2023 Annual Report

Clear Creek / Standley Lake Watershed Agreement

November 5, 2024

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Submitted to the Water Quality Control Commission by:

Black Hawk/Central City Sanitation District
Central Clear Creek Sanitation District
Church Ditch Water Authority
City of Arvada
City of Black Hawk
City of Golden
City of Idaho Springs
City of Northglenn
City of Thornton
City of Westminster
Clear Creek County
Clear Creek Skiing Corporation
Clear Creek Watershed Foundation
Climax Molybdenum Company/Henderson Operations
Colorado Department of Transportation
Farmers' High Line Canal and Reservoir Company
Farmers' Reservoir and Irrigation Company
Molson Coors Brewing Company
Gilpin County
Jefferson County
St. Mary's Glacier Water and Sanitation District
Town of Empire
Town of Georgetown
Town of Silver Plume
Upper Clear Creek Watershed Association

Report photographs contributed by the Cities of Westminster, Thornton, and Northglenn; and the Clear Creek Watershed Foundation.

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2023

Highlights

- ***Nutrient loading from the watershed was similar to recent years.***
- ***The chlorophyll a standard for Standley Lake was met in 2023, as it has been every year since the standard was adopted in 2009.***
- ***Average chlorophyll a concentrations were the lowest observed and average Secchi measurements were the highest observed over the period 2005-2023.***
- ***Due to warm fall air temperatures, the lake remained stratified longer than usual. Turnover occurred on November 1, the latest date since 2005.***

CONTENTS

Standley Lake Profiler

PURPOSE OF REPORT

This report summarizes water quality in Standley Lake and its watershed in 2023, including loading of nutrients and solids to Standley Lake and compliance with the chlorophyll *a* standard. This document fulfils the reporting requirements set forth in the 1993 Clear Creek Standley Lake Watershed Agreement. Additional information pertaining to the Agreement, monitoring plan, additional water-quality analyses, and monitoring data are included in the Supplemental Information sections.

1. THE 1993 AGREEMENT

In 1993, the Clear Creek/Standley Lake Watershed Agreement (1993 Agreement) was signed by a contingent of governmental and private entities to address water-quality issues and concerns within the Clear Creek watershed, specifically as they affect the water quality in Standley Lake. The 1993 Agreement shaped the Watershed Monitoring Program and has resulted in a long term, robust data set that is used to both monitor the success of water-quality actions and to inform future projects. To continue efforts to protect Standley Lake water quality, a numeric chlorophyll *a* standard was implemented in 2009.

Chlorophyll a Standard

In 2009, the Water Quality Control Commission adopted a numeric chlorophyll a standard for Standley Lake. A 4.0 µg/L chlorophyll a standard was established as a protective measure for this drinking water supply reservoir. The standard is evaluated on an annual basis using the average of the nine monthly averages of observed data for the period from March through November.

Standley Lake

2. THE SETTING

CLEAR CREEK WATERSHED AND THE UPPER BASIN

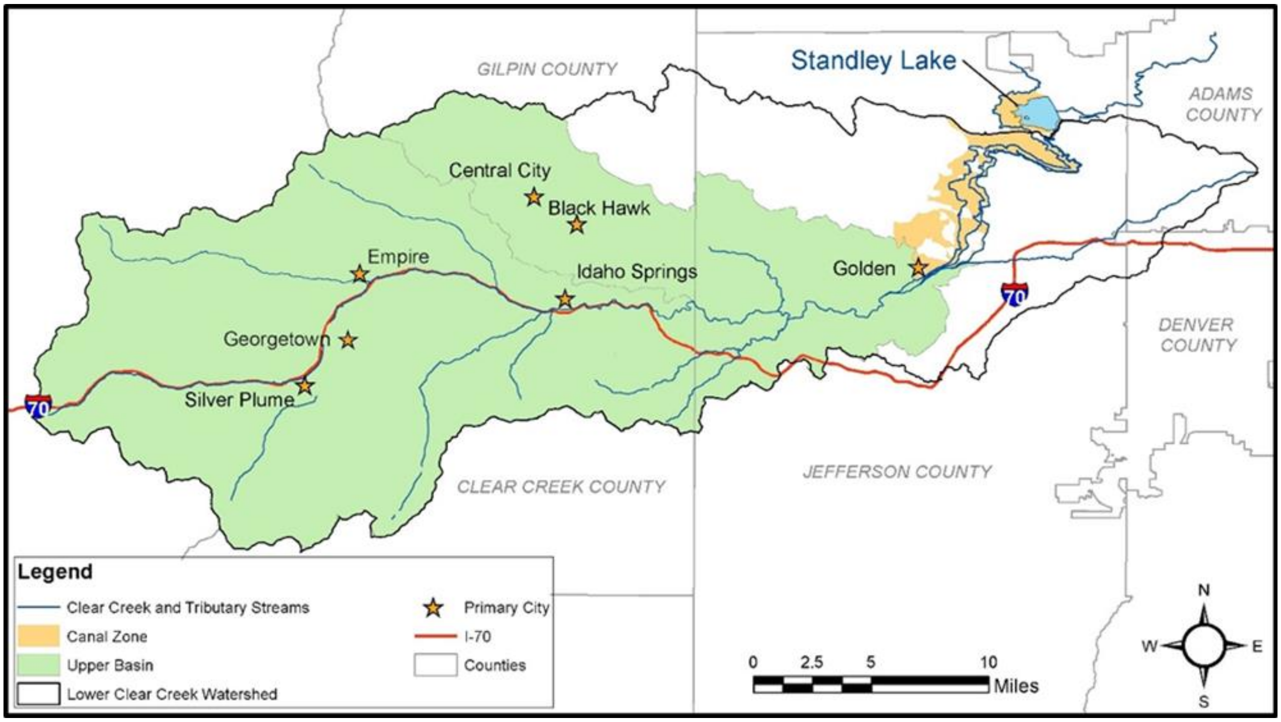


Figure 1. The Standley Lake Watershed: Upper Basin and Canal Zone

Clear Creek

The Upper Clear Creek Watershed covers 450 square miles and is located west of Denver, Colorado, with headwaters at the Continental Divide (Figure 1). The Upper Basin of the watershed is the portion above the headgates for the three canals supplying Standley Lake. It extends from the headwaters downstream to near the City of Golden. In addition to supplying drinking water for 350,000 residents in the watershed (including the Cities of Northglenn, Thornton and Westminster), Clear Creek provides water for recreational, agricultural, and industrial purposes.

CANAL ZONE

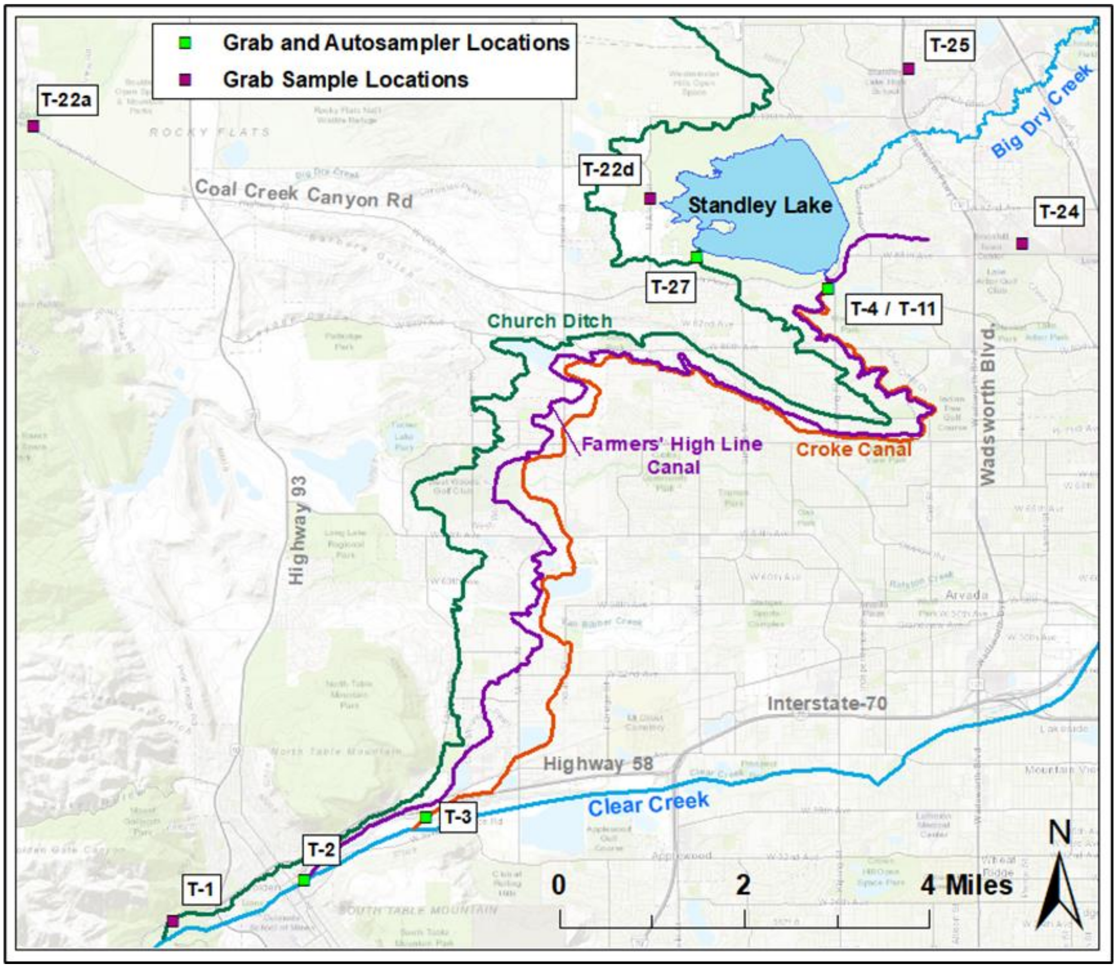
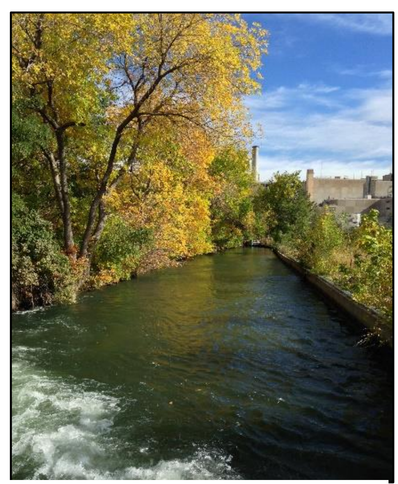


Figure 2. The Canal Zone Showing the Three Canals that Divert Water from Clear Creek to Standley Lake

The Canal Zone is the drainage area that includes three canals that divert water from Clear Creek into Standley Lake: Church Ditch (Church), Farmers' High Line Canal (FHL), and the Croke Canal (Croke) (Figure 2). The three canals are low-gradient, earthen, open, and unlined. In addition, they are subject to nonpoint-source loading from adjacent horse and cattle operations, other agricultural operations, and residential properties (some with on-site wastewater treatment systems, OWTS). To protect Standley Lake water quality, efforts have been made since the 1990s to reduce the majority of storm water inputs/runoff into the Clear Creek canals. As a result, ~80% of stormwater inputs have been hydrologically disconnected from the canals. The Kinnear Ditch Pipeline (KDPL), which provides flow from the Fraser River, South Boulder Creek, and Coal Creek, also contributes water to Standley Lake (< 6%).

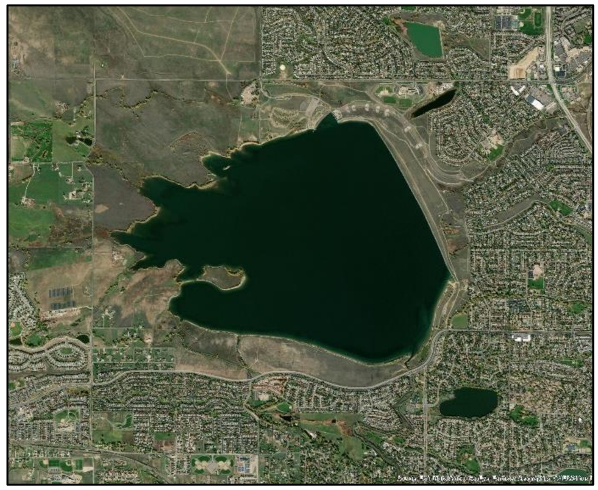


The Farmers' High Line Canal

2. THE SETTING

Standley Lake

STANDLEY LAKE



Aerial image of Standley Lake

Standley Lake is a municipal and agricultural reservoir located in Jefferson County, Colorado. Construction of the dam was completed in 1912 and in 1963, the City of Westminster expanded the reservoir to its present storage capacity of 43,000 acre-feet. The reservoir is a direct-use drinking water supply for over 300,000 consumers in Northglenn, Thornton, and Westminster. The reservoir also provides recreation opportunities as well as water to farms located in Adams and Weld counties. It is owned and operated by the Farmers' Reservoir and Irrigation Company (FRICO) and is the third largest reservoir in the Denver metropolitan area, covering approximately 1,200 acres. Standley Lake receives the majority of its inflows from the Clear Creek Watershed via three canals. Through the Watershed Monitoring Program, the lake is monitored regularly during the ice-free period.

Bobcat and Sandhill Crane near Standley Lake

Loading of total suspended solids (TSS), TP, and TN in the Upper Basin was quantified in 2023. Two sampling locations were included in this analysis: the upper station (CC26) and the lower station (CCAS59/60). Details about these sampling locations are provided in the Watershed Monitoring Program. Ambient grab and autosampler data from the two stations were used to quantify nutrient loadings from upstream to downstream and provide an assessment of water quality in the upper watershed. The results are presented in Figures 3-5. Loads of TSS at both sites in 2023 were similar to 2022, and TSS loads at the lower site were notably smaller (46%) than the 2018-2022 average. TP loads at both sites were similar to the 2018-2022 average. TN loads were greater (24-29%) than the 2018-2022 average.

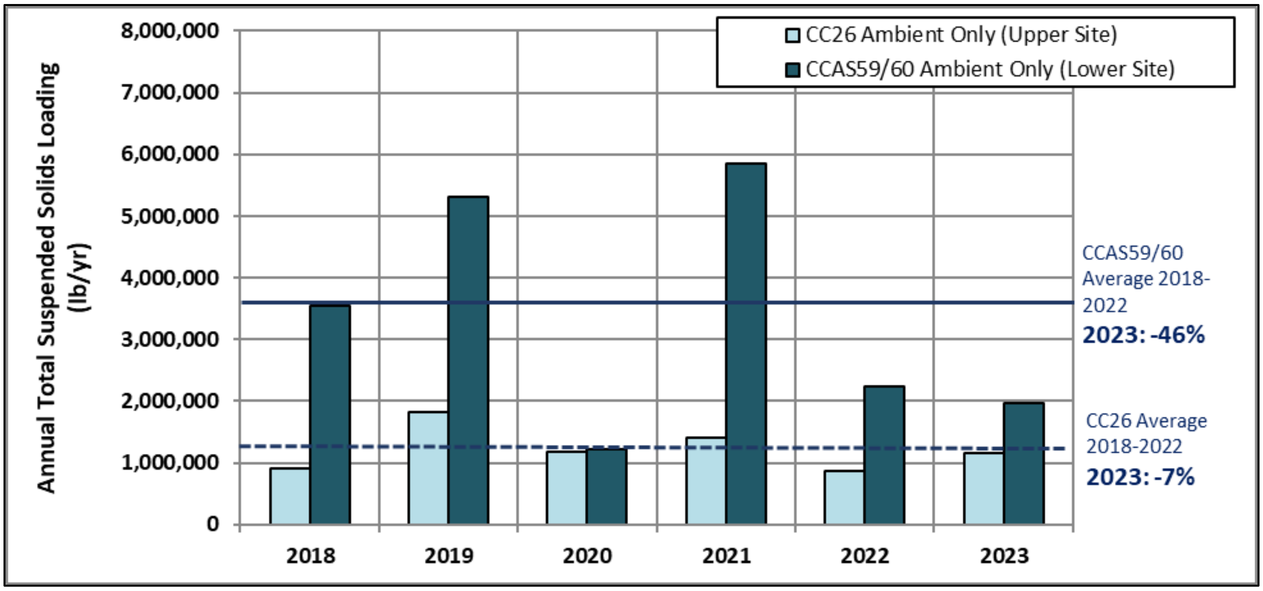


Figure 3. TSS Loads with Percent Change in 2023 for the Upper Station (CC26) and Lower Station (CCAS59/60)

