.3	17
WQ6	2.2	0.3	13

The Basin Plan states, "Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
- Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

(CVRWQCB, 1998; Fifth Edition revised May 2018).

A total of 31 turbidity measurements were recorded in the 2021 sampling efforts. Two samples had elevated turbidity levels in the lower watershed in SFAR up and downstream of Kyburz Diversion Dam (WQ5) and (WQ6). Both samples were collected

on October 25, 2021 during the "first storm of the season" sampling event. Flows of the SFAR at the Kyburz Diversion Dam were in excess of 6,500 cubic feet per second (cfs) on October 25th up from below 100 cfs on October 23rd. Turbidity levels were fluctuating significantly during the storm event and turbidity measured 17 NTU at WQ5 upstream of the diversion facility and 13 NTU downstream of the diversion facility at WQ6. All other turbidity measurements for the 2021 monitoring effort were less than 1.3 NTU.

4.6 Total Suspended Solids

7otal Suspended Solids (TSS) measured at all sample sites in 2021 are plotted in Figure 9.

The Basin Plan has a narrative objective that states, "Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses" (CVRWQCB, 1998; Fourth Edition revised October 2011). TSS measurements were generally low throughout the project area. A total of 31 TSS measurements were recorded in the 2021 sampling efforts. Six samples measured above the not detected concentration of 2 mg/L. Two samples measured elevated TSS levels in the lower watershed in SFAR up and downstream of Kyburz Diversion Dam (WQ5) and (WQ6) as discussed in the turbidity section. TSS measured 590 mg/L at WQ5 upstream of the diversion facility and 100 mg/L at WQ6 downstream of the diversion facility during the "first storm of the season" sampling event on October 25, 2021.

4.7 Alkalinity

Alkalinity measured at all sample sites in 2021 are plotted in Figure 10.

There are currently no Basin Plan objectives for alkalinity. The U.S. Environmental Protection Agency recommends ambient water quality criteria for alkalinity to protect freshwater aquatic life to be measured as a continuous concentration 4-day average expressed as a total recoverable. The aquatic life 4-day average concentration for alkalinity is 20 mg/L. The recommendation also states that "20 mg/L is a minimum concentration except where natural concentrations are less" (Water Quality Goals, 2011). The frequency of monitoring in the approved Plan does not provide for a direct relationship to the recommended average concentration.

Average, minimum, and maximum alkalinity concentrations measured during the 2021 monitoring effort at each water quality monitoring site are presented in Table 7.

Table 7. Average, minimum, and maximum alkalinity (mg/L)

Site	AVG	MIN	MAX
WQ1	6.0	4.2	8.0
WQ2	2.6	1.6	3.6
WQ3	9.8	9.0	11.0
WQ4	8.1	5.8	10.0
WQ5	18.4	8.0	34.0
WQ6	16.1	9.6	24.0

The average alkalinity throughout the Project area was 11.8 mg/L. The sampling locations with the highest concentrations of alkalinity were in the lower watershed in SFAR up and downstream of Kyburz Diversion Dam (WQ5) and (WQ6). Higher alkalinity concentrations measured at these sites are likely associated with runoff from soils with abundant calcium carbonate (CaCO3) concentrations (USDA/NRCS, 2019).

4.8 Hardness (Calcium Carbonate)

Hardness measured at all sample sites in 2021 are plotted in Figure 11.

Average, minimum, and maximum hardness concentrations measured during the 2021 monitoring effort at each water quality monitoring site are presented in Table 8.

Table 8. Average, minimum, and maximum hardness (mg/L)

Site	AVG	MIN	MAX
WQ1	3.2	2.4	4.7
WQ2	0.9	0.9	0.9
WQ3	7.3	5.2	8.5
WQ4	4.9	3.7	5.5
WQ5	13.6	5.0	19.0
WQ6	13.7	5.1	20.0

There is currently no Basin Plan objective for hardness. The average hardness throughout the Project area was 8.7 mg/L. As in the Alkalinity results, the sampling locations with the highest concentrations of calcium carbonate were in the lower watershed in SFAR up and downstream of Kyburz Diversion Dam (WQ5) and (WQ6). These locations are associated with runoff from soils with abundant calcium carbonate (CaCO3) concentrations (USDA/NRCS, 2019). Table 9 compares the water quality parameters from upstream (WQ5) and downstream (WQ6) of the Kyburz Diversion Dam on the SFAR.

4.9 Nitrate (Nitrate and Nitrite)

Nitrate measured at all sample sites in 2021 are plotted in Figure 12.

There are currently no Basin Plan objectives for nitrate. However, the EPA recommends ambient water quality criteria for non-cancer health effects to be 10 mg/L (Water Quality Goals, 2011). Additionally, both the California and Federal primary contaminated levels in drinking water are 10 mg/L. The nitrate levels measured throughout the Project area were well below the state and federal action levels. A total of 31 nitrate measurements were recorded in the 2021 sampling efforts. Eight samples measured above the not detected concentration of 0.05 mg/L, ranging from 0.08 to 0.24 mg/L.

4.10 Copper

Copper measured at all sample sites in 2021 are plotted in Figure 13.

There is no specific Basin Plan objective for copper; however, the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP, 2005), and the California Toxics Rule (CTR, 2000), provide a formula for approximating a one-hour total recoverable dissolved copper limit based on its hardness value. This standard has been incorporated by adoption into the Basin Plan. With this standard, the lower the hardness value, the lower the available copper is in the water course (greater copper concentration can be tolerated due to limited availability of copper uptake by aquatic organisms), conversely the greater the hardness value, the greater availability of free copper and therefor lower the copper concentrations are tolerated because dissolved copper can negatively affect aquatic life.

The copper calculations per California Toxics Rule criteria are provided in Table 10.

Of the 31 samples collected, 4 samples exceeded the SIP/CTR one-hour total recoverable dissolved copper limits:

June 8, 2021

- Caples Creek below Caples Lake Dam (WQ3)

October 25, 2021

- South Fork American River upstream of Kyburz Diversion Dam (WQ6)
- South Fork American River downstream of Kyburz Diversion Dam (WQ6)

December 6, 2021

- Silver Fork below Silver Lake Dam (WQ4)

Samples collected on October 25th for the first storm of the season had elevated levels of copper likely due to the abundant amount of solids suspended in the water course.

Elevated copper levels measured at Caples Creek below Caples Lake Dam (WQ3) in June and at Silver Fork below Silver Lake Dam (WQ4) in December appear to be outliers.

No project related operations or activities occurred during these time periods to account for these elevated levels.

4.11 Aluminum

Aluminum measured at all sample sites in 2021 are plotted in Figure 14.

There are currently no Basin Plan objectives for aluminum. The U.S. Environmental Protection Agency recommends ambient water quality criteria for freshwater aquatic life expressed at a maximum concentration 1-hour average to be 750 µg/L (Water Quality Goals, 2011). Of the 31 samples collected, 2 samples exceeded the aluminium ambient water criteria of 750 µg/L:

October 25, 2021

- South Fork American River upstream of Kyburz Diversion Dam (WQ6)
- South Fork American River downstream of Kyburz Diversion Dam (WQ6)

Samples collected on October 25th for the first storm of the season had elevated levels of aluminum likely due to the abundant amount of solids suspended in the water course.

4.12 E. Coli

E. coli measured at all sample sites in 2021 are plotted in Figure 15 and presented in Table 11.

USEPA and RWQCB recommendation for E. coli is as follows: the geometric mean should not be greater than 100 colony-forming units (CFU) per 100 ml over a 30-day interval and there should not be greater than a ten percent excursion frequency of the statistical threshold value of 320 CFU/100 ml in the same 30-day interval.

All E.coli samples collected in 2021 were below the threshold criteria.

5.0 CONCLUSION

The vast majority of water quality measurements in the Project area were within applicable Basin Plan objectives and other criteria during the 2021 monitoring program. Additionally, measurements for in-situ parameters were similar above and below the SFAR Diversion Dam. Project related operations and activities do not show any measureable impact on water quality parameters. Therefore, the Project does not appear to adversely affect water quality in the Project 184 area.

6.0 REFERENCES

CVRWQCB, 1998. The Water Quality Control Plan (Basin Plan) for the Central Valley Regional Water Quality Control Board Central Valley Region. Fourth Edition revised October 2011 (with Approved Amendments). The Sacramento River and San Joaquin River Basins. http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Water Quality Goals, 2011. A Compilation of Water Quality Goals. 16th Edition. Published by the California Environmental Protection Agency. April 2011. http://www.swrcb.ca.gov/water_issues/programs/water_quality_goals/docs/wq_goals_text.pdf

EID, 2021. Project No. 184 2018 Water Temperature Monitoring Report. February 2021.

State Water Resources Control Board of California. 2005. Policy for Implementation of Toxics Standards for Inland Surface Waters Enclosed Bays, and Estuaries of California (SIP). 2/24/2005. http://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/

United States Environmental Protection Agency. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule (CTR). Federal Register. 5/18/2000. https://www.federalregister.gov/documents/2000/05/18/00-11106/water-quality-standards-establishment-of-numeric-criteria-for-priority-toxic-pollutants-for-the