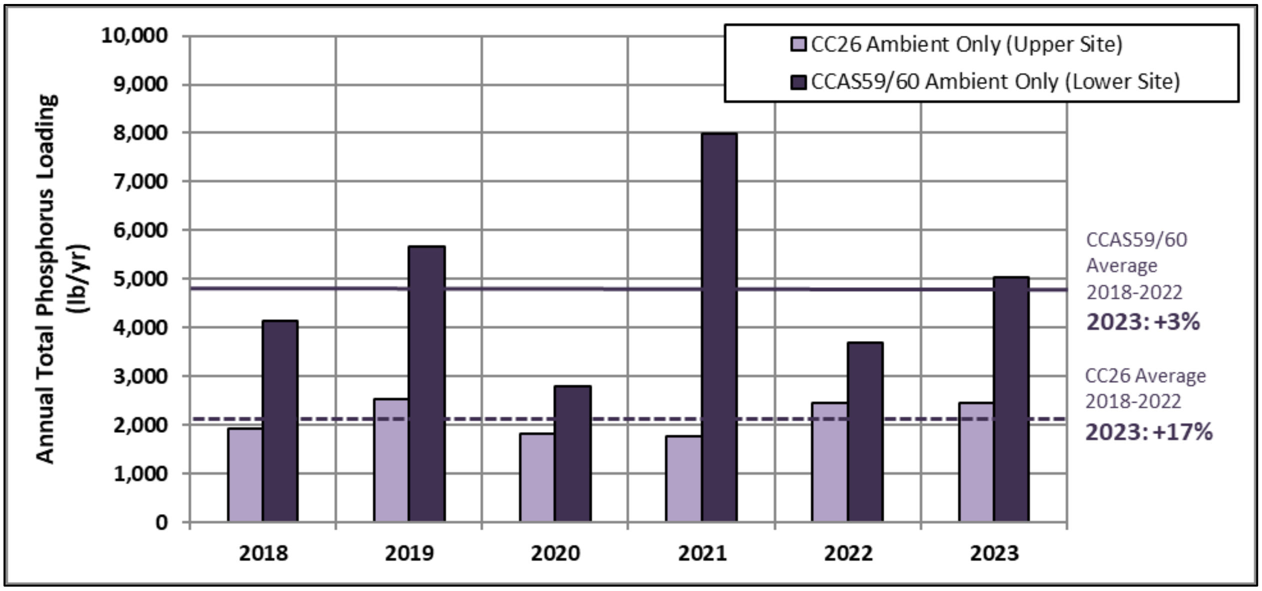


Figure 4. TP Loads with Percent Change in 2023 for the Upper Station (CC26) and Lower Station (CCAS59/60)

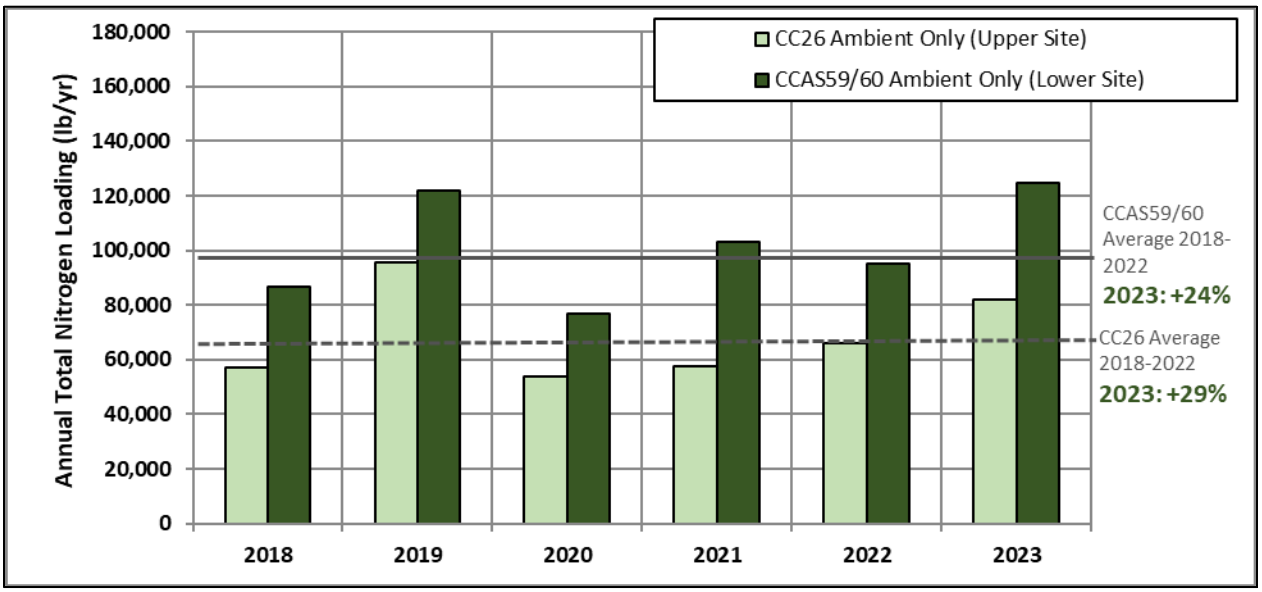


Figure 5. TN Loads with Percent Change in 2023 for the Upper Station (CC26) and Lower Station (CCAS59/60)

The Croke Canal and FHL Canal, Standley Lake's two largest flow contributors

Loads for TSS, TP, and TN from the four sources entering Standley Lake are presented in Figures 6-8. Percentages of TSS, TP, and TN load contributions by source are compared to percentages of flow by source in Figure 9. The FHL continues to contribute the largest fraction of the total annual loads to the reservoir for TSS and TP (78% and 66%, respectively). This contribution is expected as it is the primary canal used during runoff in spring and provides 58% of the total annual inflow to the reservoir. The Croke Canal is the second largest contributor of total annual TSS and TP loads (12% and 23%, respectively). Annual TN loading is more evenly distributed between the FHL and Croke Canals (49% and 44%, respectively), resulting from higher TN concentrations during the winter months when the Croke is the primary canal used.

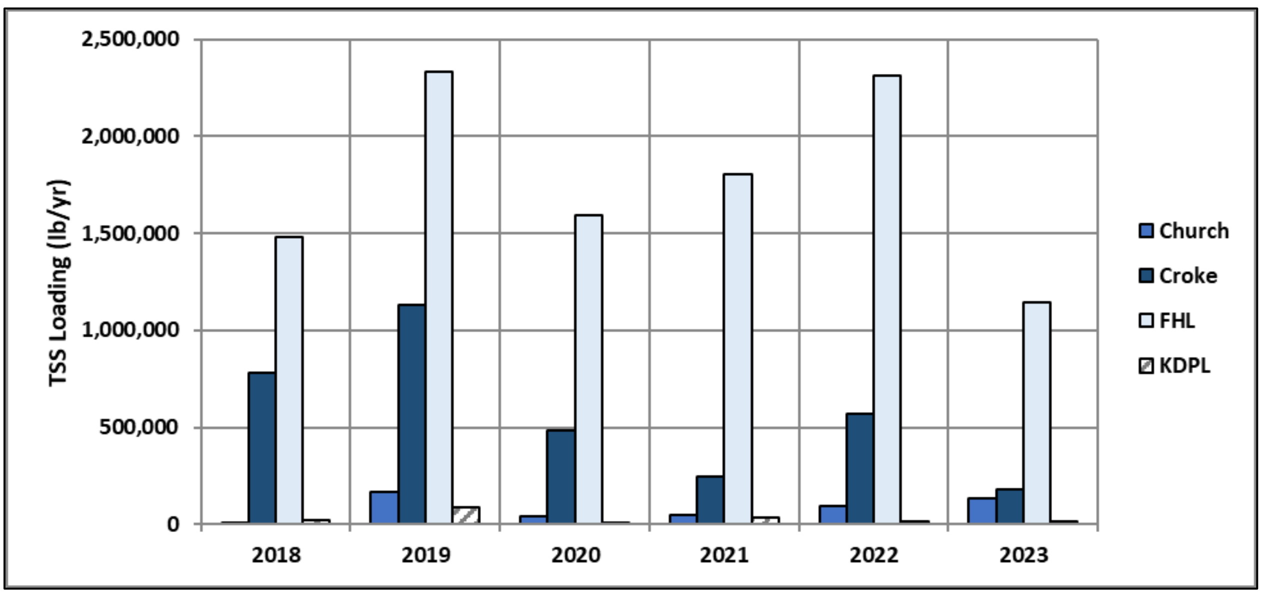


Figure 6. Total Suspended Solids Loading Into Standley Lake by Source, 2018-2023

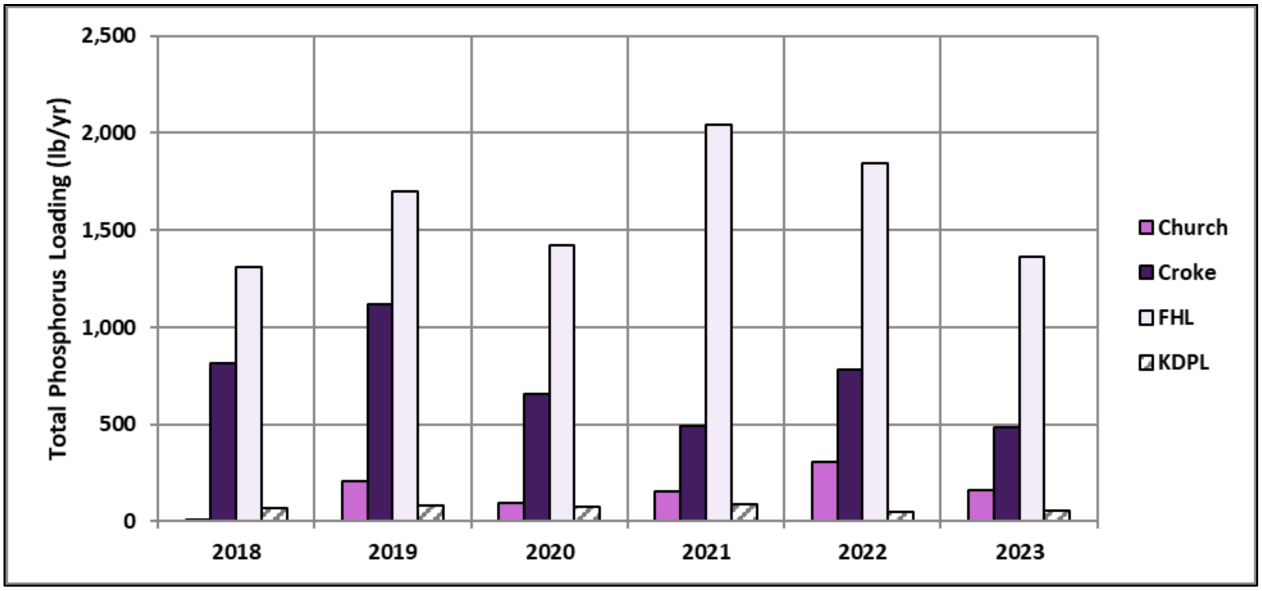


Figure 7. Total Phosphorus Loading Into Standley Lake by Source, 2018-2023

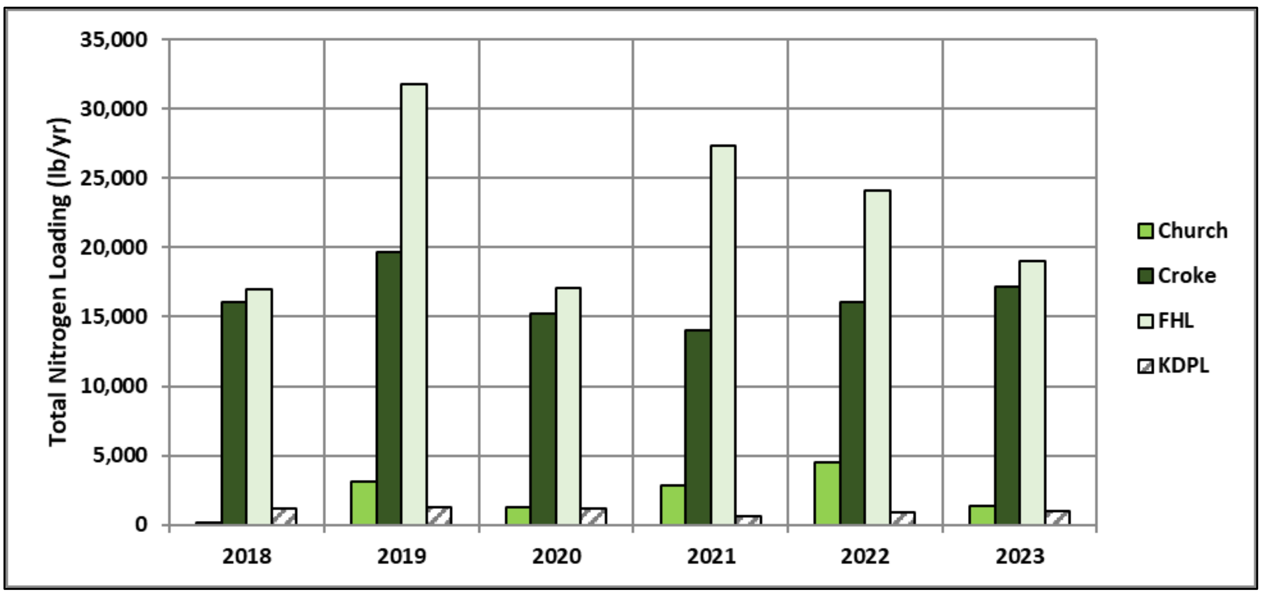


Figure 8. Total Nitrogen Loading Into Standley Lake by Source, 2018-2023

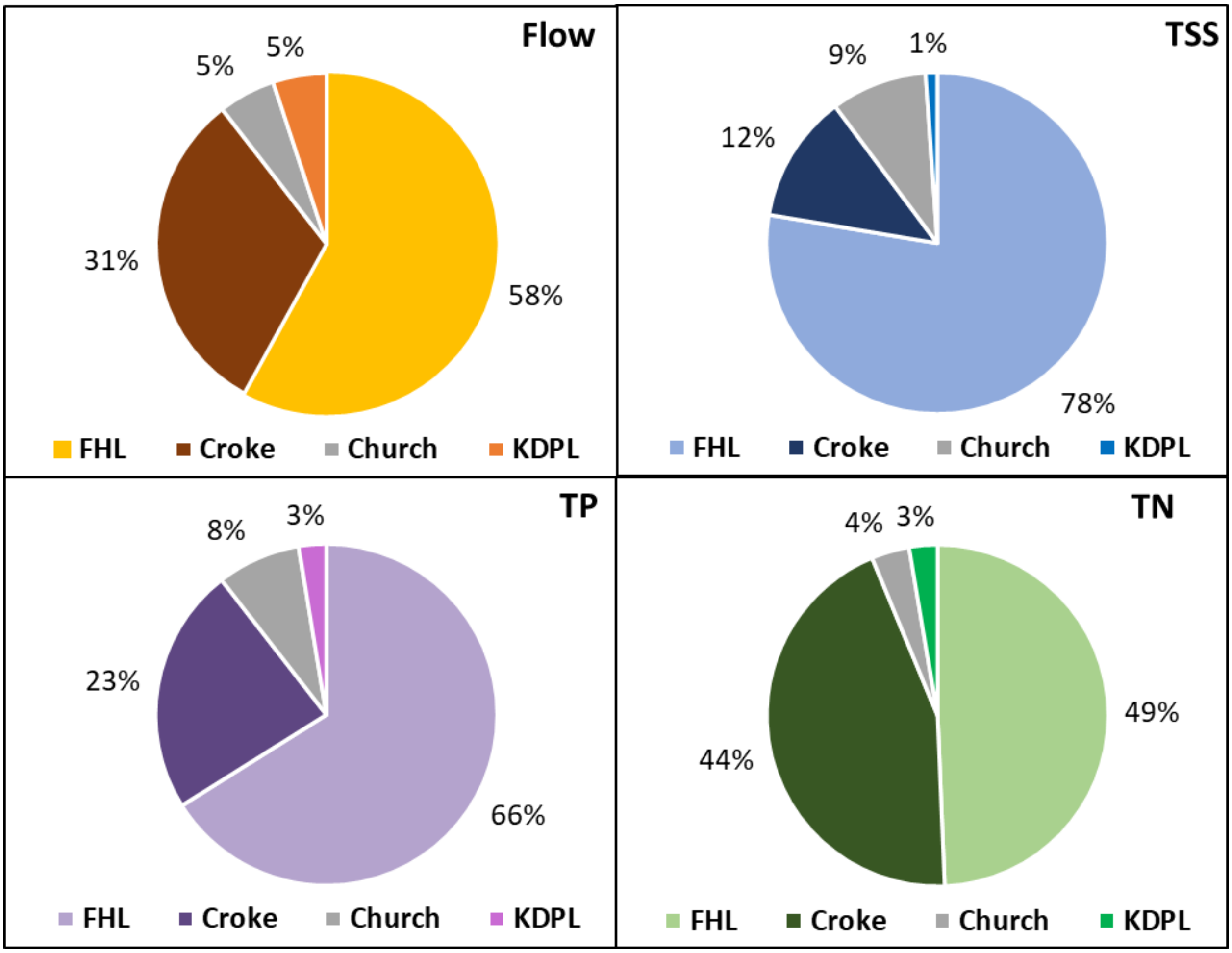


Figure 9. Annual Contributions of Flow, Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Nitrogen (TN) by Each of the Four Sources Entering Standley Lake, 2023

TOTAL SUSPENDED SOLIDS, PHOSPHORUS, AND NITROGEN LOADING INTO AND OUT OF STANDLEY LAKE

Estimated annual TSS TP and TN loads into Standley Lake are presented in Figures 10-12. TSS, TP, and TN loads into the reservoir in 2023 were 45%, 23%, and 10% lower than the 2018-2022 average, respectively. Total TSS and TP loading into the reservoir in 2023 was lower than in any of the previous five years. This is due in part to reduced inflow volume – total flow into the reservoir in 2023 was 12% below the 2018-2022 average. TSS loads leaving the reservoir were nearly equal to the 2018-2022 average, and TP and TN loads leaving the reservoir were lower than the 2018-2022 average (16% and 8% lower, respectively). As expected, loadings of TSS, TP, and TN into the lake were greater than outflow, indicating some level of sediment and nutrient retention.

Nutrient Retention in Reservoirs

Phosphorus *tends to be closely associated with* ***total suspended solids*** *through particle-associated transport and tends to be retained with sediment.*

Nitrogen *can be retained through biological uptake and deposition of particulate organic matter to the bottom sediment.*

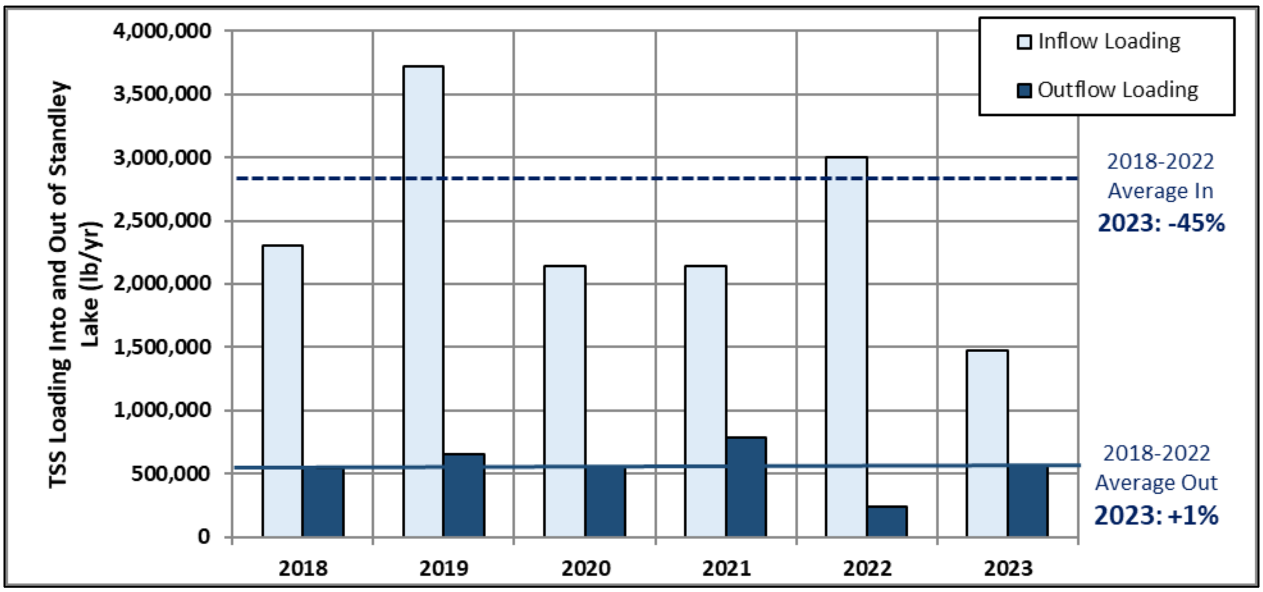


Figure 10. Total Suspended Solids Loading Into and Out of Standley Lake, 2018-2023

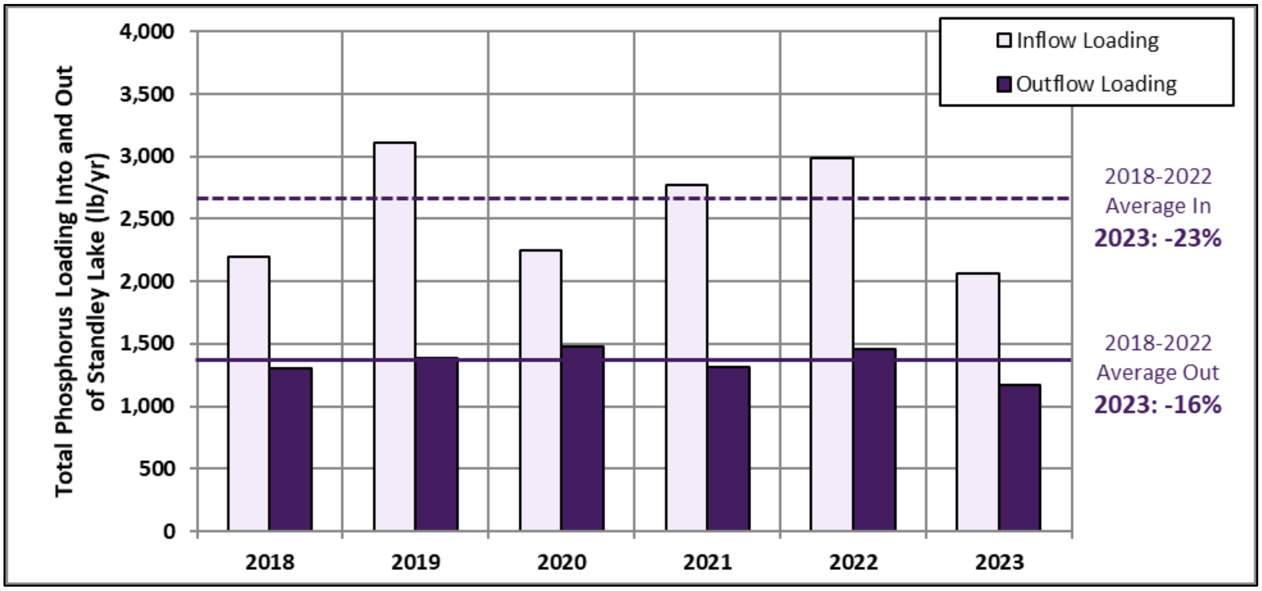


Figure 11. Total Phosphorus Loading Into and Out of Standley Lake, 2018-2023

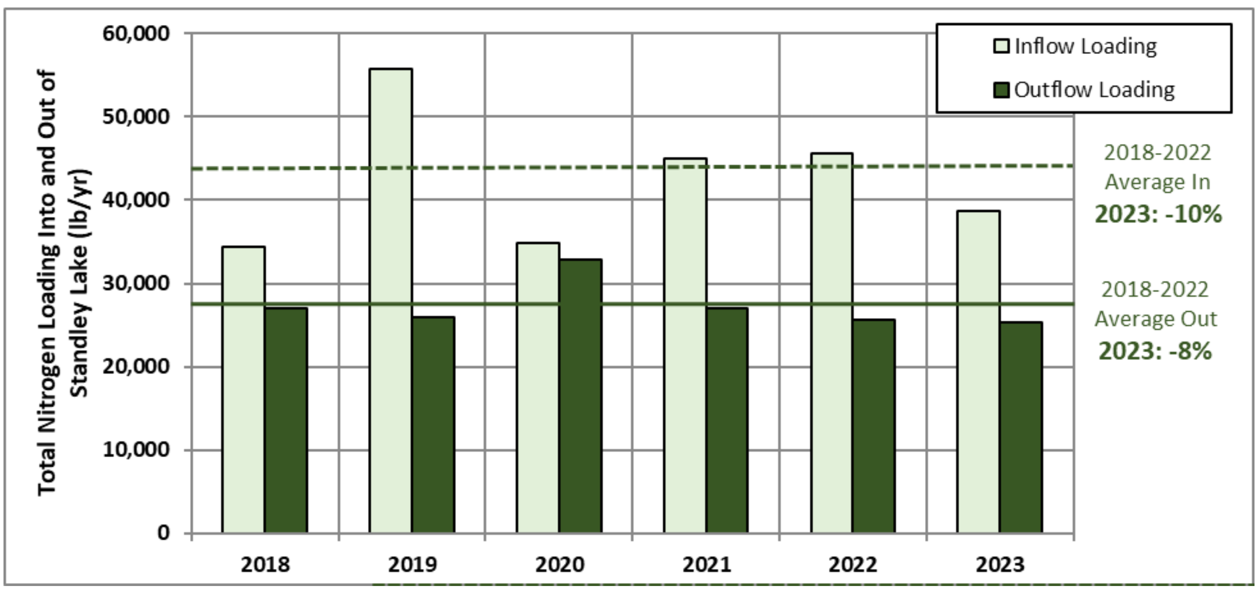


Figure 12. Total Nitrogen Loading Into and Out of Standley Lake, 2018-2023

FLOWS

Snowpack[1] accumulation and melt in 2023 followed a similar pattern as recent years, though peak accumulation was below the 2018-2022 average (Figure 13). Snowpack peaked at 18.6 in. Snow Water Equivalent (SWE) on April 28 and began decreasing, but a storm beginning on May 11 added over 2 in. SWE, extending the runoff period.

How does 2023 Snowpack Compare?

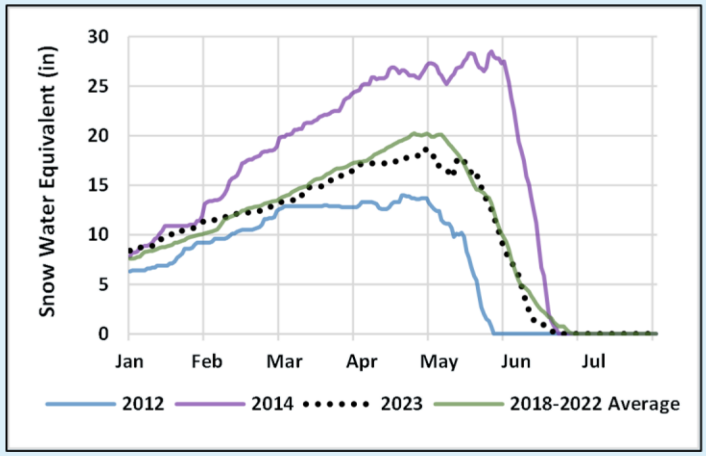


Figure 13. Snow Water Equivalent, 2012 (low), 2014 (high), 2023, and 2018-2022 Average

Hydrographs from Upper Basin locations CC26 (Clear Creek at Lawson Gage) and CC60 (Clear Creek upstream of the Church headgate, Golden, CO) are shown in Figure 14. The snowmelt-dominated pattern is consistent with previous years. Total annual flow at the upper station was 13% greater than the average of the previous five years. Total annual flow at the lower station was 23% greater than the average of the previous five years. Runoff peaked on June 23rd, approximately two weeks later than the 2018-2022 average.

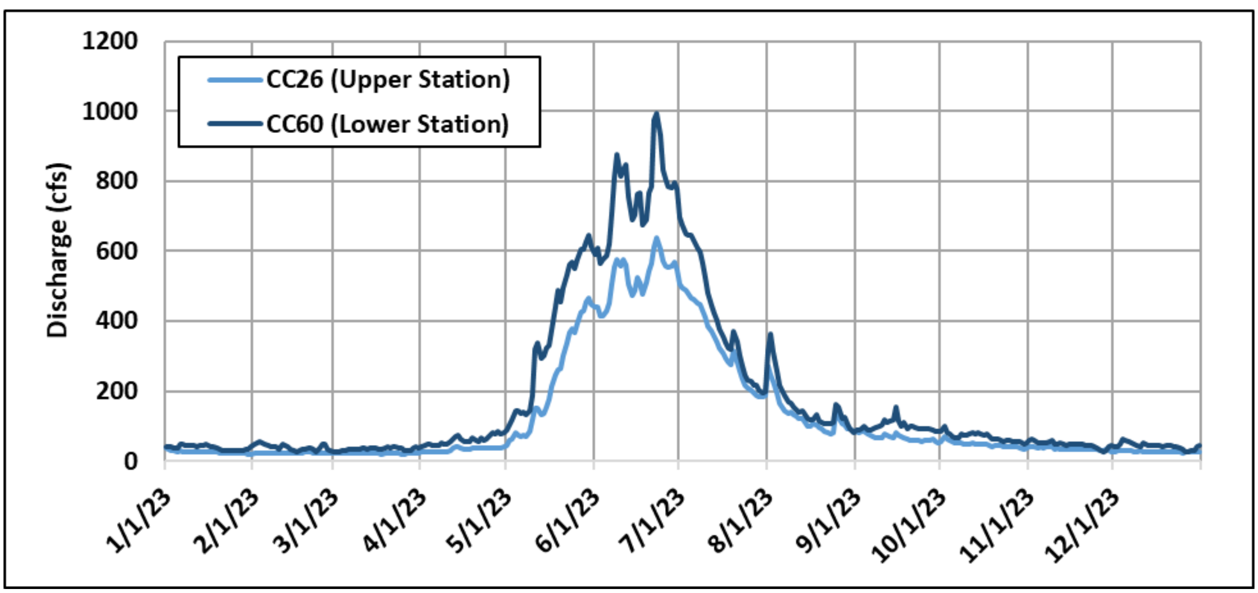


Figure 14. 2023 Clear Creek Hydrographs for the Upper Station (CC26) and the Lower Station (CC60)

[1] Snowpack data from Natural Resources Conservation Service (NRCS) SNOTEL site 602: Loveland Basin (https://wcc.sc.egov.usda.gov/nwcc/site?sitenum=602)

4A. 2023 WATER-QUALITY RESULTS – THE UPPER BASIN

CONCENTRATIONS

Upper Basin concentrations for TSS and TP in 2023 followed typical patterns with higher concentrations during spring runoff. Conversely, TN concentrations decreased during peak runoff in June due to the dilution of sources during the higher flow periods, and remained lower through the summer. Maximum observed concentrations of all constituents in 2023 were lower than annual maxima during the previous five years, with the exception of TSS and TP in 2020. This result may be due in part to sample timing, as no water-quality samples were collected during the early runoff period (between April 25 and May 30). Volume-weighted average concentrations at CC26 were below the 2018-2022 average for TSS, average for TP, and above average for TN. Volume-weighted average concentrations at CC59AS/CC60 were below the 2018-2022 average for TSS and TP, but slightly above the average for TN. Measured concentrations and annual volume-weighted concentrations are provided in Supplemental Information – 3.

4B. 2023 WATER-QUALITY RESULTS – THE CANAL ZONE

CANAL ZONE TSS, TP, AND TN CONCENTRATIONS

Results of water-quality analyses for the Canal Zone are highlighted in this section. Constituents for the Farmers' High Line and Croke Canals are the focus because they are the largest contributors of flow to Standley Lake (58% and 31% in 2023, respectively). Samples taken in the Canal Zone in 2023 showed patterns consistent with previous years. A substantial increase in TSS and TP concentrations from the headgate to the entry point into the lake continue to be notable in the Croke Canal (Figure 15 and Figure 16, right), though the magnitude of this increase has been lower since 2021. The FHL shows a smaller increase in TSS and TP between the two sampling locations. TN concentrations showed a smaller relative increase in TN between the headgate and entry point to the lake in the Croke Canal, and decreased in FHL (Figure 17).

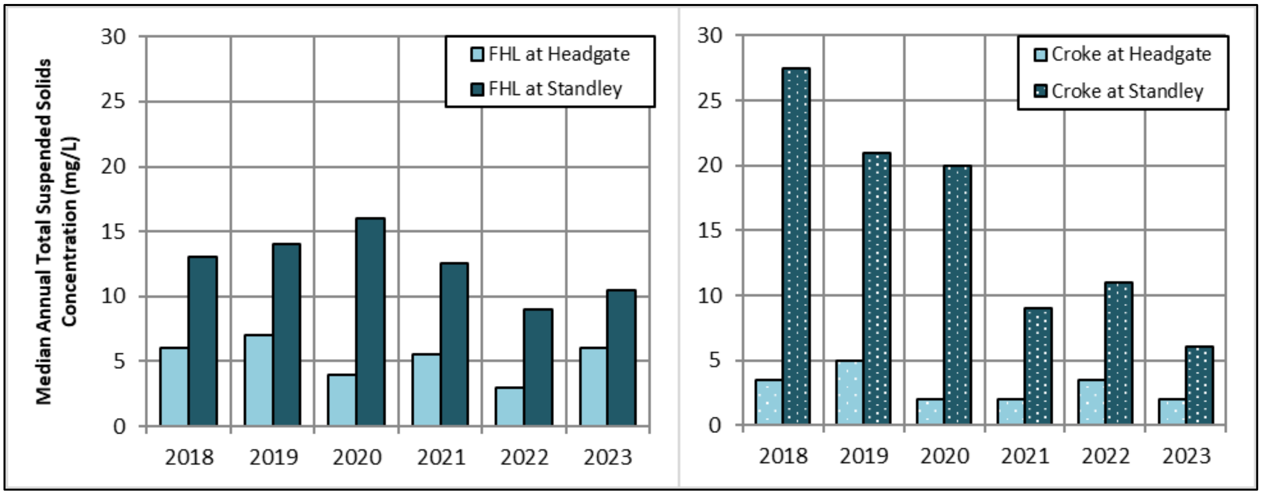


Figure 15. Median Total Suspended Solids in FHL (left) and Croke (right) Canals

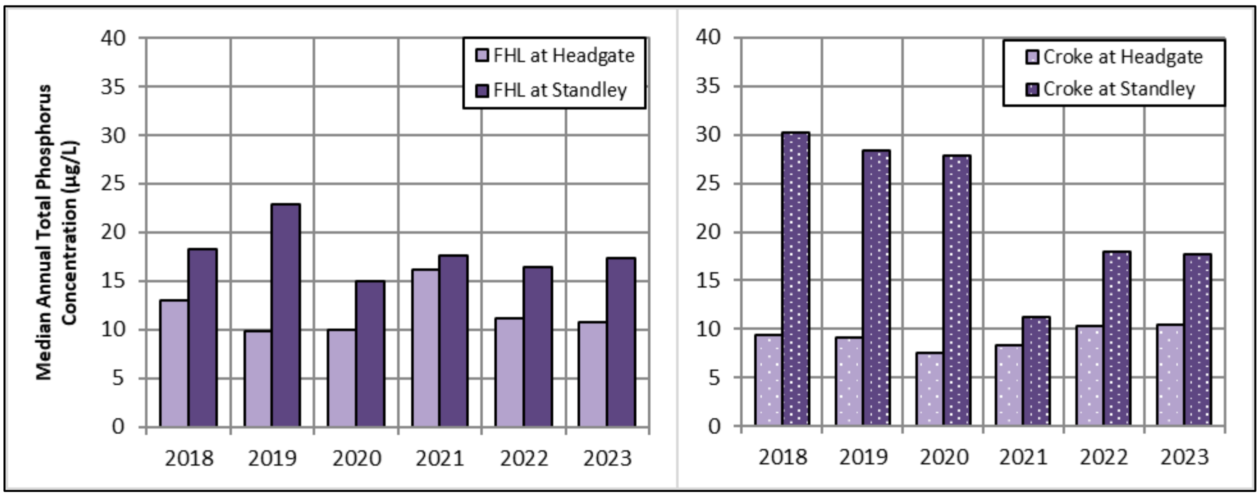


Figure 16. Median Total Phosphorus Concentrations in FHL (left) and Croke (right) Canals