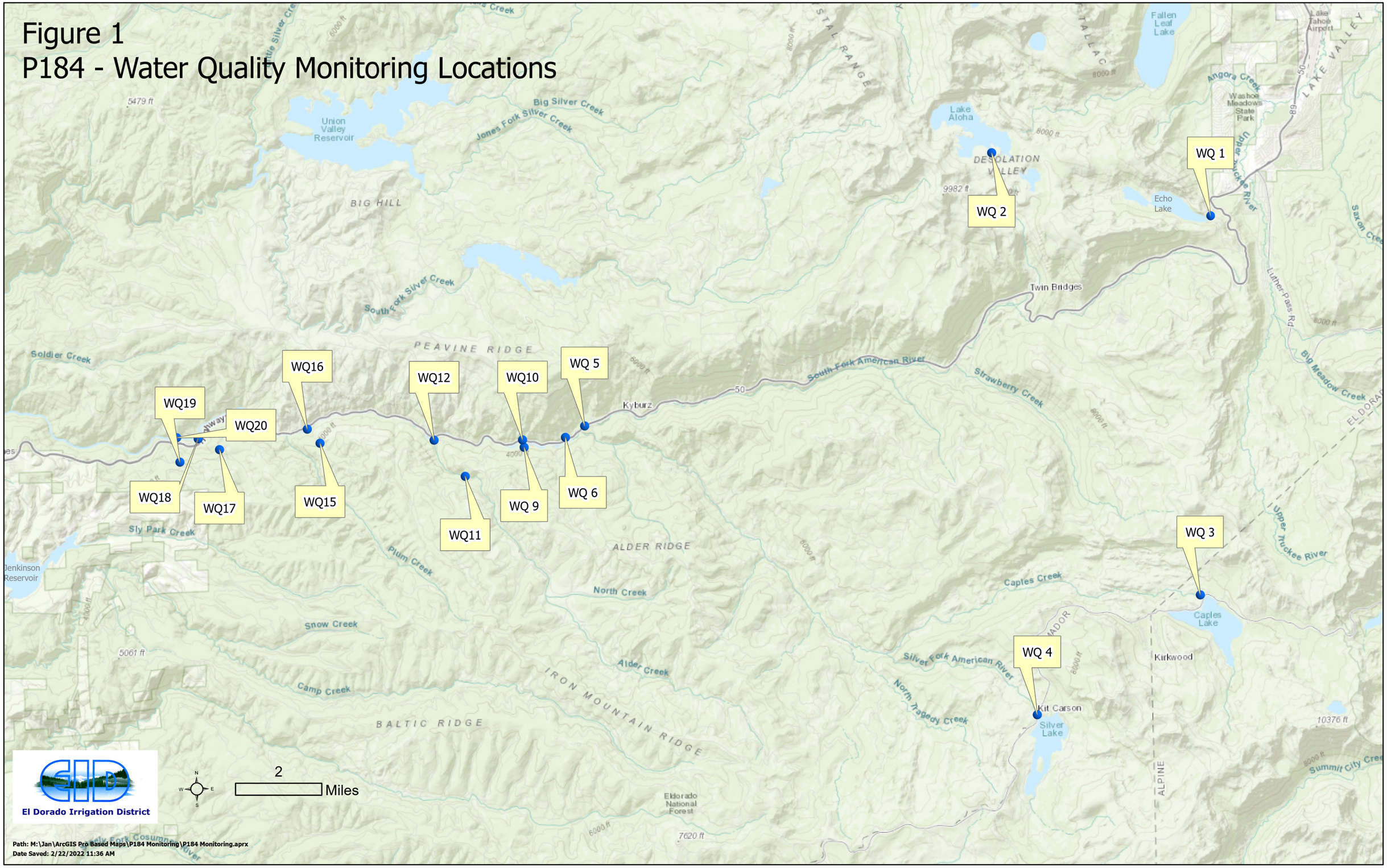
United States Environmental Protection Agency. National Recommended Aquatic Life Criteria table https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table. Standard Published 1986. Webpage last updated on January 1/6/2022.

United States Department of Agriculture – Natural Resources Conservation Service (USDA/NRCS). 2019. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/ Last Modified: 07/31/2019.

Appendix A:

Figures and Tables

Figure 1
P184 - Water Quality Monitoring Locations



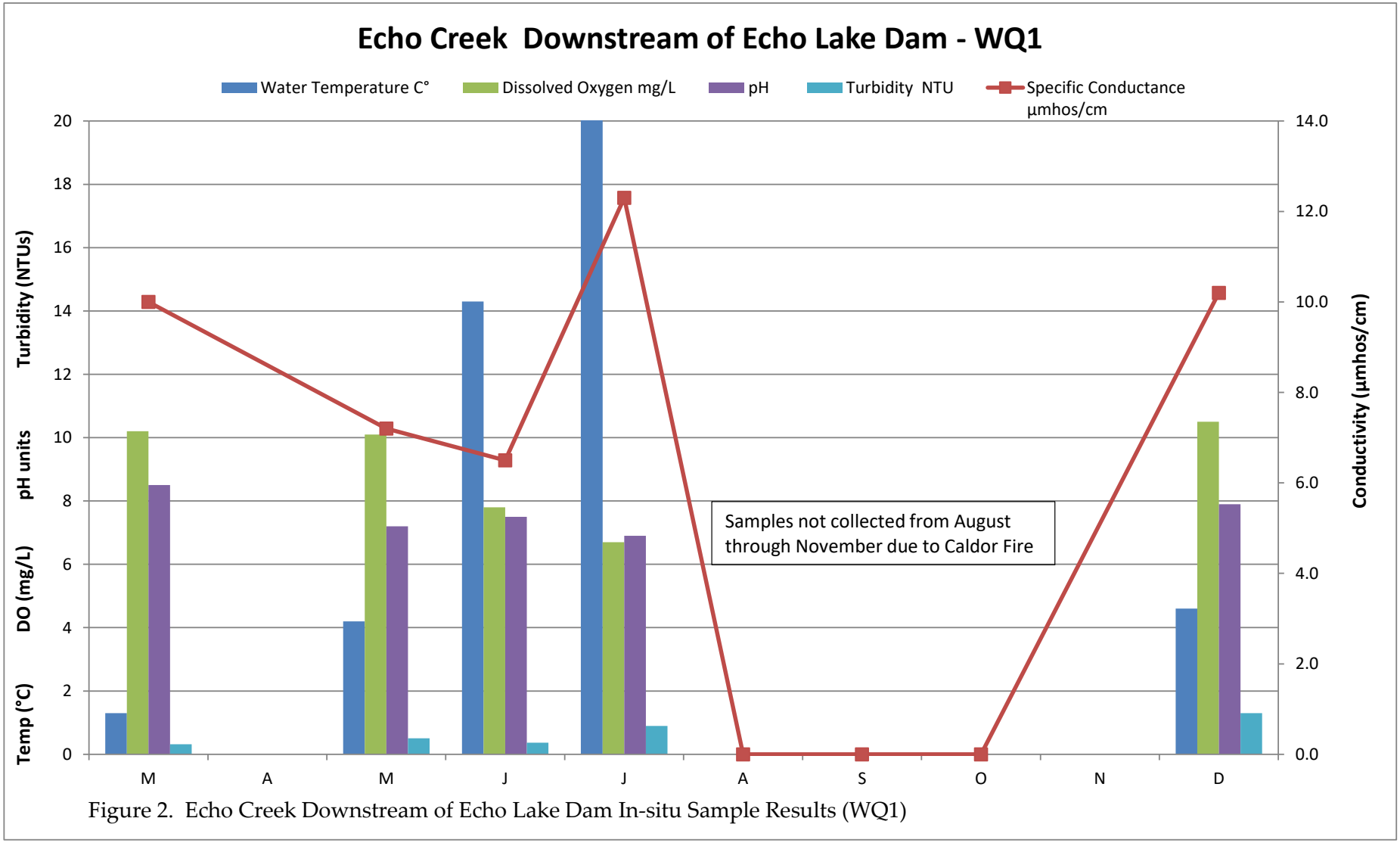


Figure 2. Echo Creek Downstream of Echo Lake Dam In-situ Sample Results (WQ1)

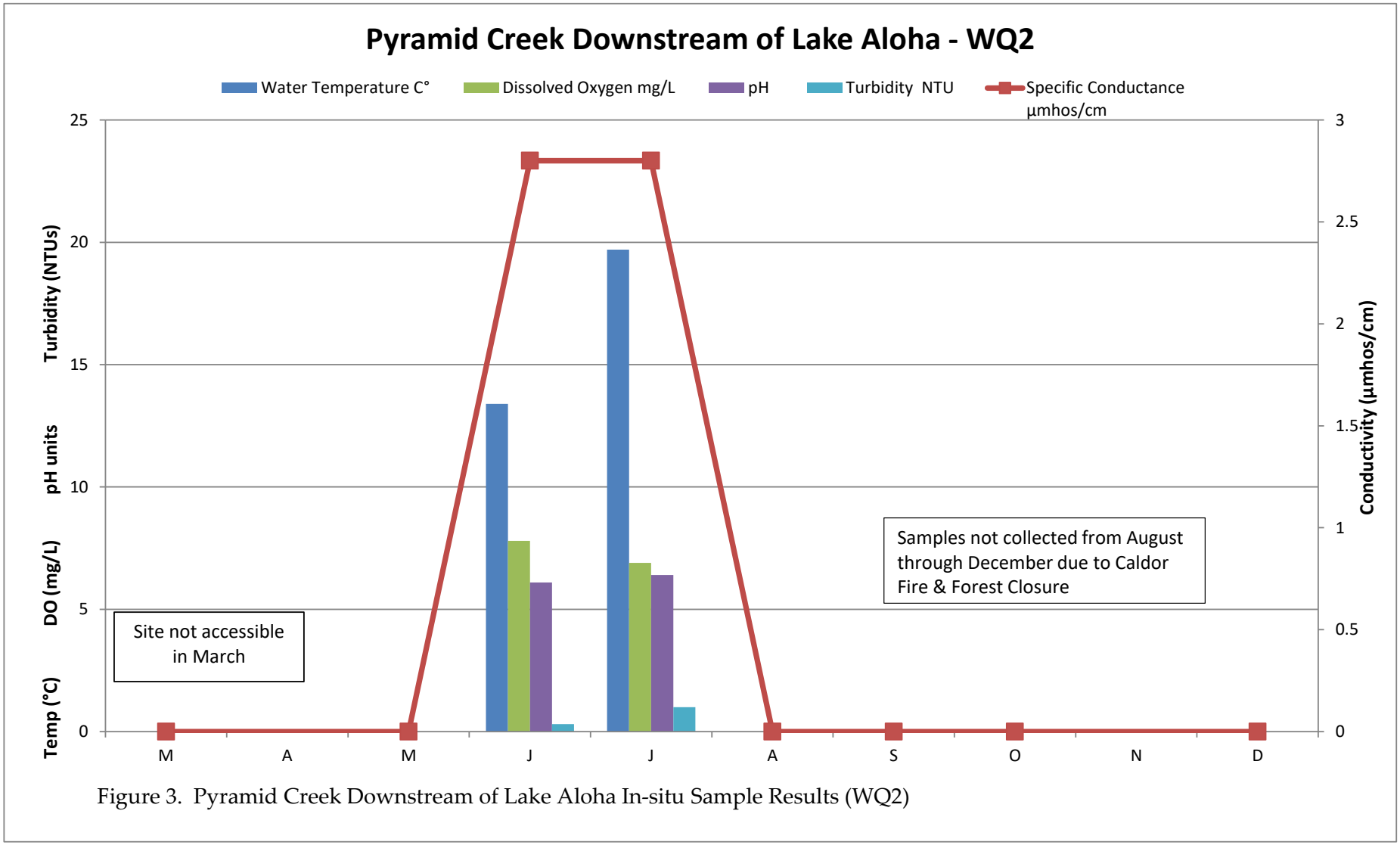


Figure 3. Pyramid Creek Downstream of Lake Aloha In-situ Sample Results (WQ2)