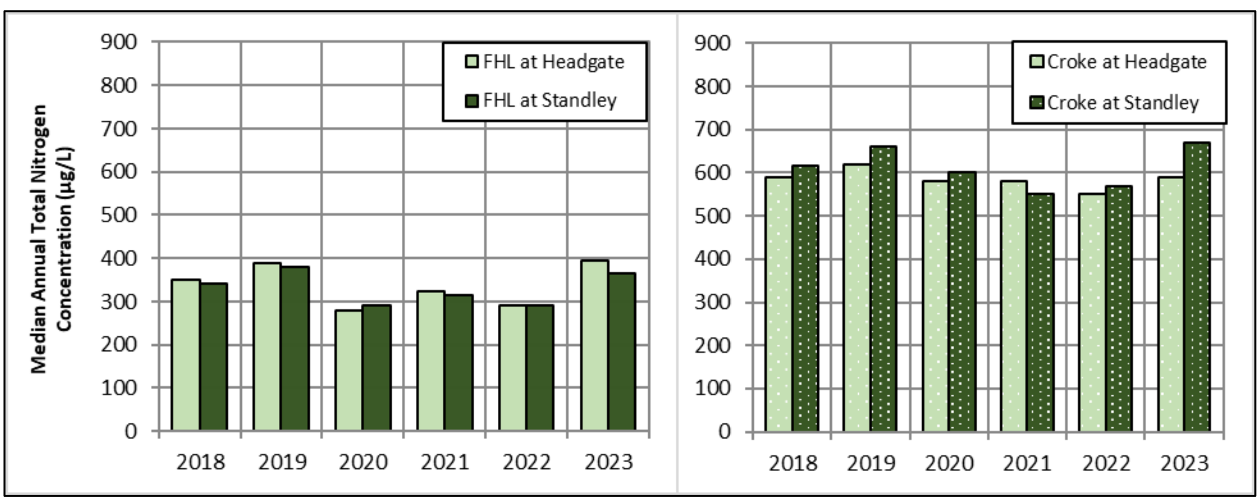


Figure 17. Median Total Nitrogen Concentrations in FHL (left) and Croke (right) Canals

LAKE CONTENTS

Standley Lake began 2023 with above-average water levels, and quickly filled to capacity by mid-May (Figure 18). Inflows exceeded demand for much of the summer, and the reservoir remained at capacity until mid-August. The duration of full pool conditions was greater than any of the previous five years. The reservoir also ended the year with above-average water levels.

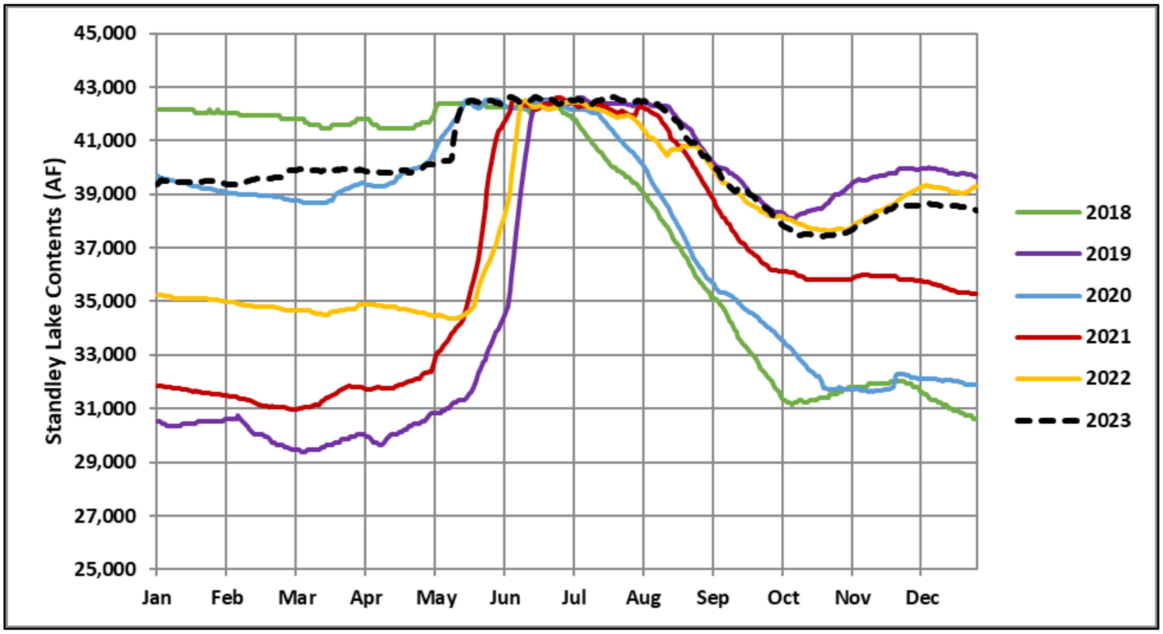
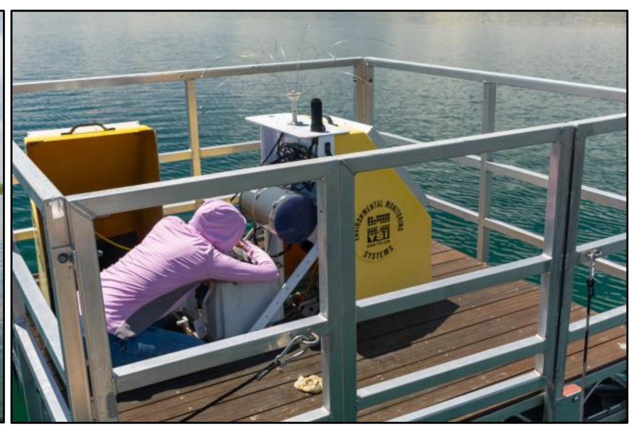


Figure 18. Standley Lake Contents, 2013-2018



Field Sampling and Profiler Maintenance on Standley Lake

TEMPERATURE

Temperature and thermal stratification are important, given their direct impact on habitat quality and biological processes, and their indirect impact on oxygen availability and redox conditions at the sediment-water interface. Stratification dynamics in Standley Lake in 2023 were similar to those observed in 2021 and 2022, with a thermocline developing in early May and eroding to a depth of 13-15 m prior to fall turnover (Figure 19). Bottom temperatures remained lower than in recent years, averaging 9.5 °C during the stratified period. Surface (0.5-m) temperatures peaked at 25.0 °C on August 4. Due to warm fall air temperatures, the lake remained stratified longer than is typical, with complete turnover occurring on November 1. This is the latest date of turnover on record since 2005.

Previous reports have noted the influence of operations on the thermal structure of Standley Lake. Operations in 2023 were similar to operations in 2022, with all outflow occurring via the lower outlet (20 m below full pool) until July 19, when the upper outlet (10 m below full pool) was opened 10%. On August 7, both outlets were opened to 100%, and the upper outlet was closed on October 31.

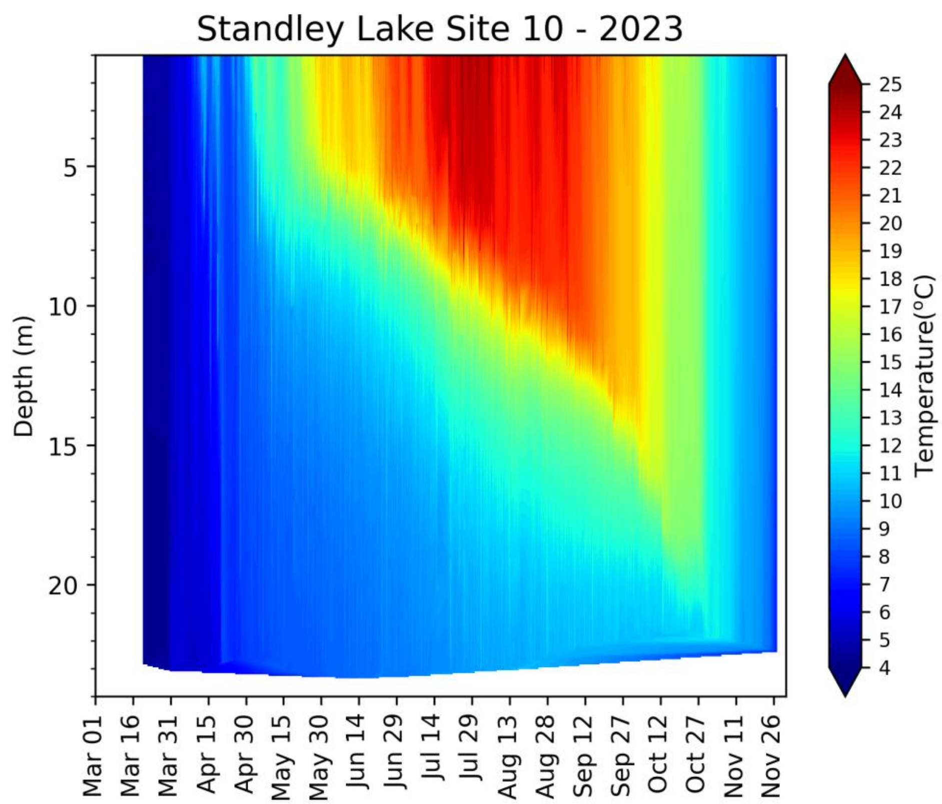


Figure 19. Contour Plots of Temperature in Standley Lake in 2023

DISSOLVED OXYGEN

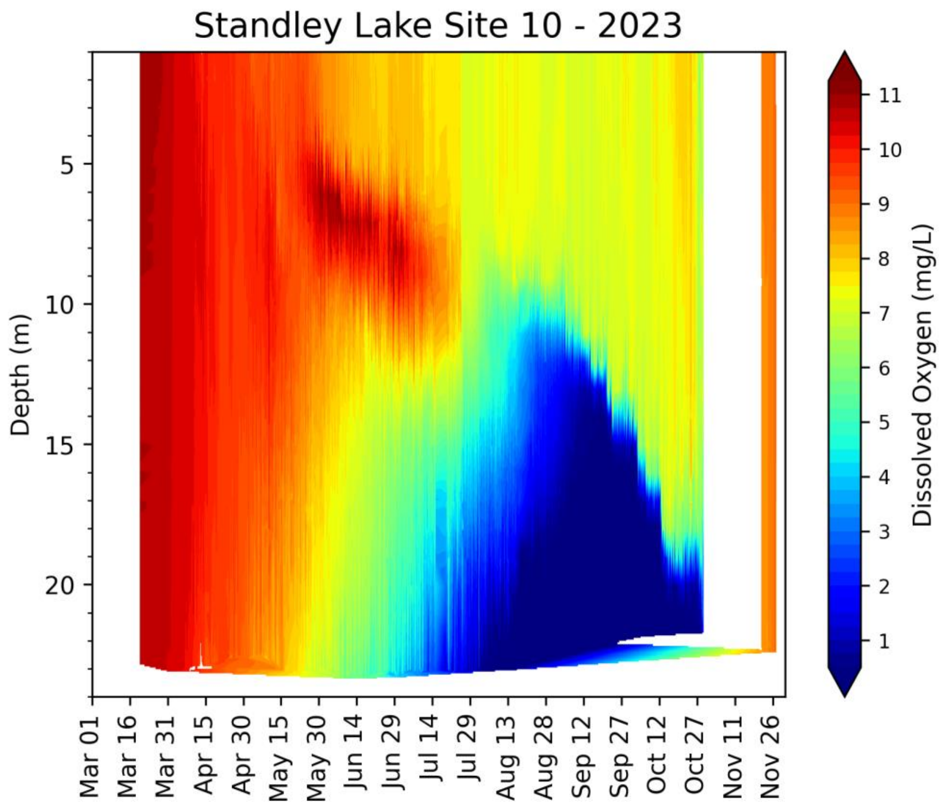


Figure 20. Contour Plot of Dissolved Oxygen in Standley Lake, March-December 2023

Dissolved oxygen (DO) concentrations in 2023 is shown in Figure 20. DO data were missing between October 29 and November 21 due to an equipment failure. The data show the presence of a metalimnetic oxygen maximum between 5 and 10 m water depth occurring between late May and mid-July, reflecting concentrated algal biomass/photosynthesis in this region of the water column. This is a common occurrence in Standley Lake, and is driven by nutrient delivery from FHL interflow. However, the intensity of the maximum was more pronounced in 2023 than in recent years.

Data from 2023 also show a typical pattern of decreasing oxygen concentrations in the hypolimnion with the onset of stratification in mid-May, and uniform concentrations throughout the water column post-turnover (turnover occurred during the period of missing data, see Figure 19). Hypoxic conditions began on July 19, 18 days later than the 2018-2022 average. However, because turnover also occurred late in the year (November 1, 14 days later than the 2018-2022 average), the duration of hypoxia (107 days) was very near the average duration for the previous five years (110 days, Figure 21). The duration of hypoxia is an important factor controlling internal loading of nutrients.

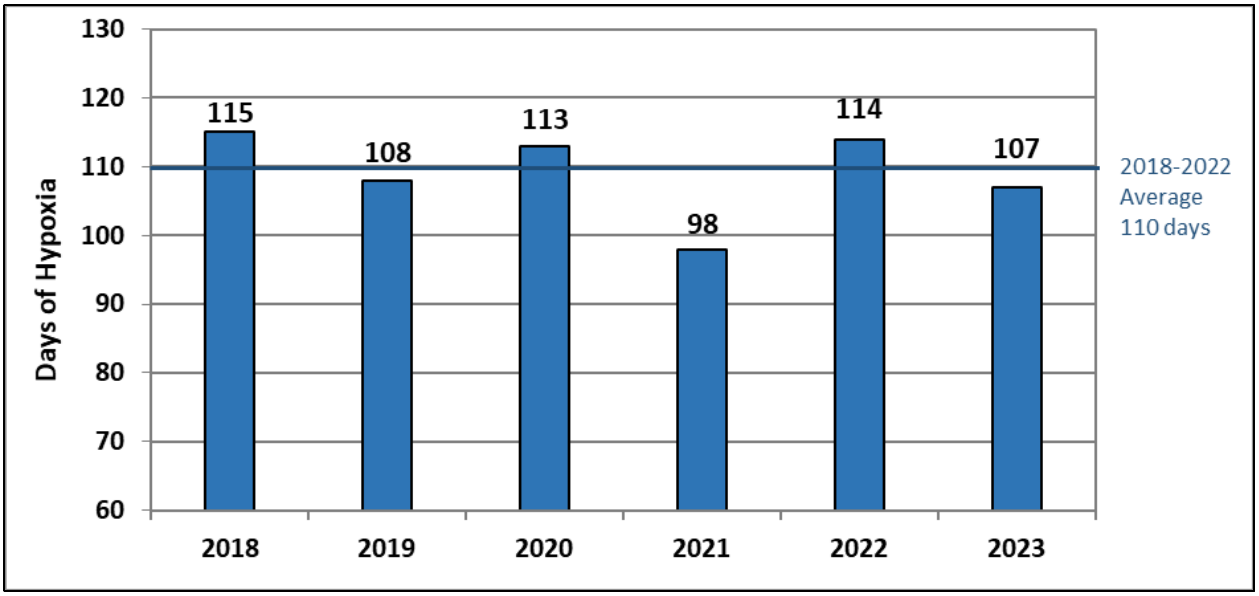


Figure 21. Days of Hypoxia (DO < 2.0 mg/L), 2018-2023

NUTRIENTS

Total Phosphorus

Phosphorus measurements are made in the photic zone and at the bottom of Standley Lake (Figure 22). 2023 Photic zone total phosphorus concentrations were low (July-September average = 9.6 µg/L), with a maximum value of 13.8 µg/L measured on October 9. Monitoring occurred weekly during the late summer and provided more insight to the patterns of nutrient release during the hypoxic period. Bottom concentrations were similar to those at the surface until mid-August, at which point they began increasing. Bottom total phosphorus concentrations peaked at 128 µg/L on October 9.

An increase in TP concentrations in the fall is typical and indicative of sediment release of nutrients as a result of hypoxia in the hypolimnion. The long-term record of phosphorus observations at the bottom is shown in Figure 23 and provides perspective on this year's observations. Observations in 2023 were lower than average when compared with the previous five years.