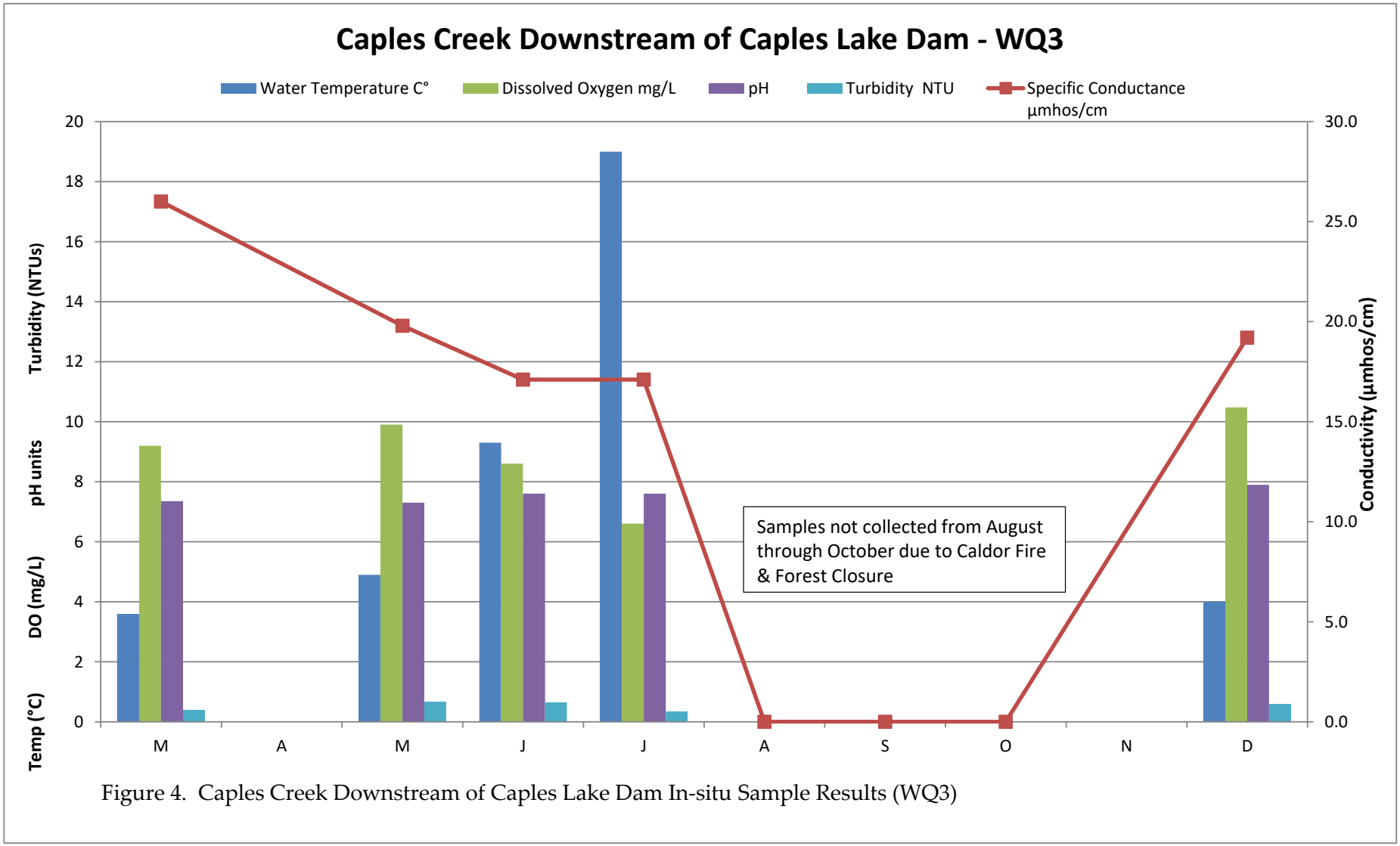


Figure 4. Caples Creek Downstream of Caples Lake Dam In-situ Sample Results (WQ3)

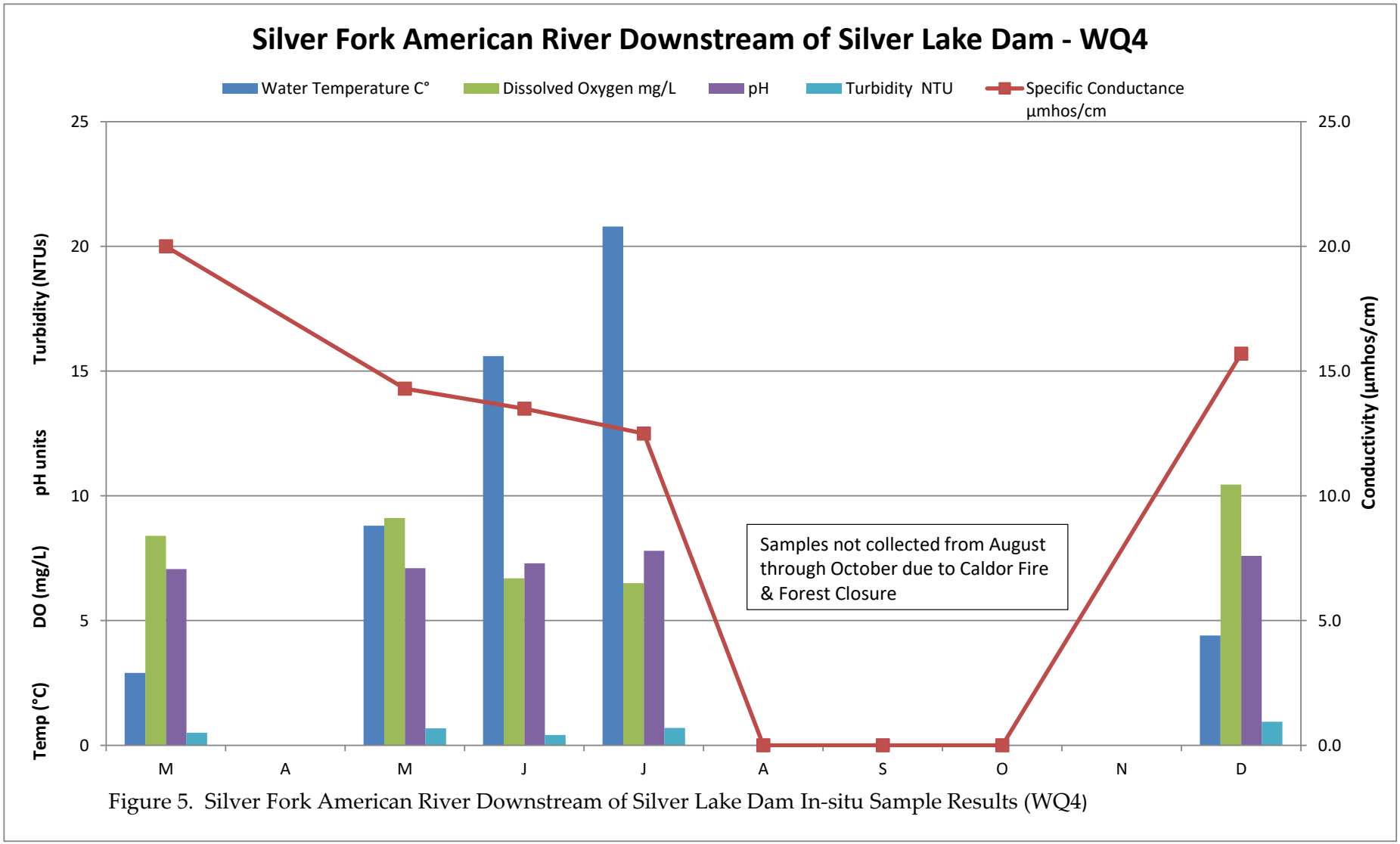


Figure 5. Silver Fork American River Downstream of Silver Lake Dam In-situ Sample Results (WQ4)

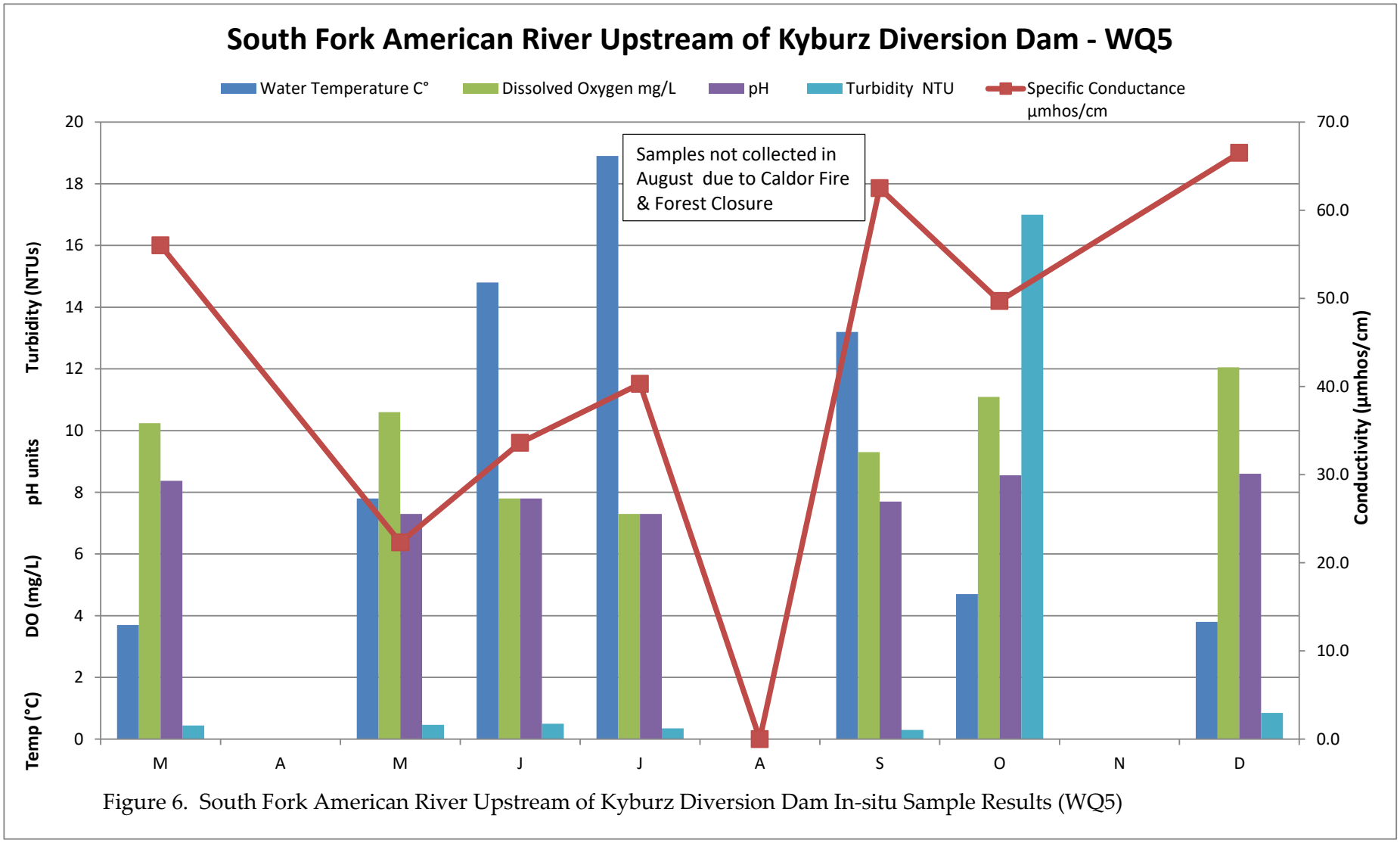


Figure 6. South Fork American River Upstream of Kyburz Diversion Dam In-situ Sample Results (WQ5)

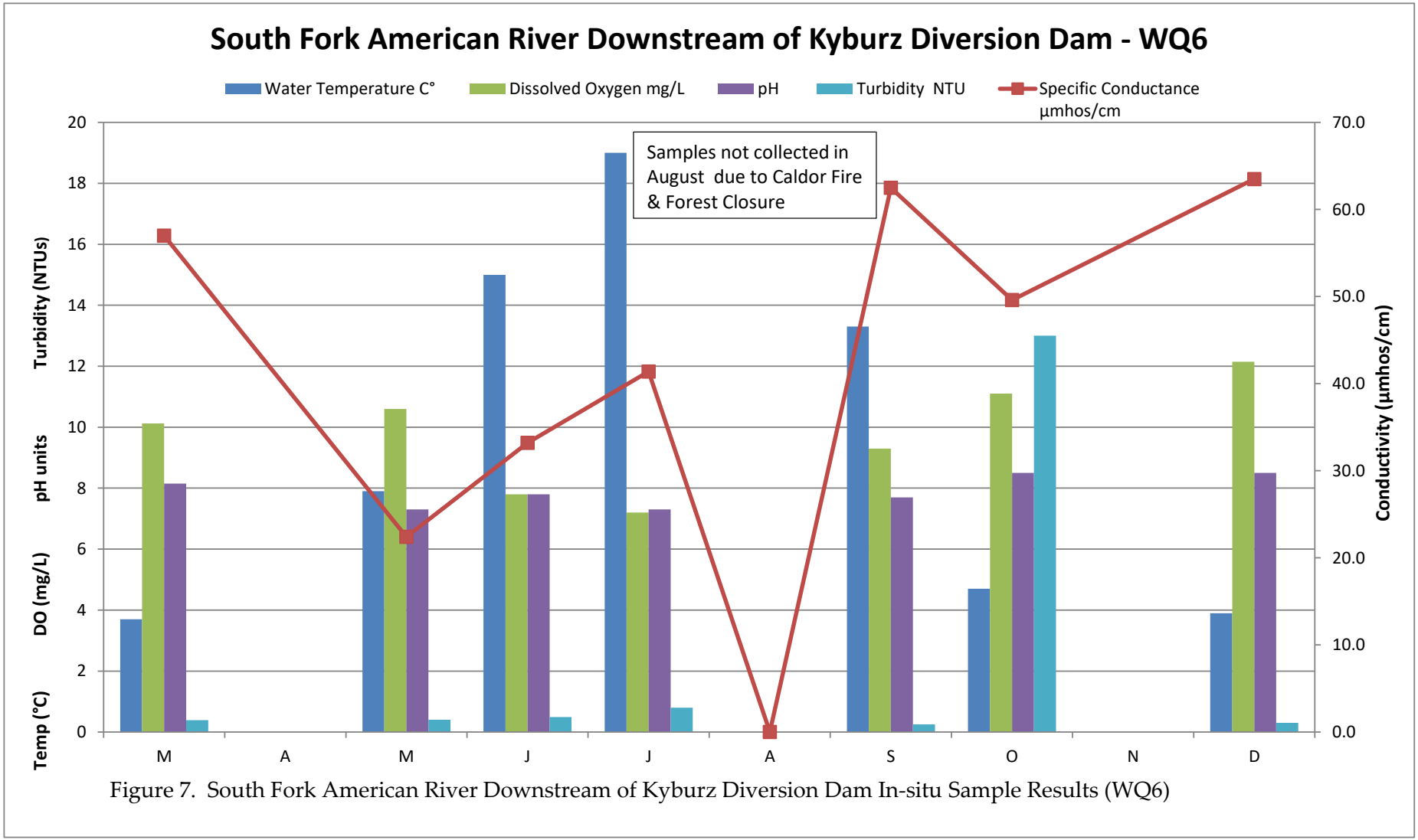


Figure 7. South Fork American River Downstream of Kyburz Diversion Dam In-situ Sample Results (WQ6)

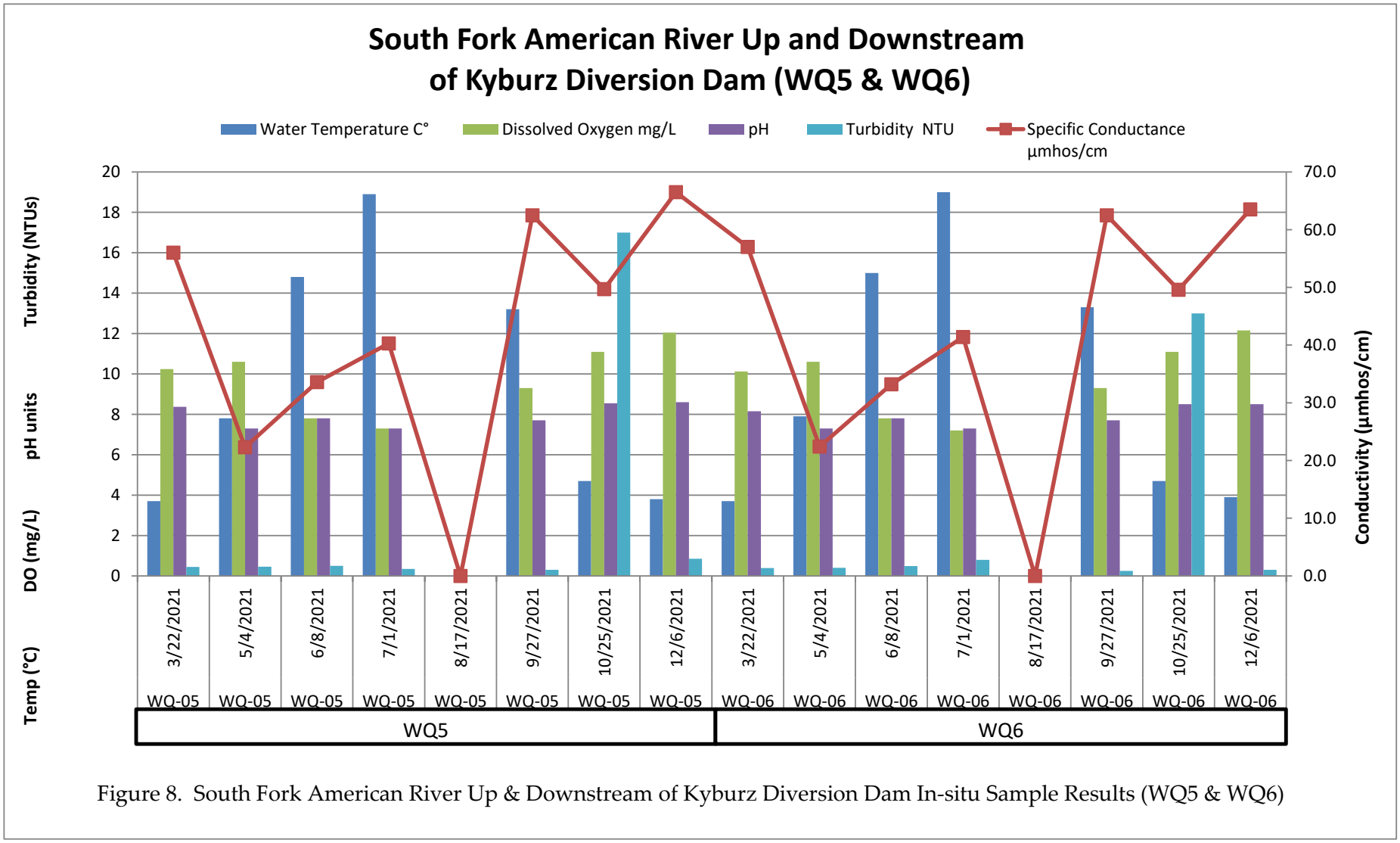


Figure 8. South Fork American River Up & Downstream of Kyburz Diversion Dam In-situ Sample Results (WQ5 & WQ6)

Table 9. South Fork American River Up & Downstream of Kyburz Diversion Dam In-situ Sample Results (WQ5 & WQ6)