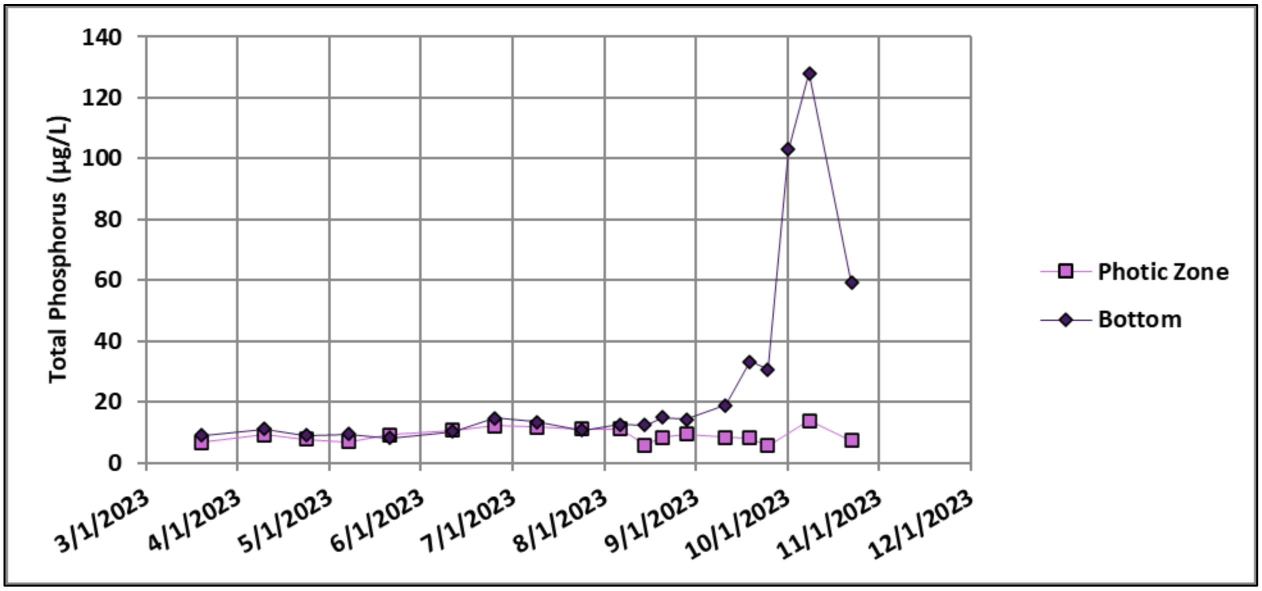


Figure 22. Total Phosphorus Concentrations in Standley Lake, 2023

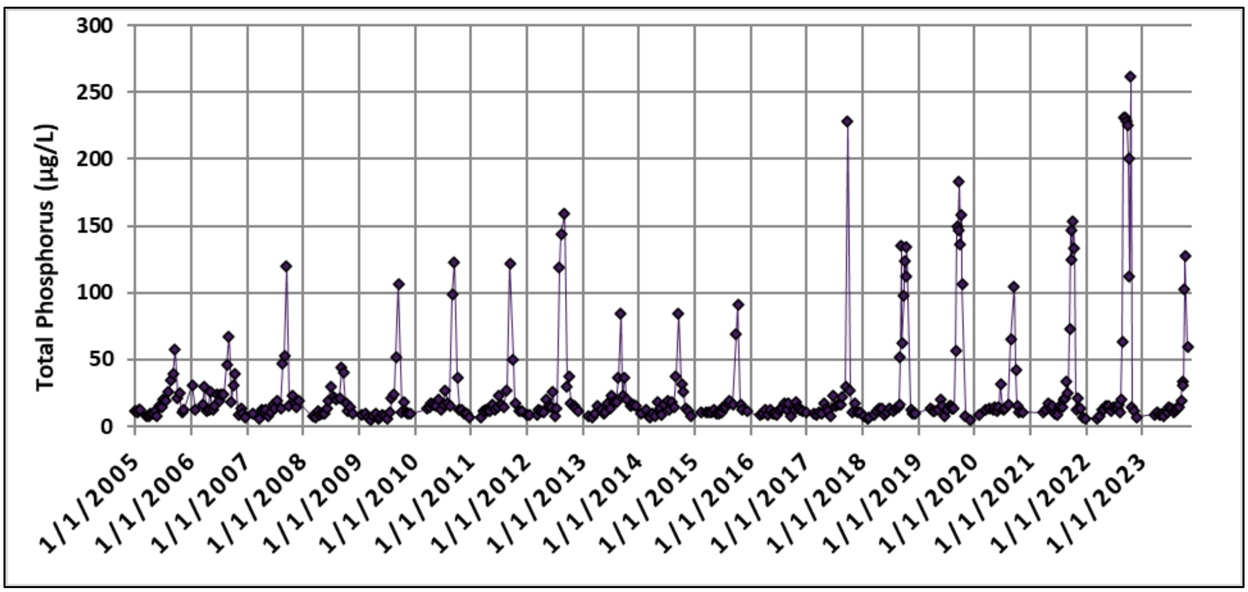


Figure 23. Total Phosphorus Concentrations at the Bottom of Standley Lake, 2005-2023

Total Nitrogen

2023 total nitrogen (TN) concentrations in Standley Lake are displayed in Figure 24. TN concentrations at the bottom of the lake exhibited a peak concentration of 600 µg/L on October 9. Surface concentrations were lower (July-September average = 212 µg/L) and decreased slightly throughout the year. Evidence of nutrient release from the sediment is demonstrated in the fall by a more rapid increase in concentration near the bottom corresponding with the timing of TP release (Figure 22).

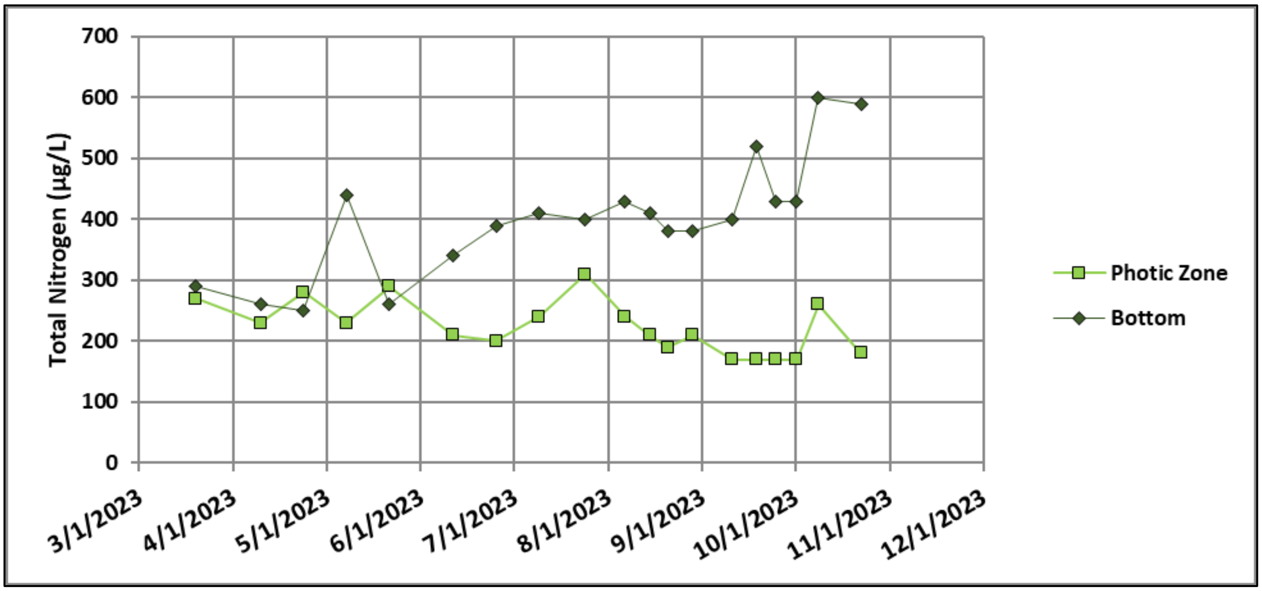


Figure 24. Total Nitrogen Concentrations in Standley Lake, 2023

CHLOROPHYLL *a*

Chlorophyll *a* concentrations measured in the photic zone are shown in Figure 25. March through November (the range of the horizontal axis) is the relevant period for standards assessment. The maximum concentration measured in 2023 was 6.2 µg/L on June 12. This peak coincides with the occurrence of the metalimnetic oxygen maximum shown in Figure 20, providing further evidence that algal biomass was concentrated in the metalimnion at this time. The dominant algal species present from May-July was the diatom Stephanodiscus.

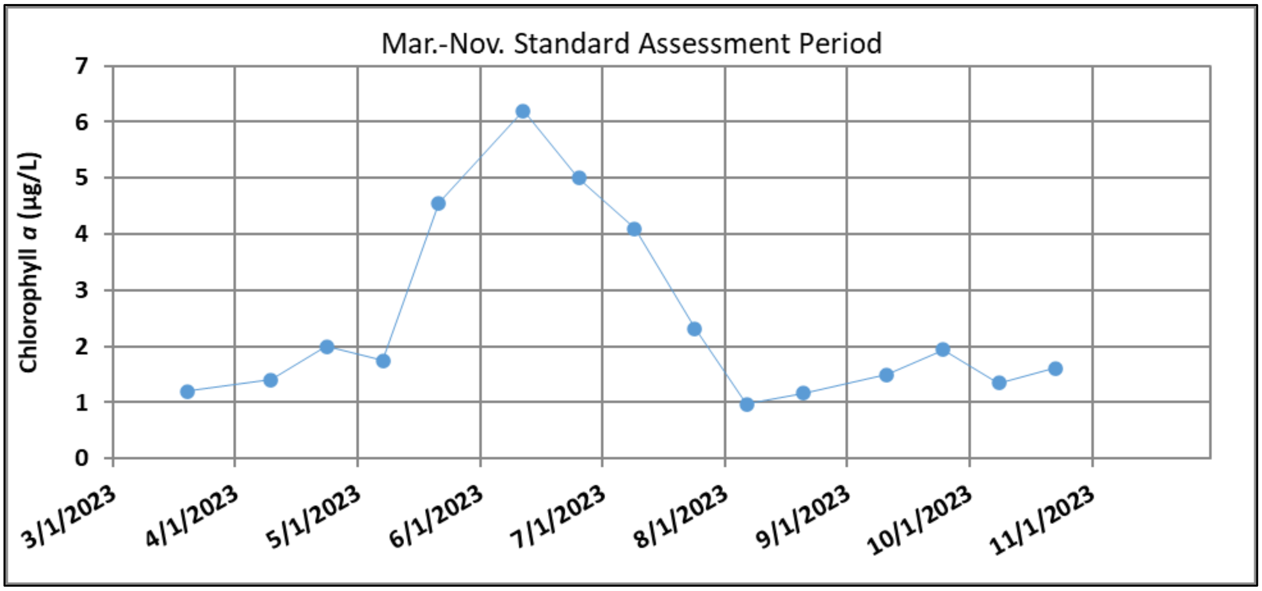


Figure 25. Chlorophyll *a* Concentrations in Standley Lake, 2023

Did we meet the chlorophyll a standard?

Yes, *the standard for chlorophyll* a *in Standley Lake was met in 2023. The 2023 average is compliant with both the 4.0 µg/L standard and 4.4 µg/L assessment threshold. The standard is met when four out of the five most recent years have a March-though-November average concentration below 4.4 µg/L. Every year in the five-year period from 2019 to 2023 has had a March-November average concentration below 4.4 µg/L.*

A chlorophyll *a* standard of 4.0 µg/L was established in 2009 for Standley Lake. This standard is evaluated on an annual basis using the average of the nine monthly averages of observed data for the period from March through November. To account for the natural variability in chlorophyll *a* concentrations, the standard is assessed using a concentration of 4.4 µg/L. For 2023, the value of the assessment metric was 2.4 µg/L (Figure 26), which is the lowest value recorded since the standard was adopted. For the 5-year period 2019-2023, the value of the assessment metric has ranged from 2.4 to 4.2 ug/L.

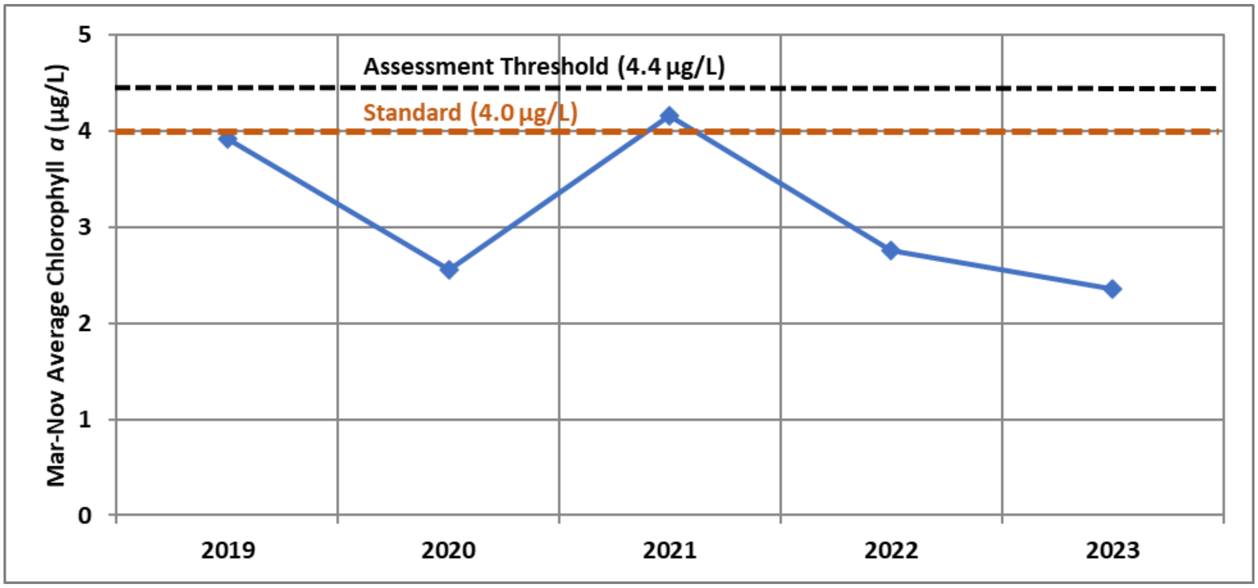


Figure 26. March-November Average Chlorophyll a Concentrations, 2019-2023

5. SUMMARY

Collaborative efforts made by UCCWA members, the Standley Lake Cities, and other parties to the 1993 Agreement continue to be successful in enhancing, protecting, and improving water quality in Standley Lake and Clear Creek. This success is evident based on consistent reservoir and watershed monitoring. Wastewater treatment plant upgrades, canal improvements, illicit discharge responses, public outreach events, and a wide host of other BMPs are all ways that the parties to The Agreement continue to contribute to water quality protection and enhancement.

The Clear Creek Watershed had acceptable water quality in 2023 and showed no signs of degradation from the previous five years for the constituents evaluated. Total flows were greater than average, and runoff peaked late in the year. At the upper station (CC26), TSS loads were average, and TP and TN loads were above average. At the lower station (CCAS59/CC60), TSS loads were below average, TP loads were average, and TN loads were above average. Loads in 2023 were consistent with the ranges observed in the previous five years.

Water-quality measurements in the Canal Zone indicate that nonpoint sources provide additional TSS and TP to the canals between Clear Creek and Standley Lake. While the FHL and the Croke Canal run parallel to each other, concentrations of TSS and TP increase to a relatively greater extent in the Croke Canal. This additional loading has been less pronounced since 2021, however. TN concentrations show little change through the Canal Zone. The FHL provides the majority of flow and TSS/nutrient loading to Standley Lake.

Standley Lake water quality in 2023 was better than average when compared with the previous five years. Water levels in the lake were above average for the entire year. As usual, Standley Lake exhibited a period of stratification and hypoxia in the hypolimnion. Fall turnover occurred unusually late in 2023 (November 1), but the duration of hypoxia was slightly below the average of recent years. Peak nutrient concentrations in the hypolimnion were lower than average. Summer surface concentrations of TN and TP remained low.

Chlorophyll *a* concentrations in 2023 were lower than average. The March-November average concentration in the photic zone was 2.4 µg/L, which is the lowest observed value since 2005. Standley Lake continues to meet the chlorophyll *a* standard, with all of the past five years falling below the assessment threshold of 4.4 µg/L. These data demonstrate the effectiveness of the efforts to manage, enhance, and protect water quality made by collaborating entities. Additional 2023 water-quality monitoring results are presented in Supplemental Information 3.

SUPPLEMENTAL INFORMATION

Supplemental Information 1 - Clear Creek / Standley Lake Watershed Agreement

Supplemental Information 2 - Upper Clear Creek / Standley Lake Watershed Water Quality Monitoring Plan

Supplemental Information 3 – Graphical Display of Select Clear Creek / Standley Lake Data - 2023

Supplemental Information 4 - Clear Creek, Canal, and Standley Lake Water Quality Monitoring Data - 2023

ACRONYMS

AF - Acre Feet

CC26 - Clear Creek Sampling Station: Clear Creek at Lawson Gage

CCAS26 - Clear Creek Autosampler Station: Clear Creek at Lawson Gage

CC59 - Clear Creek Autosampler Station: Clear Creek 2 Miles West of Highway 58/US6 in Golden. Storm Location Operated by City of Golden

CCAS59 - Clear Creek Autosampler Station: Clear Creek 2 Miles West of Highway 58/US6 in Golden

CC60 - Clear Creek Sampling Station: Clear Creek upstream of the Church Ditch Headgate

Church - Church Ditch

Croke - Croke Canal

FHL - Farmers' High Line Canal

FRICO - Farmers' Reservoir and Irrigation Company

KDPL - Kinnear Ditch Pipeline

TN - Total Nitrogen

TP - Total Phosphorus

TSS - Total Suspended Solids

UCCWA - Upper Clear Creek Watershed Association

SUPPLEMENTAL INFORMATION – 1

CLEAR CREEK / STANDLEY LAKE WATERSHED AGREEMENT

Clear Creek / Standley Lake Watershed Agreement

AGREEMENT

The undersigned parties hereto agree as follows:

I. Preamble.

This Agreement seeks to address certain water quality issues and concerns within the Clear Creek Basin of Colorado, and specifically, such issues as they affect the water quality of Standley Reservoir, an agricultural and municipal water supply reservoir located in Jefferson County Colorado, which is supplied with water primarily from Clear Creek. For purposes of this Agreement, the Clear Creek Basin is divided into three (3) areas of segments: the Upper Clear Creek Basin ("Upper Basin"), consisting of Clear Creek and its tributaries from its source to and including the headgate of the Croke Canal in Golden, Colorado; the Standley Lake Tributary Basin ("Tributary Basin"), consisting of the lands directly tributary to Standley Lake, the Church Ditch, the Farmers High Line Canal, the Croke Canal, and lands directly tributary to these Canals; and Standley Lake ("Standley Lake"), consisting of the Lake itself.