South Fork American River upstream of Kyburz Diversion Dam WQ5

Sample ID	Date	Temperature C°	Conductivity us/cm3	Dissolved Oxygen mg/L	pH	Turbidity NTU	TSS mg/L	Alkalinity mg/L	Hardness CaCO3 mg/L	Nitrate mg/L	Copper µg/L	Aluminum µg/L
WQ-05	3/22/2021	3.7	56	10.2	8.4	0.4	0	13.0	18.0	0.0	0.7	40.0
WQ-05	5/4/2021	7.8	22.3	10.6	7.3	0.5	0	5.0	11	0.0	0.0	64.0
WQ-05	6/8/2021	14.8	33.6	7.8	7.8	0.5	3.3	11.0	8	0.0	0.3	41.0
WQ-05	7/1/2021	18.9	40.3	7.3	7.3	0.4	0	12.0	20.0	0.0	0.0	0.0
WQ-05	8/17/2021	*	*	*	*	*	*	*	*	*	*	*
WQ-05	9/27/2021	13.2	62.5	9.3	7.7	0.3	0	19.0	34.0	0.0	0.0	0.0
WQ-05	10/25/2021	4.7	49.7	11.1	8.6	17.0	590	17.0	18.0	0.2	2.9	1900.0
WQ-05	12/6/2021	3.8	66.5	12.1	8.6	0.9	3.3	18.0	20.0	0.1	0.0	30.0

South Fork American River downstream of Kyburz Diversion Dam WQ6

Sample ID	Date	Temperature C°	Conductivity us/cm3	Dissolved Oxygen mg/L	pH	Turbidity NTU	TSS mg/L	Alkalinity mg/L	Hardness CaCO3 mg/L	Nitrate ug/L	Copper ug/L	Aluminum ug/L
WQ-06	3/22/2021	3.7	57	10.1	8.2	0.4	0	14.0	18.0	0.0	0.9	39.0
WQ-06	5/4/2021	7.9	22.4	10.6	7.3	0.4	0	5.1	9.6	0.0	0.0	61.0
WQ-06	6/8/2021	15.0	33.2	7.8	7.8	0.5	0	11.0	13	0.0	0.6	35.0
WQ-06	7/1/2021	19.0	41.4	7.2	7.3	0.8	0	12.0	14	0.1	0.0	20.0
WQ-06	8/17/2021	*	*	*	*	*	*	*	*	*	*	*
WQ-06	9/27/2021	13.3	62.5	9.3	7.7	0.3	0	17.0	24.0	0.0	0.0	0.0
WQ-06	10/25/2021	4.7	49.6	11.1	8.5	13.0	100	20.0	17.0	0.2	3.1	3800.0
WQ-06	12/6/2021	3.9	63.5	12.2	8.5	0.3	0.0	17.0	17.0	0.1	0.0	37.0

WQ5 - WQ6 = Comparison*

Date	Temperature C°	Conductivity us/cm3	Dissolved Oxygen mg/L	pH	Turbidity NTU	TSS mg/L	Alkalinity mg/L	Hardness CaCO3 mg/L	Nitrate ug/L	Copper ug/L	Aluminum ug/L
3/22/2021	0.0	-1	0.1	0.2	0.1	0.0	-1.0	0.0	0.0	-0.3	1.0
5/4/2021	-0.1	-0.1	0.0	0.0	0.1	0.0	-0.1	1.4	0.0	0.0	3.0
6/8/2021	-0.2	0.4	0.0	0.0	0.0	3.3	0.0	-5.0	0.0	-0.3	6.0
7/1/2021	-0.1	-1.1	0.1	0.0	-0.5	0.0	0.0	6.0	-0.1	0.0	-20.0
8/17/2021	*	*	*	*	*	*	*	*	*	*	*
9/27/2021	-0.1	0	0.0	0.0	0.1	0.0	2.0	10.0	0.0	0.0	0.0
10/25/2021	0.0	0.1	0.0	0.1	4.0	490.0	-3.0	1.0	0.0	-0.2	-1900.0
12/6/2021	-0.1	3	-0.1	0.1	0.6	3.3	1.0	3.0	0.0	0.0	-7.0

*Negative values indicate measurements downstream of the diversion were higher than measurements upstream of the diversion.

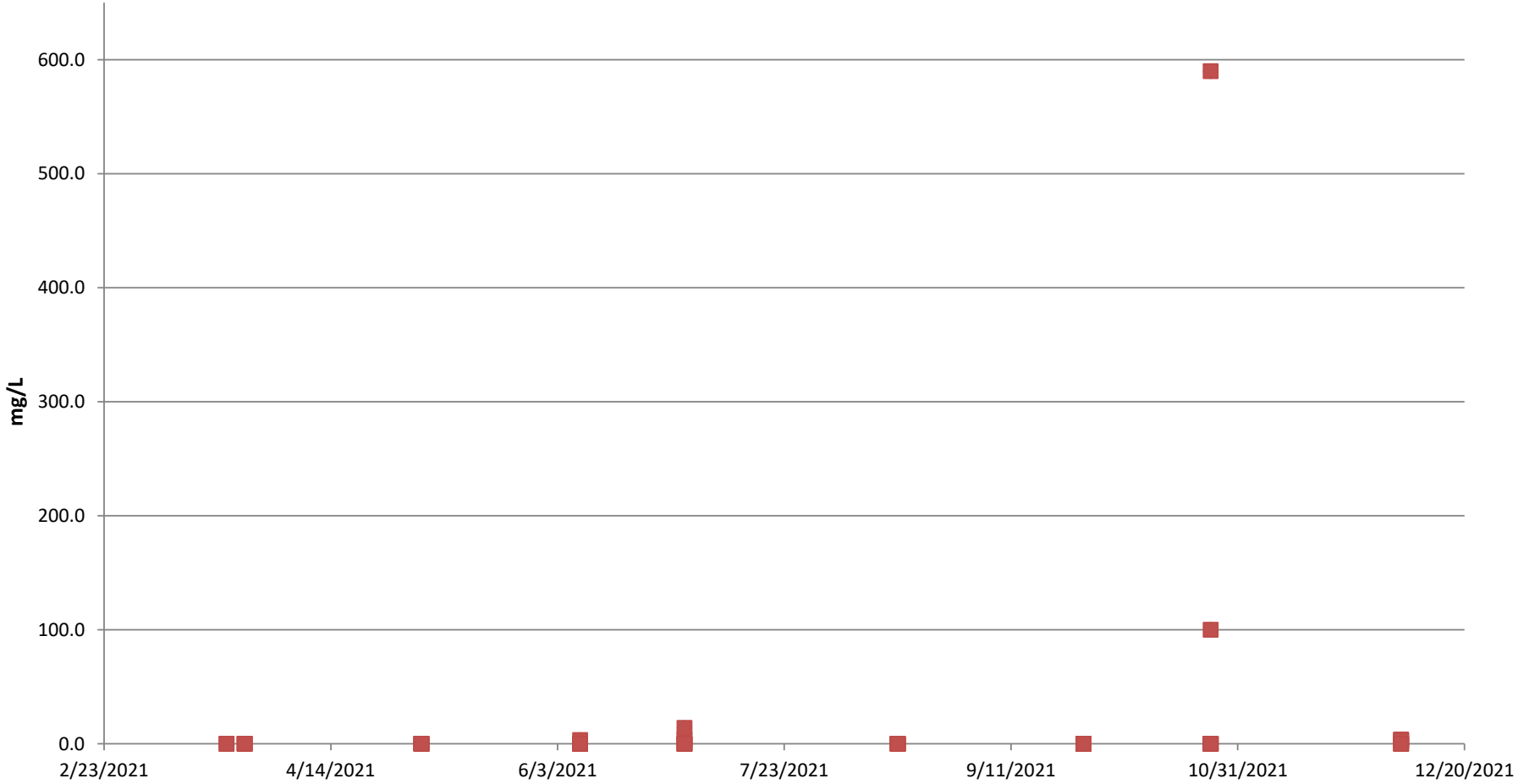


Figure 9. Total Suspended Solids Laboratory Results- All Sites

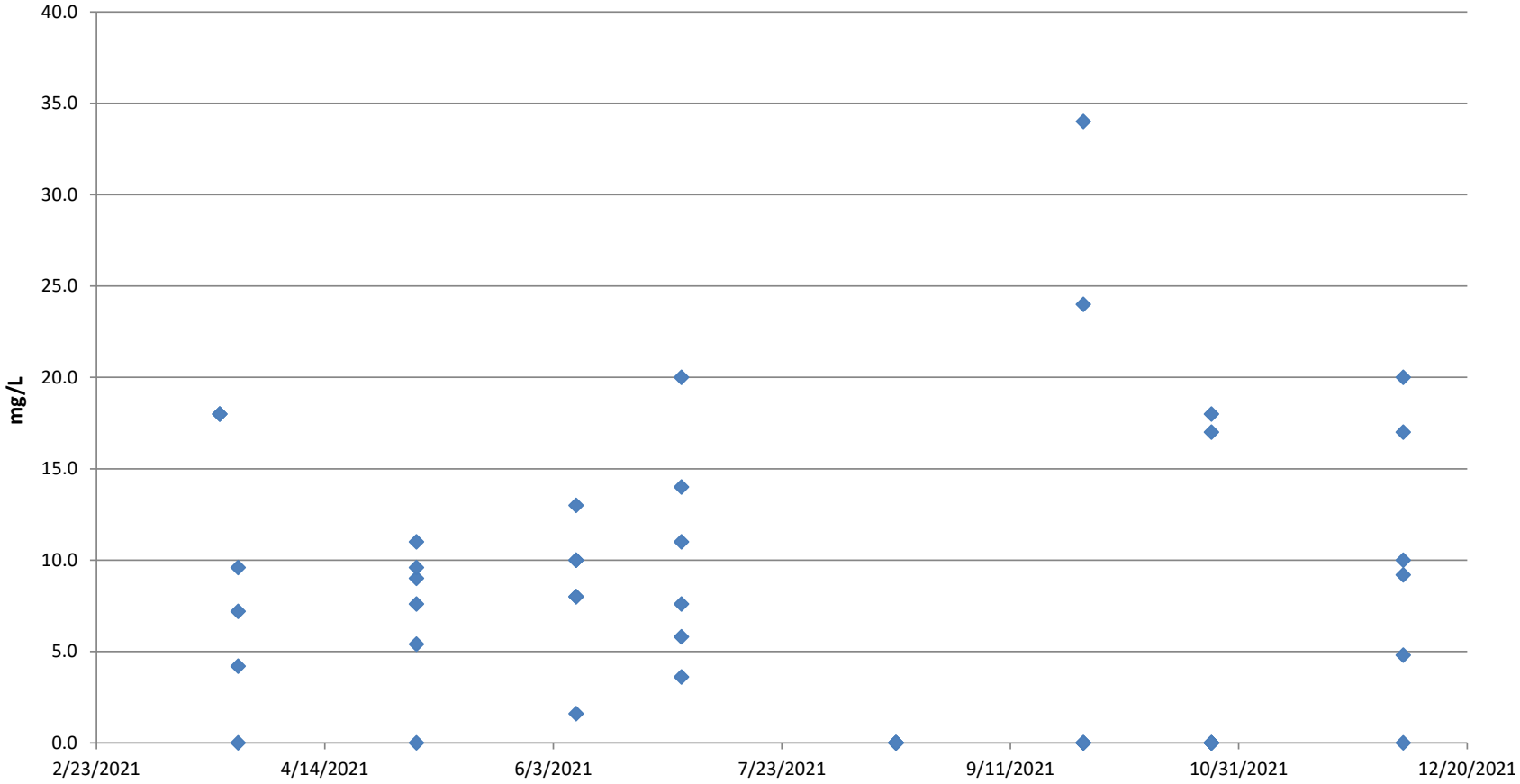


Figure 10. Alkalinity Laboratory Results- All Sites

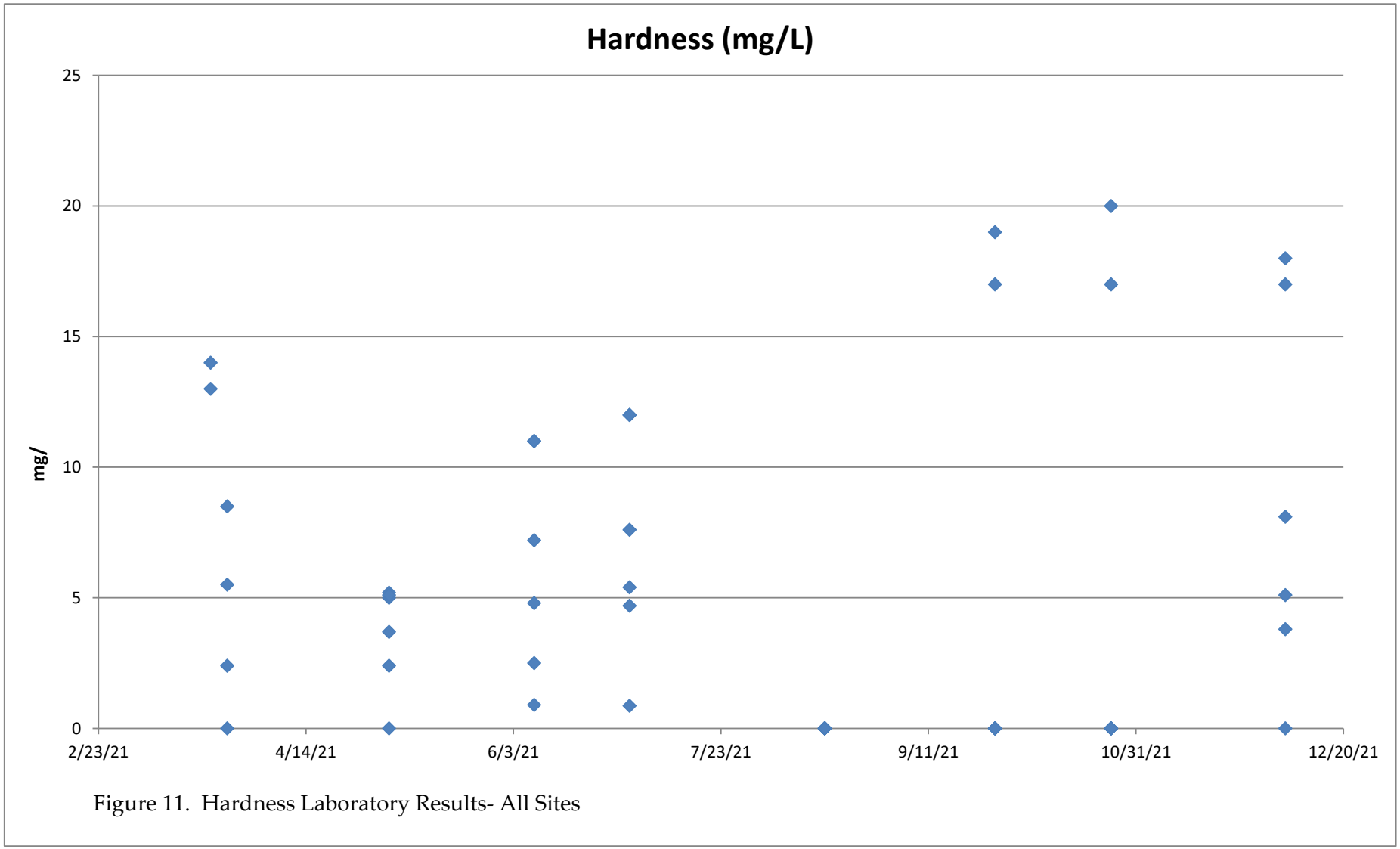


Figure 11. Hardness Laboratory Results- All Sites

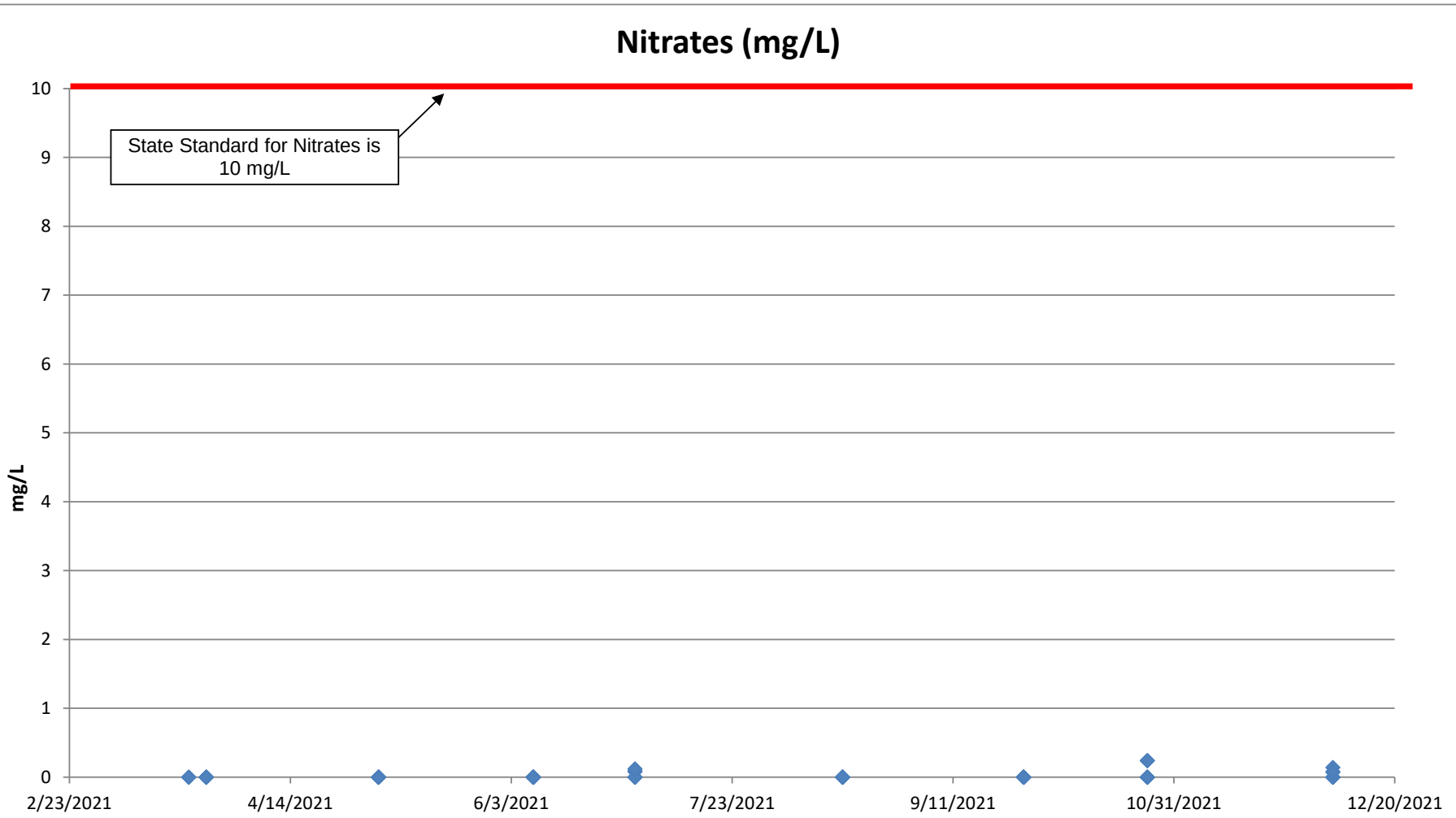


Figure 12. Nitrate Laboratory Results- All Samples

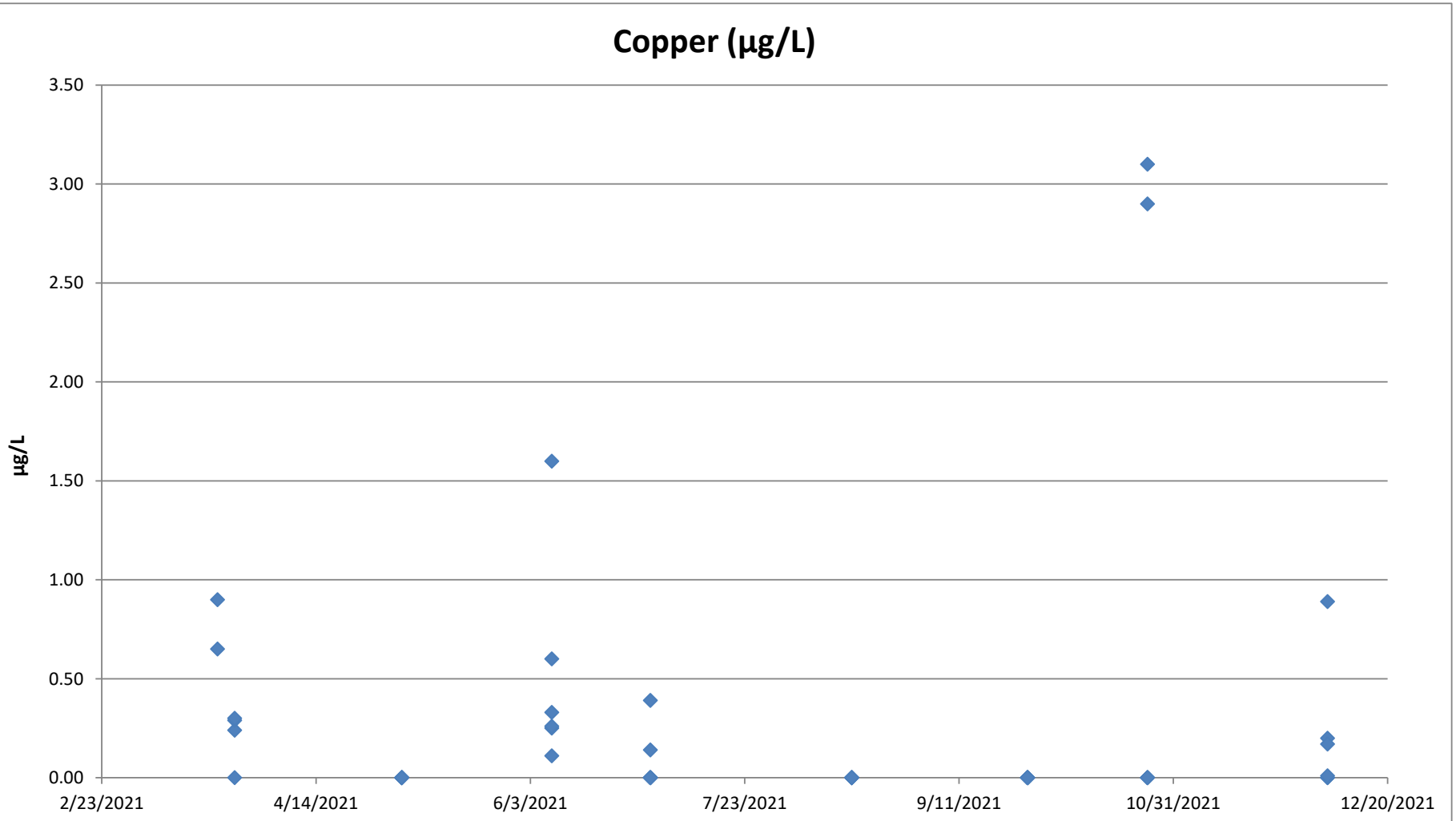


Figure 13. Copper Laboratory Results- All Sites

Table 10. Copper Calculations per California Toxics Rule Criteria

Results based on the following equation:
Criteria Maximum Concentration (1-hour Average, dissolved) = (e{0.9422[ln(hardness)] – 1.700})

Sample ID	Date	Copper (µg/L)	Hardness CaCO3 (mg/L)	Max Dissolved Concentration (µg/L)	Meets or Exceeds Acute Criterion
WQ-01	3/26/2021	0.24	2.4	0.40	MEETS
WQ-01	5/4/2021	0.00	2.4	0.40	MEETS
WQ-01	6/8/2021	0.25	2.5	0.42	MEETS
WQ-01	7/1/2021	0.39	4.7	0.75	MEETS
WQ-01	8/17/2021	*	*	*	*
WQ-01	9/27/2021	*	*	*	*
WQ-01	10/25/2021	*	*	*	*
WQ-01	12/6/2021	0.20	3.8	0.62	MEETS
WQ-02	3/26/2021	*	*	*	*
WQ-02	5/4/2021	*	*	*	*
WQ-02	6/8/2021	0.11	0.9	0.16	MEETS