The parties to this Agreement are governmental agencies and private corporations having land use, water supply, and/or wastewater treatment responsibilities within the Clear Creek Basin. The parties are: (1) UCCBA; (2) City of Golden; (3) City of Arvada; (4) Jefferson County; (5) Jefferson Center Metropolitan District; (6) City of Westminster; (7) City of Northglenn; (8) City of Thornton; (9) City of Idaho Springs; (10) Clear Creek County; (11) Gilpin County; (12) Black Hawk/Central City Sanitation District; (13) Town of Empire; (14) City of Black Hawk; (15) City of Central; (16) Town of Georgetown; (17) Town of Silverplume; (18) Central Clear Creek Sanitation District; (19) Alice/St. Mary's Metropolitan District; (20) Clear Creek Skiing Corporation; (21) Henderson Mine; (22) Coors Brewing Company; (23) Church Ditch Company; (24) Farmers High Line Canal and Reservoir Company; and (25) Farmers Reservoir and Irrigation Company. For purposes of this Agreement, the parties can be divided into four (4) functional groups, as follows: The Upper Basin Entities ("Upper Basin Users" or "UCCBA"), consisting of the members of the Upper Clear Creek Basin Association (generally representing entities with jurisdiction over land use and wastewater treatment activities in the Upper Basin that can affect water quality in the Upper Basin); the Tributary Basin Entities ("Tributary Basin Entities"), consisting of the Cities of Golden, Arvada, and Westminster, and the County of Jefferson and the Jefferson Center Metropolitan District (generally representing entities with jurisdiction over land use activities that can affect water quality in the Tributary Basin); the Standley Lake Cities ("Standley Lake Cities"), consisting of the Cities of Westminster, Northglenn, and Thornton, (representing the municipal water users from Standley Lake); and the three canal companies (the "Canal Companies"), consisting of the Church Ditch Company, the Farmers High Line Canal and Reservoir Company, and the Farmers Reservoir and Irrigation Company (representing the entities that own and operate canals through which water is conveyed to Standley Lake for municipal and agricultural use).

In accordance with the geographical and functional divisions, this Agreement generally sets out rights and obligations with respect to certain water quality matters within the Clear Creek Basin (as above defined) by area or segment and by functional group.

II. Agreement.

1. The parties will submit a joint alternative proposal to the Water Quality Control Commission ("WQCC") in the matter captioned "For Consideration of Revisions to the Water Quality Classifications and Standards, Including Adoption of a Narrative Standard, for Segment 2, Standley Lake, of Big Dry Creek, in the South Platte Basin, and Adoption of a Standley Lake Control Regulation" on or before December 23, 1993. Said alternative proposal shall contain the following points:

   a. Request the WQCC to adopt a narrative standard only for Standley Lake at this time, with further consideration of any control regulation or numeric criteria for implementation of the standard at or after the triennial review of the South Platte River to be held in 1997. The narrative standard shall require maintenance of Standley Lake in a mesotrophic state, as measured by a combination of relevant indicators, as recommended by the parties' consultants prior to December 23, 1993.

   b. Request language in the Rule and in the Statement of Basis and Purpose for the regulation explaining that during the next triennium ending in 1997 ("triennium") the parties hereto will be conducting additional testing and monitoring, as well as implementing certain best management practices and controls on a voluntary basis, the results of which will be reported to the WQCC on an annual basis, and that point-source discharge permits written during the triennium shall not include any new or more stringent nutrient effluent limitations or wasteload allocations to meet the narrative standard. The proposed language will also refer to the intention of the parties and the Commission that should the narrative standard not be met at the end of the triennium, and substantial progress has not been made in reducing the nutrient loads to Standley Lake, additional measures may be required, including numeric standards or effluent limitations for phosphorous and/or nitrogen in the Upper Basin, and for additional best management controls in Standley Lake to be considered.

2. Should the WQCC fail to approve and adopt the substance of the proposed alternative described in paragraphs 1.a. and 1.b. above, this agreement shall automatically terminate and the parties shall be released from all other obligations and rights hereunder.

3. At or after the triennial review in 1997, the UCCBA and Standley Lake Cities agree that if substantial progress has not been made by the UCCBA in reducing its portion of nutrient loading and in developing controls to maintain appropriate reductions in nutrient loads to Standley Lake sufficient to maintain the narrative standard, they

will jointly petition the Commission to adopt a control regulation for Standley Lake containing the following points:

a. Total Phosphorous effluent limitation of 1.0 mg/l as P as a thirty (30) day average at the Upper Clear Creek Wastewater Treatment Plants, or such other numeric standard(s) or effluent limitations (s) for phosphorous or nitrogen, or in combination, with opportunity for point to point source and nonpoint source to point source trading among the entities that operate the UCCBA treatment plants, as has been determined will be effective in achieving and maintaining the narrative standard for Standley lake. Such numeric standard(s) or effluent limitation(s) shall be implemented over a three year period to allow time for the affected entities to fund, design and construct improvements necessary to meet the standards.

b. In-lake treatment to reduce internal phosphorous loading by 50% from the 1989-90 measured loadings in the 1993 USGS report by Mueller and Ruddy, or such other standards for reduction of internal phosphorous and nitrogen loading as has been determined will be effective in achieving and maintaining the narrative standard for Standley Lake, within three (3) years.

4. The UCCBA, in consultation with the Standley Lake Cities and Tributary Basin Entities will prepare a Best Management Practices Manual by December 31, 1994 for nonpoint sources that will cover disturbed areas of 1 acre or more and use its best efforts to have it approved and adopted for implementation by all jurisdictions within the Upper Basin by July 1, 1995. This Manual will be prepared to deal with the geologic, topographic and weather conditions existing within the Upper Basin to facilitate the reduction of nutrient loading from the various activities of the Upper Basin. This Manual will be coordinated with the Standley Lake Cities and Tributary Basin entities. The plan will include a program for monitoring representative results, to be included in the overall basin monitoring plan. For purposes of development of BMPs, Jeffco will not be considered to be part of the UCCBA.

5. The UCCBA, in consultation with the Standley Lake Cities and the Tributary Basin Entities, will examine the costs and effects of nutrient removal at UCCBA wastewater treatment plants, including operational controls or modifications which would decrease nutrient loads. Recommendations of such review shall be furnished to all the parties hereto by June 30, 1994. The UCCBA will use its best efforts to have its members implement operational modifications which can be implemented without significant capital improvements as quickly as reasonably practical.

6. The Standley Lake Cities, in consultation with the other parties, will develop a Standley Lake Management Plan by December 31, 1994 which will address in-lake nutrient loading and potential nutrient loading from lake activities, water supply operations, recreational activities, and activities in the watershed. The Standley Lake Cities will use their best efforts to implement the Lake Management Plan by

June, 1995. It is understood that the water rights implications of the plan must be considered.

7. The parties will jointly design, implement, and fund in such allocations as they shall agree a monitoring program to evaluate (1) nutrient loadings from point sources; (2) nutrient loadings from non-point sources in the Upper Basin; (3) nutrient loadings from non-point sources in the Tributary Basin; (4) internal Lake loading; and (5) the effect of nutrient reduction measures implemented by the various parties on the trophic status of Standley Lake. The results of the monitoring program will be provided to the Water Quality Control Commission for informational purposes annually. A description of the monitoring program will be included with the Annual Reports.

8. The Tributary Basin Entities and the Standley Lake Cities, in consultation with the other parties, will develop Best Management Practices (BMPs) for each of their jurisdictions by December 31, 1994, and shall use their best efforts to have them adopted as regulations by July, 1995. The BMPs will be designed to remove pollutants to the maximum extent practical considering the costs and benefits of possible measures; provided, however that no retro-fitting of existing construction or development will be required.

9. The Tributary Basin Entities, the Standley Lake Cities and the Canal Companies will develop a Management Plan for the Tributary Basin, addressing stormwater quality and quantity, hazardous substance spills, canal flushing, crossing permits, the Canal Companies' stormwater concerns, and the water rights implications of the above by December, 1994, and use their best efforts to achieve adoption of the portions of the Plan under the control of each entity by July, 1995. If not all affected parties adopt the agreed measures, then the parties that have adopted such measures will determine whether or not to implement the Plan despite such non-adoption by one or more parties.

10. Each functional group (The UCCBA, The Tributary Entities, The Standley Lake Cities, and the Canal Companies) shall provide each other group with semi-annual reports detailing the progress made on the implementation of its responsibilities herein, including development of any BMPs, nutrient reduction programs or controls, or other items required by this agreement, beginning in June, 1994. The parties shall also meet periodically after each report is completed to discuss progress by the parties. It is anticipated that the various functional groups may assign or appoint task groups or committees to address specific tasks or areas of concern (e.g. BMPs; ISDS; Wastewater Plant operational changes; monitoring, etc). If so, then the task groups shall provide the appropriate reports and participate in follow-up meetings.

11. This agreement may be enforced as a contract according to the laws of the State of Colorado; however, this agreement shall not create any right to claim or recover monetary damages for a breach thereof.

12. It is anticipated that other regional agencies with land use and/or water quality responsibilities or impacts within the Clear Creek Basin (as above defined) may join in the parties' monitoring and other efforts pursuant to this Agreement.

13. This Agreement may be executed in counterparts.

SUPPLEMENTAL INFORMATION – 2

UPPER CLEAR CREEK / STANDLEY LAKE WATERSHED WATER QUALITY MONITORING PLAN

Upper Clear Creek/Standley Lake Watershed

Water Quality Monitoring Plan

Standley Lake, photo courtesy of Eric Scott

April 18, 2024

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APPENDICES

Abbreviations and Acronyms

BH/CC	Blackhawk/Central City
°C	Degrees Centigrade
CC	Clear Creek
cfs	cubic feet per second
COC	chain of custody
CWQCC	Colorado Water Quality Control Commission
DI	Deionized Water
DO	Dissolved Oxygen
DRP	Dissolved Reactive Phosphorus (ortho-Phosphate-P)
EPA	U.S. Environmental Protection Agency
FHL	Farmers Highline Canal
FRICO	Farmers Reservoir and Irrigation Company
HCl	Hydrochloric acid
KDPL	Kinnear Ditch Pipe Line
LDMS	Laboratory Data Management System
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
m	meter
mgd	million gallons per day
mg/L	milligrams per liter
MSCC	Mainstem Clear Creek
mv	millivolt
N	Nitrogen
NFCC	North Fork Clear Creek
NG	City of Northglenn
NPS	Nonpoint Source
NTU	Nephelometric Turbidity Units
fDOM	Fluorescent Dissolved Organic Matter
ORP	Oxidation Reduction Potential
OWTS	Onsite Wastewater Treatment System
pCi/L	picocuries per liter
P	Phosphorus
QC	Quality Control
SDWA	Safe Drinking Water Act
SFCC	South Fork Clear Creek
SLC	Standley Lake Cities
SLWQIGA	Standley Lake Water Quality Intergovernmental Agreement
SM	Standard Methods for the Examination of Water and Wastewater
TH	City of Thornton
TOC	Total Organic Carbon
TSS	Total Suspended Solids
TVSS	Total Volatile Suspended Solids
UCC	Upper Clear Creek
USGS	United States Geological Survey
Westy	City of Westminster
WFCC	West Fork Clear Creek
WMA	Upper Clear Creek Watershed Management Agreement
WQIGA	Water Quality Intergovernmental Agreement (Standley Lake)
WQS	Colorado Water Quality Standards (Regs #31 and #38)
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Staff from Golden, Northglenn, Thornton, and Westminster at the

2017 Standley Lake Analyst Appreciation Picnic

MONITORING PROGRAMS OVERVIEW

Introduction

The quality of the water in Standley Lake has been monitored for more than two decades. Efforts to protect Standley Lake through State water quality regulations culminated in adoption of the numeric chlorophyll *a* standard for the lake in 2009. The Colorado Water Quality Control Commission ("CWQCC") established the chlorophyll *a* standard at 4.0 µg/L with a statistically derived assessment threshold of 4.4 µg/L. The standard is based on the arithmetic average of the individual monthly average chlorophyll *a* data for samples collected during March through November in each year. Exceedance of the standard would occur if the yearly 9-month average of the monthly chlorophyll *a* average results is greater than 4.4 µg/L more frequently than once in five years. In addition, a version of the narrative standard adopted in 1993 was also retained stating that the trophic status of Standley Lake shall be maintained as mesotrophic as measured by a combination of common indicator parameters such as total phosphorus, chlorophyll *a*, Secchi depth and dissolved oxygen. The voluntary implementation of best management practices clause included in the 1993 version of the standard was eliminated from the 2009 narrative standard.

The Standley Lake Cities ("SLC") of Northglenn, Thornton and Westminster remain committed to effective and efficient water quality monitoring in the watershed as originally agreed to in the 1993 Watershed Management Agreement. The Standley Lake Water Quality Intergovernmental Agreement ("SLWQIGA" or "WQIGA"), entered into between the SLC, details the provisions for costs sharing related to cooperative efforts regarding water quality issues in the Clear Creek Basin and Standley Lake. The WQIGA monitoring program is subdivided into three inter-related programs for which the SLC provide field sampling, laboratory analyses and data management support: the Upper Clear Creek Monitoring Program, the Tributary Basin Monitoring Program and the Standley Lake Monitoring Program.

The Monitoring Committee was formed to periodically evaluate the monitoring programs and propose appropriate modifications as necessary. The proposals are evaluated by the SLWQIGA committee prior to implementation. Representatives from the SLC, Upper Clear Creek Basin and the Tributary Basin are actively involved in committee activities as appropriate. This document details the specific requirements and responsibilities of the SLC and outlines the commitments of additional entities involved in the Standley Lake watershed monitoring programs.

Standley Lake serves as the sole drinking water source for the cities of Northglenn and Westminster and is one of several drinking water sources for the city of Thornton. The monitoring program is designed to collect samples from a variety of locations in the watershed with varying anthropogenic and natural sources of pollutants. The data is used for trend analysis, modeling and for numerous other applications. Interpretation of the results allows the upstream and downstream communities to work cooperatively to minimize impacts to water quality.

Safety Considerations

The personal safety of the sampling team members is paramount in the decision making process for collection of water quality samples. At no time should personal safety be jeopardized in order to collect a sample. Environmental conditions may change suddenly and are variable throughout the watershed.

The following safety measures should be observed during all sampling activities:

- Sample collection should be performed by a two person team whenever possible.
- Weather conditions at the sampling sites should be evaluated prior to leaving the laboratory.
- Personal flotation devices should be worn if the creek water level is greater than twelve inches deep. Hydrostatically triggered, self-inflating personal flotation devices are recommended for non-lake sampling, as the device will automatically inflate if the sensor is submerged below six inches of water.
- Personal flotation devices are mandatory on Standley Lake. Lake sampling team members should be experienced swimmers.
- Wear waterproof gloves and sock liners, as appropriate.
- Exercise caution on slippery rocks, river banks, and boat docks.
- Cell phones must be available during sampling, but be aware that cell phone signals are not reliable in all areas of Clear Creek Canyon.
- First aid kits must be available in all sampling vehicles, including boats. It is recommended that sampling team members be trained in basic first aid techniques.
- Supervisors are notified of the sampling team’s itinerary and the expected return time to the lab. Sampling teams will notify supervisors of any delay in the expected return time.

UPPER CLEAR CREEK MONITORING PROGRAM

The Upper Clear Creek ("UCC") Monitoring Program is designed to provide water quality information in order to evaluate nutrient loadings from both point sources (discrete) and non-point sources (dispersed) within the Upper Clear Creek Basin.

The UCC Monitoring Program includes three distinct sub-programs, each designed to obtain water quality data during specified conditions:

- ambient grab samples;
- continuous stream monitoring and the automated collection of 24-hour ambient samples; and
- the automated collection of event samples.

Sampling at CC15 during a Long Schedule

UCC – AMBIENT GRAB SAMPLES

Program Coordination and Sampling Team: Thornton

Grab samples are single, point-in-time samples collected in-stream throughout the Upper Clear Creek Basin. Grab sample locations were selected to correspond with established USGS gage stations and additional sites have been included over the years as the monitoring program has evolved. Refer to the table below for sample site locations. The rationale for selection of the specific sampling sites is included in Appendix A. A map of the watershed is included in Appendix B.

Grab samples are collected five times during the year to correspond with seasonally varying flow conditions in Clear Creek. The *Short Schedule* is collected three times per year (February, April and December) and includes four stream locations. The *Long Schedule* is collected twice per year (June and October) and includes 15 stream locations. Laboratory analytical protocols and Thornton's internal sampling programs limit sample collection to only Wednesdays. Sampling is performed each year on approximately the same schedule. The specific sampling dates for the year are predetermined at the beginning of the year.

Since 2013, Wastewater Treatment Plant (WWTP) effluent samples collected by treatment plant staff are analyzed for nutrients (nitrogen and phosphorus) by commercial laboratories in accordance with Colorado Regulation 85. Sampling and analysis plans were developed by each WWTP outlining the monitoring locations, frequency and analytical parameters for testing. The analytical data reported by the WWTPs to the Colorado Water Quality Control Division will be included in the watershed annual reports.