WQ-02	7/1/2021	0.14	0.87	0.15	MEETS
WQ-02	8/17/2021	*	*	*	*
WQ-02	9/27/2021	*	*	*	*
WQ-02	10/25/2021	*	*	*	*
WQ-02	12/6/2021	*	*	*	*
WQ-03	3/26/2021	0.29	8.5	1.32	MEETS
WQ-03	5/4/2021	0.00	5.2	0.83	MEETS
WQ-03	6/8/2021	1.60	7.2	1.13	EXCEEDS
WQ-03	7/1/2021	0.00	7.6	1.19	MEETS
WQ-03	8/17/2021	*	*	*	*
WQ-03	9/27/2021	*	*	*	*
WQ-03	10/25/2021	*	*	*	*
WQ-03	12/6/2021	0.17	8.1	1.26	MEETS
WQ-04	3/26/2021	0.30	5.5	0.87	MEETS
WQ-04	5/4/2021	0.00	3.7	0.60	MEETS
WQ-04	6/8/2021	0.26	4.8	0.77	MEETS
WQ-04	7/1/2021	0.00	5.4	0.86	MEETS
WQ-04	8/17/2021	*	*	*	*
WQ-04	9/27/2021	*	*	*	*
WQ-04	10/25/2021	*	*	*	*
WQ-04	12/6/2021	0.89	5.1	0.81	EXCEEDS
WQ-05	3/22/2021	0.65	13	1.97	MEETS
WQ-05	5/4/2021	0.00	5	0.80	MEETS
WQ-05	6/8/2021	0.33	11	1.68	MEETS
WQ-05	7/1/2021	0.00	12	1.82	MEETS
WQ-05	8/17/2021	*	*	*	*
WQ-05	9/27/2021	0.00	19	2.81	MEET
WQ-05	10/25/2021	2.90	17	2.53	EXCEEDS
WQ-05	12/6/2021	0.00	18	2.67	MEETS
WQ-06	3/22/2021	0.90	14	2.11	MEETS
WQ-06	5/4/2021	0.00	5.1	0.81	MEETS
WQ-06	6/8/2021	0.60	11	1.68	MEETS
WQ-06	7/1/2021	0.00	12	1.82	MEETS
WQ-06	8/17/2021	*	*	*	*
WQ-06	9/27/2021	0.00	17	2.53	MEETS
WQ-06	10/25/2021	3.10	20	2.95	EXCEEDS
WQ-06	12/6/2021	0.01	17	2.53	MEETS

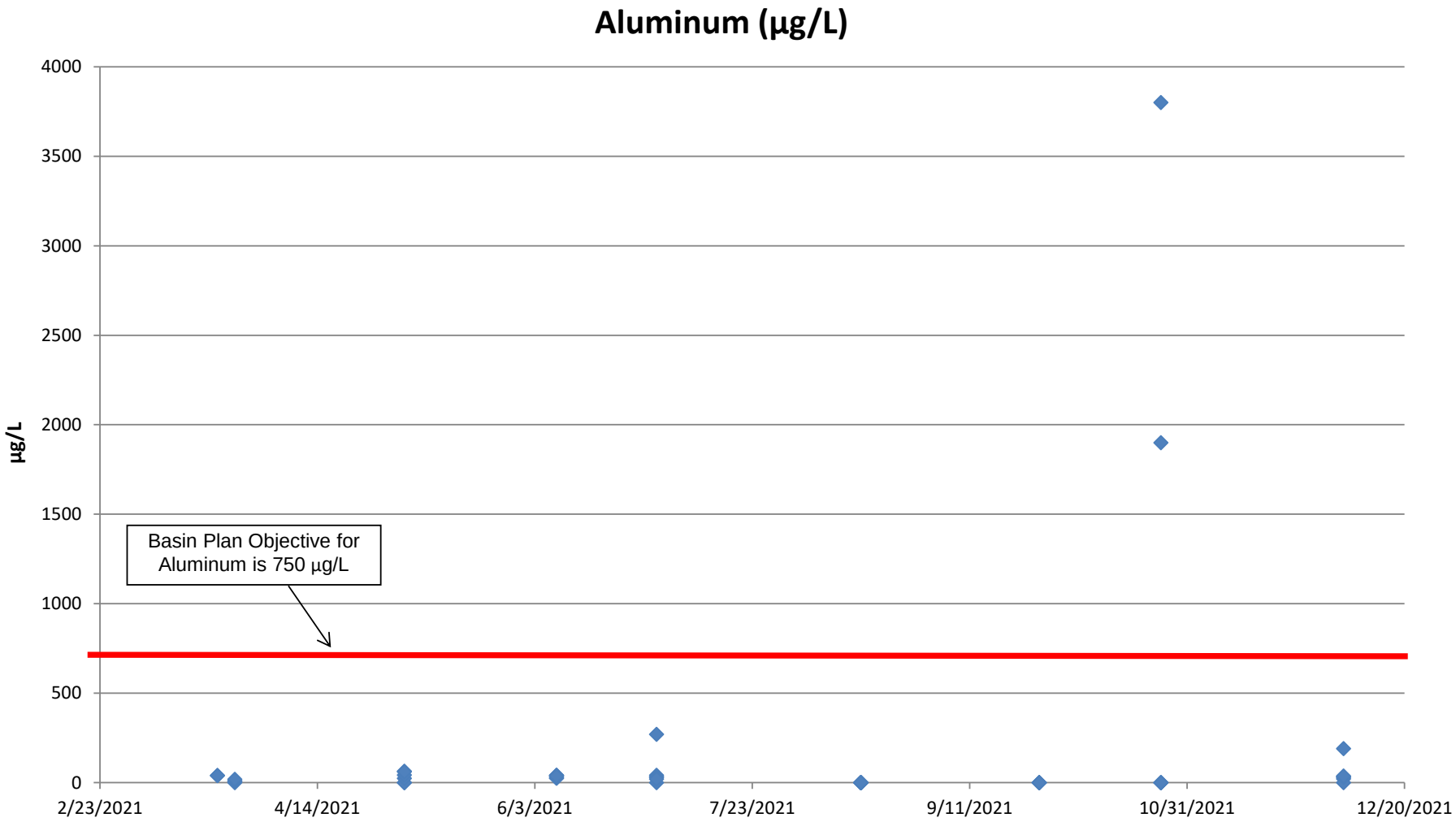


Figure 14. Aluminum Laboratory Results- All Sites

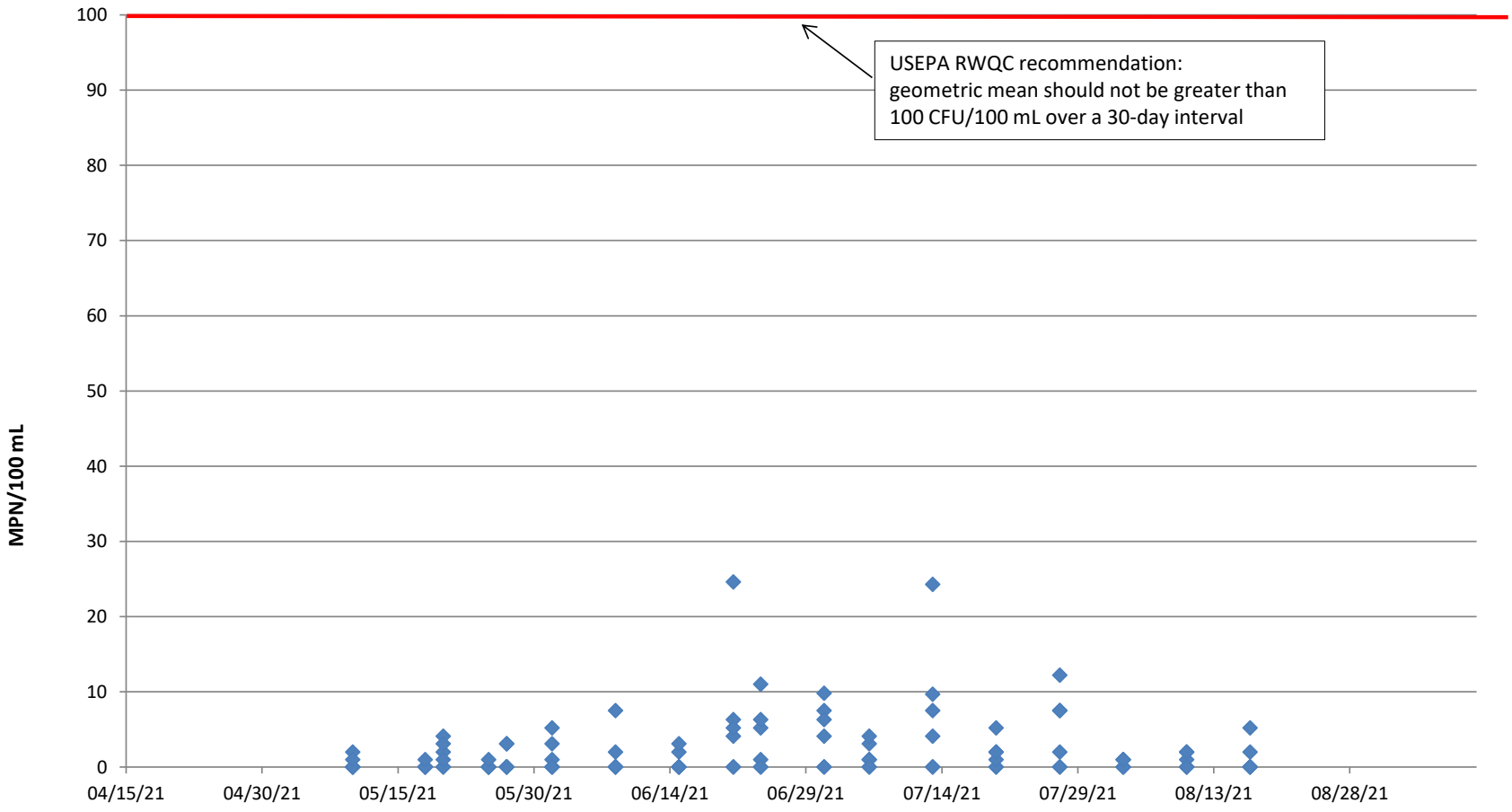


Figure 15. E. Coli Laboratory Results- All Sites

Table 11. E. Coli Laboratory Results- All Sites

Sample ID	Date	Time	E. Coli MPN/100 mL
WQ-01	5/10/2021	11:15	0.0
WQ-01	5/18/2021	11:45	0.0
WQ-01	5/20/2021	12:10	0.0
WQ-01	5/25/2021	11:15	0.0
WQ-01	5/27/2021	11:15	0.0
WQ-01	6/1/2021	11:25	5.2
WQ-01	6/8/2021	8:40	0.0
WQ-01	6/15/2021	13:40	0.0
WQ-01	6/21/2021	13:45	4.1
WQ-01	6/24/2021	13:45	5.2
WQ-01	7/1/2021	14:15	4.1
WQ-01	7/6/2021	14:10	1.0
WQ-01	7/13/2021	13:55	24.3
WQ-01	7/20/2021	12:50	2.0
WQ-01	7/27/2021	13:15	7.5
WQ-01	8/3/2021	13:40	0.0
WQ-01	8/10/2021	14:15	1.0
WQ-01	8/17/2021	13:25	0.0

Sample ID	Date	Time	E. Coli MPN/100 mL
WQ-02	5/10/2021	*	*
WQ-02	5/18/2021	*	*
WQ-02	5/20/2021	*	*
WQ-02	5/25/2021	*	*
WQ-02	5/27/2021	*	*
WQ-02	6/1/2021	*	*
WQ-02	6/8/2021	11:06	0.0
WQ-02	6/15/2021	11:05	0.0
WQ-02	6/21/2021	11:00	0.0
WQ-02	6/24/2021	11:10	0.0
WQ-02	7/1/2021	11:45	0.0
WQ-02	7/6/2021	11:25	0.0
WQ-02	7/13/2021	11:25	0.0
WQ-02	7/20/2021	11:20	0.0
WQ-02	7/27/2021	11:20	0.0
WQ-02	8/3/2021	11:25	0.0
WQ-02	8/10/2021	11:30	0.0
WQ-02	8/17/2021	11:00	0.0

Sample ID	Date	Time	E. Coli MPN/100 mL
WQ-03	5/10/2021	12:30	0.0
WQ-03	5/18/2021	10:30	0.0
WQ-03	5/20/2021	13:00	2.0
WQ-03	5/25/2021	10:00	0.0
WQ-03	5/27/2021	13:10	0.0
WQ-03	6/1/2021	13:20	0.0
WQ-03	6/8/2021	10:40	0.0
WQ-03	6/15/2021	11:35	0.0
WQ-03	6/21/2021	11:20	0.0
WQ-03	6/24/2021	10:20	1.0
WQ-03	7/1/2021	11:10	0.0
WQ-03	7/6/2021	11:45	1.0
WQ-03	7/13/2021	11:43	9.7
WQ-03	7/20/2021	10:45	0.0
WQ-03	7/27/2021	11:30	12.2
WQ-03	8/3/2021	11:35	1.0
WQ-03	8/10/2021	0:00	0.0
WQ-03	8/17/2021	11:30	0.0

Sample ID	Date	Time	E. Coli MPN/100 mL
WQ-04	5/10/2021	13:00	0.0
WQ-04	5/18/2021	10:45	0.0
WQ-04	5/20/2021	13:15	1.0
WQ-04	5/25/2021	11:40	0.0
WQ-04	5/27/2021	13:45	0.0
WQ-04	6/1/2021	13:55	1.0
WQ-04	6/8/2021	11:15	7.5
WQ-04	6/15/2021	11:35	0.0
WQ-04	6/21/2021	11:30	24.6
WQ-04	6/24/2021	10:40	0.0
WQ-04	7/1/2021	10:45	7.5
WQ-04	7/6/2021	12:35	0.0
WQ-04	7/13/2021	12:00	0.0
WQ-04	7/20/2021	11:15	1.0
WQ-04	7/27/2021	11:45	0.0
WQ-04	8/3/2021	12:05	0.0
WQ-04	8/10/2021	9:20	0.0
WQ-04	8/17/2021	11:50	0.0

0.0 = < 1 MPN/100 mL
* Location not accessible
Note: Sampling events were suspended in August due to the Caldor Fire and associated forest closure

Table 11. E. Coli Laboratory Results- All Sites

Sample ID	Date	Time	E. Coli MPN/100 mL
WQ-05	5/10/2021	10:15	2.0
WQ-05	5/18/2021	12:15	0.0
WQ-05	5/20/2021	10:20	4.1
WQ-05	5/25/2021	11:40	0.0
WQ-05	5/27/2021	10:30	3.1
WQ-05	6/1/2021	10:30	3.1
WQ-05	6/8/2021	13:30	0.0
WQ-05	6/15/2021	13:00	2.0
WQ-05	6/21/2021	10:10	6.3
WQ-05	6/24/2021	11:40	6.3
WQ-05	7/1/2021	9:05	6.3
WQ-05	7/6/2021	10:20	3.1
WQ-05	7/13/2021	13:12	7.5
WQ-05	7/20/2021	12:00	5.2
WQ-05	7/27/2021	12:40	2.0
WQ-05	8/3/2021	13:00	1.0
WQ-05	8/10/2021	10:00	2.0
WQ-05	8/17/2021	12:45	2.0

Sample ID	Date	Time	E. Coli MPN/100 mL
WQ-06	5/10/2021	10:23	1.0
WQ-06	5/18/2021	12:20	1.0
WQ-06	5/20/2021	10:15	3.1
WQ-06	5/25/2021	11:45	1.0
WQ-06	5/27/2021	10:35	3.1
WQ-06	6/1/2021	10:35	0.0
WQ-06	6/8/2021	13:40	2.0
WQ-06	6/15/2021	13:05	3.1
WQ-06	6/21/2021	10:20	5.2
WQ-06	6/24/2021	12:00	11.0
WQ-06	7/1/2021	9:15	9.8
WQ-06	7/6/2021	10:25	4.1
WQ-06	7/13/2021	13:15	4.1
WQ-06	7/20/2021	12:15	2.0
WQ-06	7/27/2021	12:35	7.5
WQ-06	8/3/2021	12:55	1.0
WQ-06	8/10/2021	10:05	2.0
WQ-06	8/17/2021	12:50	5.2

0.0 = < 1 MPN/100 mL
* Location not accessible
Note: Sampling events were suspended in August due to the Caldor Fire and associated forest closure

Appendix B:

Datasheet: 2021 Water Quality Monitoring Data Summary

https://www.eid.org/our-services/hydroelectric/project-184/project-184-document-library