WWTP Effluent Sample ID	Sample Location
CC1A	Loveland WWTP
CC3A	Georgetown WWTP
CC5A	Empire WWTP
CC7A	Central Clear Creek WWTP
CC8A	St Mary's WWTP
CC12A	Idaho Springs WWTP
CC13B	Black Hawk/Central City WWTP
CC14A	Henderson Mine WWTP
CC15A	Eisenhower Tunnel WWTP

UCC – AMBIENT GRAB SAMPLES

Locations and Sample Schedule

Clear Creek Sample ID	Flow Gage	Sample Location[1]	Feb	Apr	Jun	Oct	Dec
CC05	Staff gage	MSCC at Bakerville			X	X	
CC10	Recording gage	SFCC upstream of Georgetown Reservoir			X	X	
CC15	Staff gage	WFCC below Berthoud			X	X	
CC20	Recording gage	WFCC below Empire			X	X	
CC25	Recording gage	MSCC above WFCC			X	X	
CC26	Recording gage	MSCC at Lawson Gage	X	X	X	X	X
CC30	Staff gage	Fall River above MSCC			X	X	
CC34	----	MSCC above Chicago Creek			X	X	
CC35	Recording gage	Chicago Creek above Idaho Springs WTP			X	X	
CC40	Recording gage	MSCC below Idaho Springs WWTP (US 6 and I-70)	X	X	X	X	X
CC44	Staff gage	NFCC above BH/CC WTP intake			X	X	
CC50	Recording gage	NFCC at the mouth	X	X	X	X	X
CC52	----	Beaver Brook at the mouth			X	X	
CC53	----	Soda Creek at the mouth			X	X	
CC60	----	MSCC at Church Ditch Headgate	X	X	X	X	X

[1] MSCC = Mainstem Clear Creek
SFCC = South Fork Clear Creek
WFCC = West Fork Clear Creek
NFCC = North Fork Clear Creek
WTP = Water Treatment Plant
WWTP = Wastewater Treatment Plan

UCC – AMBIENT GRAB SAMPLES

Analytical Parameters for Creek samples – includes parameters for both Short and Long Schedules

Analyte	**Analytical Method Reference**[1]	**Reporting Limit Goal**[2]	**Responsible Laboratory**
Total Nitrogen	SM 4500-NO3 I	0.02 mg/L	Westminster
Nitrate/Nitrite as N	SM 4500-NO3 I	0.01 mg/L	Westminster
Ammonia as N	SM 4500-NH3 H	0.01 mg/L	Westminster
Total Phosphorus	SM 4500-P E	0.005 mg/L	Northglenn
Ortho-phosphate as P (dissolved) or DRP	SM 4500-P E	0.005 mg/L	Northglenn
Total Organic Carbon (TOC)[3]	SM 5310 B	0.5 mg/L	Thornton
Total Suspended Solids	SM 2540 D	1 mg/L	Thornton
Chloride	EPA 300	5 mg/L	Thornton
Bromide	EPA 300	0.1 mg/L	Thornton
Sulfate	EPA 300	10 mg/L	Thornton
Temperature (field)[4]	SM 2550 B	1.0 °C	Thornton
pH (field)	SM 4500-H+ B-2000	1.0 Std Units	Thornton
Conductivity (field)	SM 2510 B-1997	10 µS/cm	Thornton
Turbidity (field)	ASTM D7315	1.0 NTU	Thornton
Dissolved Oxygen (field)	ASTM D888-09 (C)	1.0 mg/L	Thornton
Stream Depth	Staff gage reading	0.1 ft	Thornton

[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.
[2] Reporting limit goals are matrix dependent and may be increased for complex matrices and may be lower depending on laboratory capability.
[3] TOC is analyzed on samples from sites CC05, CC20, CC26, CC35, CC40, CC50, CC52, CC53, and CC60 during the Long Schedule events. TOC is analyzed on all four creek grab samples during the Short Schedule events.
[4] YSI/Xylem ProDSS or 6-series sondes are used for field measurements.

UCC – AMBIENT GRAB SAMPLES

Flow Monitoring

Various mechanisms are employed throughout the watershed for monitoring the hydrologic conditions at strategic locations. USGS real-time recording gages are installed at CC10, CC20, CC25, CC26, CC35, CC50 and CC61 (Clear Creek at Golden). USGS staff gages are in place at CC05, CC15, CC30 and CC44. The staff gage readings are recorded to the nearest 0.1 foot and may be converted to stream flow using the USGS calibration rating curve established for the location.

The recording gage at CC40 (Clear Creek at US 6 and I-70) is operated and maintained by Clear Creek Consultants on behalf of UCCWA. The SLC provide financial support for the USGS gages at CC05 at Bakerville (staff gage), CC15 on the West Fork below Berthoud (staff gage), and CC26 at Lawson (recording gage). The SLC provide financial support for the Department of Natural Resources staff gage at CC30 on Fall River at the mouth. The City of Golden provides financial support for the USGS gage on the West Fork of Clear Creek at Empire.

UCC – AMBIENT GRAB SAMPLES

Program Coordination and Sampling Team - Short Schedule:Thornton

Two weeks before the scheduled Clear Creek sampling date:

- Contact Westminster and Northglenn to request adequate supply of sample bottles from each lab.
- Prepare four sample kits as directed below. Each sample bottle kit includes the containers for sampling at one location.

Sample Bottle Kit Prep- Short Schedule

Destination	Quantity	Volume	Bottle Type	Parameter	Laboratory	Additional Documentation[1]
Clear Creek Team – Feb, April and Dec **ONLY** (Collect samples at CC26, CC40, CC50 and CC60)	4	500 mL	Rectangular plastic	Phosphorus[2] series	Northglenn	Instructions, COCs and one field data sheet
	4	500 mL	Plastic jug	TSS	Thornton	
	4	125 mL	Brown plastic	Nitrogen series[3]	Westminster	
	4	40 mL	Glass vial	TOC	Thornton	
	4	500 mL	Plastic	Chloride/Bromide/Sulfate	Thornton	

[1] The additional documentation forms are included in Appendix C.
[2] Phosphorus series includes total P and dissolved ortho-phosphate-P (also referred to as DRP).
[3] Nitrogen series includes total N, ammonia-N and nitrate/nitrite-N.

On Clear Creek sampling day (Short Schedule):

- Calibrate field equipment in the lab. Ensure all probes and meters are working properly before leaving the lab. Take aliquots of the standards into the field to check instrument calibration if necessary.
- At each sample location, collect samples and analyze for field parameters (pH, temperature, DO, conductivity, and turbidity). Complete the COC and record all results on the Field Data Sheet (refer to Appendix C).
- The field samples are returned to the Thornton Lab and refrigerated until pickup by Westminster and Northglenn personnel. The samples are relinquished to Westminster (nitrogen) and Northglenn (phosphorus) and the COCs are signed appropriately. The original copies of the COCs are retained by Westminster and Northglenn. Original field data sheets and copies of the COCs are retained by the city of Thornton for permanent archive.

UCC – AMBIENT GRAB SAMPLES

Sampling Locations Directions and Narrative Descriptions - Short Schedule

Sampling Frequency: Feb, April, Dec

POINT	DIRECTIONS AND DESCRIPTION OF LOCATION
CC26	Travel westbound I-70 to exit at Lawson. Travel frontage road through Lawson. Immediately before the I-70 overpass, on your right, is a parking area. Sample creek at gage and USGS sampling station by bridge. [RECORDING GAGE] (39-45-57N/105-37-32W) **Sample TOC**
CC40	Traveling eastbound on I-70 take US 6 exit. Pull off in parking area just east of the off ramp. (Tributary Restaurant is across the road) Sample approx. 100 yards east of stop sign below recording gage. (39-44-47N/105-26-08W) [RECORDING GAGE] **Sample TOC**
CC50	Travel Hwy 119 eastbound toward US 6. Approximately 2 miles downstream of the Black Hawk/Central City WWTP and ¼ mile upstream from intersection is a pullout area to the right immediately before the junction. Sample at the recording gage. (39-44-56N/105-23-57W) [RECORDING GAGE] **Sample TOC**
CC60	Approximately 1 mile west of the intersection of Hwy 58 and US 6. Park in the pullout on the south side of highway and walk down (or drive) downhill to the Church Ditch diversion structure. Go across the bridge and sample from the main stem of Clear Creek. Do not sample from Church Ditch. (39-45-11N/105-14-40W) **Sample TOC**

Photographs of the sampling locations and GPS coordinates are included in Appendix D.

UCC – AMBIENT GRAB SAMPLES

Program Coordination and Sampling Teams - Long Schedule: Thornton

Two weeks before the scheduled Clear Creek sampling date:

- Contact Westminster and Northglenn to request adequate supply of sample bottles from each lab.
- Prepare sample kits as directed below. Each sample bottle kit includes the containers for sampling at one location.
- Coordinate with Northglenn to borrow the YSI multiprobe for use on the sampling day.

Prepare sample bottle kits as directed below. Each sample bottle kit contains the prepared sample bottles to collect samples at one location. Prepare 15 bottle kits: 8 kits Creek Team A and 7 kits for Creek Team B.

Sample Bottle Kit Prep- Long Schedule

Destination	Quantity	Volume	Bottle Type	Parameter	Laboratory	Additional Documentation[1]
Clear Creek Team A (Collects samples at CC25, CC05, CC10, CC26, CC34, CC35, CC52 and CC53)	8	500 mL	Rectangular plastic	Phosphorus series[2]	Northglenn	One set of: Instructions, COCs and one field data sheet
	8	16 oz	Plastic	TSS	Thornton	
	8	125 mL	Brown plastic	Nitrogen series[3]	Westminster	
	5	40 mL	Glass vial	TOC	Thornton	
	8	500 mL	Plastic	Chloride/Sulfate/Bromide	Thornton	
Clear Creek Team B (Collects samples at CC15, CC20, CC30, CC40, CC44, CC50 and CC60)	7	500 mL	Rectangular plastic	Phosphorus series	Northglenn	One set of: Instructions, COCs and one field data sheet
	7	16 oz	Plastic	TSS	Thornton	
	7	125 mL	Brown plastic	Nitrogen series	Westminster	
	4	40 mL	Glass vial	TOC	Thornton	
	7	500 mL	Plastic	Chloride/Sulfate/Bromide	Thornton	
QC	4	Half gallon	1:1 HCl-rinsed plastic	QC spikes and dups for Golden	Thornton	QC sampling completed by Team A in May and Team B in October.
	1 (blank)	1 L	Rectangular plastic	Phosphorus series	Northglenn	
	1 (blank)	250 mL	Brown plastic	Nitrogen series	Westminster	

[1] The additional documentation forms are Included in Appendix C.
[2] Phosphorus series includes total P and dissolved ortho-phosphate-P (also referred to as DRP).
[3] Nitrogen series includes total N, ammonia-N and nitrate/nitrite-N.

On Clear Creek sampling day (Long Schedule):

- Calibrate field equipment in the lab. Ensure all probes and meters are working properly before leaving the lab. Take aliquots of the standards into the field to check instrument calibration if necessary.
- Prepare coolers with ice and sample bottle kits. The Creek Team chosen for QC sampling must also include in the field sample bottle kit: field blank bottles (nitrogen and phosphorus), and at least 4 half-gallon bottles for QC samples. Thornton prepares both sample kits for Clear Creek Teams A and B and will provide the extra materials needed for the QC sampling in the appropriate sample kit.
- At each sample location, collect samples and analyze for field parameters (pH, temperature, DO, conductivity, and turbidity). Complete the COC and record all results on the Field Data Sheet (refer to Appendix C). Samples will be collected at all creek sites for nitrogen series, phosphorus series and TSS. TOC samples are collected only at designated creek sites: CC05, CC20, CC26, CC35, CC40, CC50, CC52, CC53, and CC60.
- The Clear Creek Team selected for QC sampling will randomly select four creek sites. Collect one sample (half-gallon, HCl-rinsed bottle) at four randomly selected creek sites for preparation of the spike and duplicate nutrient QC samples by Thornton staff.
- Complete the COC for the QC samples.
- Return to the Thornton Lab when sampling is completed. Relinquish the QC samples to the Thornton Lab staff.
- Thornton's Lab staff prepares one duplicate and one spike sample for total nitrogen and total phosphorus from the four QC samples.
- Analyze and complete any missed field parameters as allowable.
- Make one copy of each team's field data sheet for Westminster to use for logging in the samples to the electronic spreadsheet.
- The field samples and prepared QC samples are relinquished to Westminster (nitrogen) and Northglenn (phosphorus) and the COCs are signed appropriately. The original copies of the COCs are retained by Westminster and Northglenn. Original field data sheets and copies of the COCs are retained by the city of Thornton for permanent archive.

UCC – AMBIENT GRAB SAMPLES

Sampling Locations Directions and Narrative Descriptions - Long Schedule

Clear Creek Team A

Sampling frequency: Jun, Oct

Sample bottles: Creek sites: One 500mL rectangular (phosphorus series), one 500 mL (TSS/chloride/bromide/sulfate), one 125 mL (nitrogen series) and one 40 mL amber glass vial (TOC) as required.

POINT	DIRECTIONS AND DESCRIPTION OF LOCATION
CC05	1-70 westbound to Exit 221 (Bakerville); go south back over Interstate (left). Park at call box. Take sample upstream of parking area, read gage located downstream. [STAFF GAGE] (39-41-31N/105-48-15W) **Sample TOC**
CC10	I-70 eastbound to Georgetown. Begin at intersection of 6th and Rose in Georgetown. Go 2.2 miles up Guanella Pass Road (go to the first lake). U-turn by the inlet and park on the right side of road. Sample from stream above lake inlet point. [RECORDING GAGE] (39-41-11N/105-42-00W)
CC25	Return towards but do not enter I-70. Instead take the frontage road (Alvarado Road) back towards Empire. Travel on the road approximately 3.3 miles until you see a large dirt pull off on the left, across the road from the cemetery. You'll need to hop the barb wire fence to access the creek. Sample near the culvert under I-70. (39-45-05N/105-39-45W)
CC26	Continue approximately 2.3 miles down Alvarado Road towards and through Lawson. Immediately before the road curves left under I-70 is a parking area straight ahead through an opening at the end of a guardrail. Sample creek at gage and USGS sampling station by the bridge over the creek. [RECORDING GAGE] (39-45-57N/105-37-32W) **Sample TOC**
CC34	From I-70 (either direction) Exit 240 (Chicago Creek), pull off in the small parking area on the other side of the bridge. Sample the main stem of Clear Creek upstream of Chicago Creek across from the Forest Service Building. (39-44-26N/105-31-17W)
CC35	Continue approx. 3.7 miles on Hwy 103. Pull off on the right shoulder just past the green roofed house that looks like a barn (on the left). Sample where the creek emerges from the culvert underneath the road. Note: a nearby homeowner is suspicious of people along the south side of the road. [RECORDING GAGE] (39-42-58N/105-34-15W) **Sample TOC**
CC52	Exit I-70 eastbound at Beaver Brook/Floyd Hill (Exit #247). Turn Left to the north frontage road (US Hwy 40). Travel east approximately 2.4 miles. Pull off to the side of road and sample Beaver Brook at this point. (39-43-7N/105-22-4W) **Sample TOC**
CC53	Continue travelling east bound 0.3 miles and cross the second white bridge. Exit immediately on the right to Soda Creek Drive. Park on the right. Sample Soda Creek upstream of the bridge. (39-42-50N/105-21-42W) **Sample TOC**

Photographs of the sampling locations and GPS coordinates are included in Appendix D.

UCC – AMBIENT GRAB SAMPLES

Sampling Locations Directions and Narrative Descriptions - Long Schedule

Clear Creek Team B

Sampling frequency: Jun, Oct

Sample bottles: Creek sites: One 500 mL rectangular (phosphorus series), one 500 mL (TSS/chloride/bromide/sulfate), one 125 mL (nitrogen series) and one 40 mL amber glass vial (TOC) as required.

POINT	DIRECTIONS AND DESCRIPTION OF LOCATION
CC15	Travel west on US 40 through Empire. Begin at Empire Dairy King and continue 6.0 miles west on US 40. There is a large pullout on the creek side of highway with a large stump in the middle of the pullout located a ¼ mile past mile marker 250. Sample directly below the stump at the creek. Staff gage is along the north bank of stream next to a tree at the stream's edge. (39-46-05N/105-47-36W) [Read the STAFF GAGE and record on the field data sheet]
CC20	Returning back through Empire eastbound, travel along the road\ramp from US 40 to Westbound I-70. Immediately after turning onto road/ramp, there is a large open space on right side of road\ramp. Park in open space and cross road to the Colorado Dept. of Transportation (CDOT) fence enclosing their maintenance yard. Enter fence and sample approximately 100 feet downstream of bridge at recording gage. (39-45-23N/105-39-34W) [RECORDING GAGE] **Sample TOC**
CC30	East on 1-70. Exit 238 (Fall River Road/St. Mary's Glacier). Approximately 100 yards up Fall River Road, there is a small turnout on right by a wooden support wall. Cross road and sample creek at staff gage. (39-45-23N/105-33-20W) [Read the STAFF GAGE and record on the field data sheet]
CC40	Traveling eastbound on I-70 take US 6 exit. Pull off in parking area just east of the off ramp. (Tributary Restaurant is across the road) Sample approximately 100 yards east of stop sign below recording gage. (39-44-47N/105-26-08W) [RECORDING GAGE] Sample **TOC**
CC44	Continue east on US 6 to 119. Drive west on 119 to Black Hawk. From the Black Hawk intersection travel westbound approximately 1 mile on Hwy 119. There is a small wooden building and parking area on the left side of the road. This is the Black Hawk water intake. Walk approximately 100 feet upstream and sample at staff gage. (39-44-56N/105-23-57W) [STAFF GAGE] Record the staff gage and sample near there.
CC50	Continue on Hwy 119 eastbound toward US 6. Approximately 1 mile downstream of the Black Hawk/Central City WWTP and ¼ mile upstream from intersection is a pullout area just past a masonry buildingon the right by Tunnel 4 (out of service) above the junction of US-6 and CO-119. Sample at the recording gage. (39-44-56N/105-23-57W) [RECORDING GAGE] Sample **TOC**
CC60	Site is approximately 1 mile west of intersection of Hwy 58 and US 6. Park in the pullout on the south side of highway and walk down (or drive) downhill to the Church Ditch diversion structure. Go across the bridge and sample from the main stem of Clear Creek. Do not sample from Church Ditch. (39-45-11N/105-14-40W) **Sample TOC**

Photographs of the sampling locations and GPS coordinates are included in Appendix D.

UCC – AMBIENT GRAB SAMPLES

QA/QC Program - Long Schedule Only

Duplicate and spike quality control samples are prepared from creek samples collected during the Clear Creek Long Schedule sampling events for selected nutrients and are analyzed by Westminster (total nitrogen) and Northglenn (total phosphorus). The QC samples are prepared by the city of Thornton at their laboratory on the day of sampling. Four creek locations are randomly selected for preparation of the QC samples. One duplicate and one spike are submitted to each Westminster and Northglenn.

In 2018, Thornton took over preparation of QC samples from the city of Golden. Only commercially prepared, certified of nitrate-N and phosphate stock standards are used. All calculations below are for phosphate as P. Thornton staff will need to remain vigilant of that as all stock standards are phosphate as PO_4. Multiply all concentrations as PO_4 by 0.326 to convert into concentrations as P.

The analytical procedure for QC preparation is detailed below:

- Prepare 4 sample bottles for spike and duplicate samples. Bottles used for spike and duplicate prep are provided by the city of Thornton and are the plastic HCl-washed, 16-ounce "milk type" bottles.
- The bottles are marked with (##) corresponding to the date of the sampling (for example, "061419" for June 14, 2019). Mark the 4 bottles with the following information:
    - Northglenn - P(##) - Spike for phosphate-P, Date of sampling.
    - Northglenn - D(##) - Duplicate for phosphate-P, Date of sampling.
    - Westminster - N(##) - Spike for nitrate-N, Date of sampling.
    - Westminster - D(##) - Duplicate for nitrate-N, Date of sampling.
- Select ONE of these as the QC sample (**spike and duplicate)** and set aside. Record which site was chosen in the QC log book. This sample will be spiked with <u>both</u> nitrogen and phosphorus at concentrations within the analytical ranges of Northglenn's and Westminster's labs.
- **<u>To Prepare Spiked Sample:</u>**
    - Rinse out a clean 1-Liter volumetric flask with DI.
    - Then rinse flask with a small portion of the selected QC Creek sample - 2 times.
    - Fill the flask half way with creek sample.
    - Add appropriate amounts of phosphate-P and nitrate-N to the flask:
        - Amounts for phosphate-P are within a total spiked concentration of 0.00875 to 0.015 ppm.
        - Amounts for nitrate-N are within a total spiked concentration of 0.15 to 0.3 ppm.
    - Mix well.
    - Add remaining amount of creek sample to bring the volume up to 1 liter. Use a pipet as pouring accurately from the half-gallon bottle will be difficult.
    - Mix well and pour into 2 bottles labeled for spike samples ("N" and "P").
- **<u>To Prepare Duplicate Sample</u>:**
    - Thoroughly mix remaining Clear Creek sample.
    - Pour into 2 bottles labeled for duplicates ("D").
- Record the following information:
    - the new (##) number discussed earlier,

    - the Clear Creek sample site number that was selected for preparation of the QC samples, and
    - spike concentrations for phosphorus and nitrogen.
- It is advisable to email QC information (spikes values and identity of QC parent samples) to Westminster and Northglenn at a later date so it is not accidentally lost. Westminster will record QC results and recoveries into the shared database.
- Add the QC samples to the chain of custody forms for the respective labs along with the rest of their creek samples.

Collecting ambient samples from CC50

UCC GRAB SAMPLES ASSOCIATED WITH 24-HOUR AMBIENT TRIBUTARY SAMPLES

Program Coordination and Sampling Team: Westminster

Autosampler sites were selected at strategic locations in the watershed in order to assess diurnal variations and sporadic weather events that would normally not be captured by the discreet, grab sampling. Beginning in fall 2023, due to staff limitations and the time required to collect 24-hour composites in the upper watershed, only grab samples are collected in the upper watershed and autosamplers are utilized at the FHL head-gate and at the lake inlet. (The canal autosamplers are set to trigger at specific times based on total flows entering the canal to better characterize changes in water quality from the head-gate to the reservoir. See the "*TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES"* Section for more details.)

UCC GRAB SAMPLES ASSOCIATED WITH 24-HOUR AMBIENT TRIBUTARY SAMPLES

Grab Sample Locations

CCAS26	Mainstem of CC at USGS Lawson gage
CCAS49	Mainstem of CC above the confluence with the North Fork
CCAS50	North Fork of CC above confluence with Mainstem of CC at USGS gage
CCAS59[1]	Mainstem of CC above Golden and Church Ditch diversions

[1] In 2016, Westminster assumed responsibility for sample collection at and maintenance of the new autosampler location at CCAS59 installed approximately 100 feet upstream of the City of Golden's CC59 station.

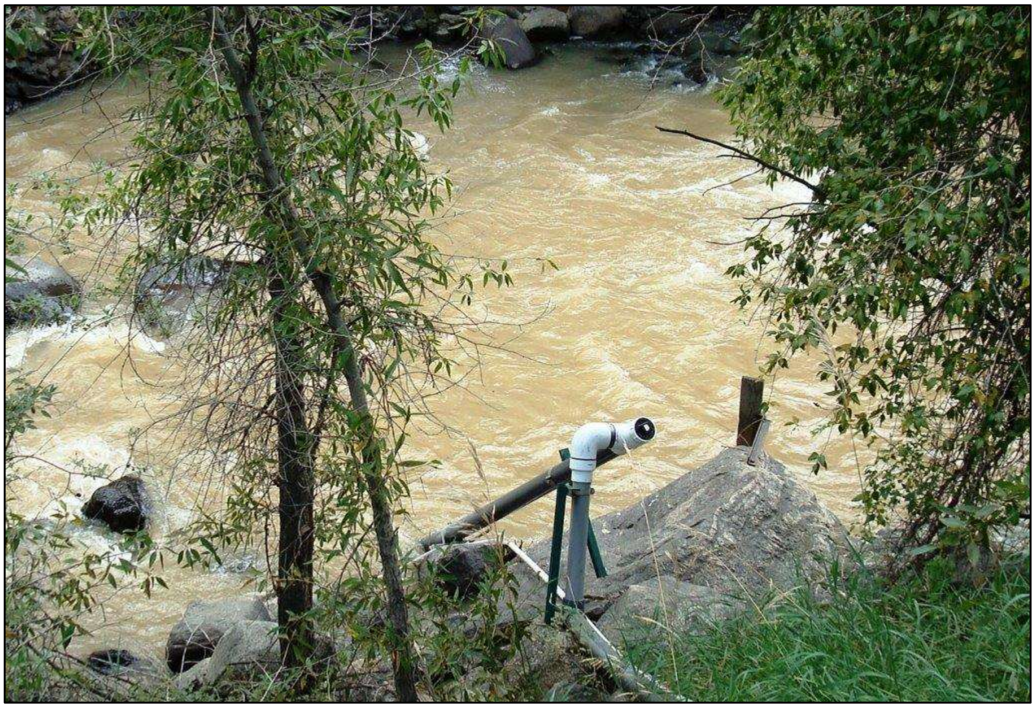
UCC GRAB SAMPLES ASSOCIATED WITH 24-HOUR AMBIENT TRIBUTARY SAMPLES

Analytical Parameters

Analyte	Analytical Method Reference[1]	Reporting Limit Goal[2]	Responsible Laboratory[3]
Total Nitrogen[4]	SM 4500-NO3 I	0.02 mg/L	Westminster
Nitrate/Nitrite-N	SM 4500-NO3 I	0.01 mg/L	Westminster
Ammonia-N	SM 4500-NH3 H	0.01 mg/L	Westminster
Total Phosphorus	SM 4500-P E	0.005 mg/L	Northglenn
Ortho-phosphate-P (dissolved) or DRP	SM 4500-P E	0.005 mg/L	Northglenn
Total Suspended Solids (TSS)	SM 2540 D	1 mg/L	Thornton
Total Organic Carbon (TOC)	SM 5310 B	0.5 mg/L	Thornton
Chloride	EPA 300	5 mg/L	Thornton
Bromide	EPA 300	0.1 mg/L	Thornton
Sulfate	EPA 300	10 mg/L	Thornton
pH (field)[5]	SM 4500-H+ B-2000	1.0 Std Units	Westminster
Temperature (field)	SM 2550 B	1.0 °C	Westminster
Conductivity (field)	SM 2510 B-1997	10 µS/cm	Westminster
Turbidity (field)	ASTM D7315	1.0 NTU	Westminster
Total and Dissolved Arsenic	EPA 200.8	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Barium	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Beryllium	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Cadmium	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Chromium	EPA 200.8	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Copper	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Iron	EPA 200.7	0.02 mg/L	Westminster Contract Laboratory
Total and Dissolved Lead	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Manganese	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Molybdenum	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Nickel	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Selenium	EPA 200.8	0.005 mg/L	Westminster Contract Laboratory
Total and Dissolved Silver	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Strontium	EPA 200.7	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Vanadium	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Zinc	EPA 200.8	0.02 mg/L	Westminster Contract Laboratory

[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.
[2] Reporting limit goals are matrix dependent and may be increased for complex matrices and may be lower depending on laboratory capability.
[3] EPA recommended holding times less than 72 hours may not be met due to the extended sampling routine.

[4] Samples collected for nutrients (nitrogen and phosphorus) with a turbidity reading of greater than 100 NTU may be analyzed by commercial laboratories that have demonstrated proficiency in analyzing complex matrices for nutrients.
[5] YSI/Xylem 6-series or EXO sondes are used for field measurements.



High turbidity at CC26 from a storm event

UCC AUTOSAMPLERS – EVENT SAMPLES

Sample Locations

CCAS49 Event	Mainstem of CC above the confluence with the North Fork
CCAS50 Event	North Fork of CC above confluence with Mainstem of CC at USGS gage
CCAS59 Event	Mainstem of CC above Golden and Church Ditch diversions

UCC AUTOSAMPLERS – EVENT SAMPLES

Flow Monitoring

Westminster will obtain the 15 minute interval flow data from the USGS gage at CC61 (Clear Creek at Golden) to correlate to CCAS59. The average event flow will be calculated to correspond to the specific time-event composited samples. If the 15 minute interval flow data is not available, the average daily flow will be associated with the event. The average daily flow at UCCWA gage CC40 will be used to correlate with CCAS49. Flow at CC50 is measured by a USGS gage at that site.

UCC AUTOSAMPLERS – EVENT SAMPLES

Analytical Parameters

Storm event samples are analyzed for the same suite of analytical parameters listed in the previous section for the 24-hour ambient samples.

Westminster will collect storm samples triggered at CCAS49, CCAS50, and CCAS59 and send them out to their contract laboratory for metals analysis. Independently from this Monitoring Plan, the City of Golden will perform metals analyses collected at CC59 event samples using EPA Method 200.8. Some samples may be analyzed outside the EPA recommended holding time for some parameters based on the random nature of the storm event triggering. Golden and the Standley Lake cities have agreed to share their data. The SLC will submit all other autosampler event samples to a commercial lab for metals testing.

UCC AUTOSAMPLERS – EVENT SAMPLES

Program Coordination and Sampling Team: Westminster

The event autosampler program was initiated in 2006 to assess the pollutant concentrations mobilized during significant snow melt (runoff) or rain events at the 24-hour ambient locations CCAS49, CCAS50 and CCAS59. Automated sample collection of stormwater is triggered based on changes in ambient turbidity, conductivity, stage height, or rain gage readings, depending on the autosampler location. The autosamplers are currently set to trigger when the 25 minute running average exceeds a predetermined turbidity level (for example, 100 NTU). The autosampler at CCAS50 triggers based on a combination of change in stream depth, precipitation and turbidity in order to eliminate triggering autosampler event sampling that might be associated with localized human disturbances in the creek (e.g. sluice mining). Autosamplers trigger independently depending on the localized conditions in the watershed. The autosampler collects discrete samples every 15 minutes until the parameter that triggered the event returns to the ambient condition or until the maximum number of samples is collected. The discrete samples may be analyzed individually or multiple discrete samples may be composited based on the field observations. As necessary, refer to the previous section for instructions on compositing samples from autosamplers. Event sampling can also be started remotely in the event of a spill or other event that might not cause the triggering parameters to be met. Westminster coordinates sampling at CCAS49, CCAS50 and CCAS59. Golden is in charge of CC59, independently from this Monitoring Plan. Golden and the Standley Lake cities have agreed to share their data.

UCC AUTOSAMPLERS - EVENT SAMPLES

Field Equipment

Storm event sampling utilizes the same equipment listed in the previous section for the 24-hr ambient samples.

Autosampler Operation

Field equipment used for storm event sampling is operated using the same techniques as described in the previous section for 24-hr ambient sampling.

Sample Compositing

Sample compositing is performed similarly to the procedure described in the previous section for 24-hr ambient sampling; however, fewer or more samples may be composited based on the intensity and duration of a storm event.

TRIBUTARY BASIN MONITORING PROGRAM

The Standley Lake Tributary Basin Monitoring Program is designed to provide water quality information for evaluation of the nutrient loadings from non-point sources in the Standley Lake Tributary Basin. The only point source discharge between CC60 on the main stem of Clear Creek and the canal diversions to Standley Lake is the Coors cooling basin return flow.

Three tributaries (the terms trib and canal are interchangeable) divert Clear Creek water to Standley Lake: the Church Ditch, the Farmers Highline ("FHL") Canal and the Croke Canal. The trib monitoring locations were selected to assess the relative loadings to the canals from areas within unincorporated Jefferson County and the city limits of Golden and Arvada. Denver Water supplies Westminster with a small quantity of water via the Kinnear Ditch Pipeline ("KDPL") which enters Standley Lake after passing through a wetlands area located west of 96th Ave and Alkire Street. The upstream and downstream locations near the wetlands are monitored when there is flow through the pipeline. The Denver Water raw water sources include Gross Reservoir and Coal Creek.

The Church Ditch delivery structure at Standley Lake was relocated in 2008 from the west side of the lake to the south side of the lake in order to avoid the potential for significant stormwater impacts to the lake. The former Church Ditch monitoring location at Standley Lake (T-09) was abandoned in 2009 when the new delivery structure (T-27) became operational.

TRIB AMBIENT GRAB SAMPLES

Trib ambient grab samples are collected year-round on the first Wednesday of each month. All tributaries flowing at a rate that allows collection of a representative sample are monitored.

The raw water pipeline at Semper (T-24) is monitored monthly to provide lake outflow data used to determine lake outflow loadings. The raw water pipeline at NWWTP (T-25) is monitored only when the Semper facility is offline.

Locations and Sample Schedule

Sample ID	Sample Location[1]	Every month of the year when flowing[2]
T-01	Church Ditch at Headgate on MSCC	X
T-02	FHL at Headgate on MSCC	X
T-03	Croke Canal at Headgate on MSCC	X
T-04	Croke Canal at Standley Lake	X
T-11	FHL at Standley Lake	X
T-22A	Kinnear Ditch Pipeline (KDPL) – at Coal Creek entry point into pipeline	X
T-22D	Kinnear Ditch Pipeline (KDPL) downstream of wetlands	X
T-24	Raw Water Pipeline at Semper	X
T-25	Raw Water Pipeline at NWWTP	X
T-27	Church Ditch delivery structure at SL (est. 2009)	X

[1] MSCC = Mainstem Clear Creek

[2] Exceptions noted in paragraph above the table.

TRIB AMBIENT GRAB SAMPLES

Analytical Parameters and Analytical Scheme

Analyte	Analytical Method Reference[1]	Reporting Limit Goal[2]	Responsible Laboratory	Monitoring Frequency
Temperature (field)[3]	SM 2550 B	1.0 °C	Northglenn	Monthly
pH (field)	SM 4500-H+ B-2000	1.0 Std Units	Northglenn	Monthly
Conductivity (field)	SM 2510 B-1997	10 µS/cm	Northglenn	Monthly
Turbidity (field)	ASTM D7315	1.0 NTU	Northglenn	Monthly
Dissolved Oxygen (field)	ASTM D888-09 (C)	1.0 mg/L	Northglenn	Monthly
Total Phosphorus[4]	SM 4500-P E	0.005 mg/L	Northglenn	Monthly
Ortho-phosphate as P (dissolved) or DRP	SM 4500-P E	0.005 mg/L	Northglenn	Monthly
Total Suspended Solids (TSS)	SM 2540 D	1 mg/L	Thornton	Monthly
Total Organic Carbon	SM 5310	0.5 mg/L	Thornton	Monthly
E. coli	SM 9223 B	1 cfu/100mL	Thornton	Monthly
Chloride	EPA 300	5 mg/L	Thornton	Monthly
Bromide	EPA 300	0.1 mg/L	Thornton	Monthly
Sulfate	EPA 300	10 mg/L	Thornton	Monthly
Total and Dissolved Iron	EPA 200.7	0.05 mg/L	Westminster Contract Lab	Monthly
Total and Dissolved Manganese	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Monthly
Total and Dissolved Zinc	EPA 200.8	0.020 mg/L	Westminster Contract Lab	Monthly
Total Nitrogen	SM 4500-NO3 I	0.02 mg/L	Westminster	Monthly
Nitrate/Nitrite as N	SM 4500-NO3 I	0.01 mg/L	Westminster	Monthly
Ammonia as N	SM 4500-NH3 H	0.01 mg/L	Westminster	Monthly
Gross Alpha and Gross Beta	EPA 901.1	0.1 pCi/L	Westminster Contract Lab	Quarterly[5]
Total and Dissolved Arsenic	EPA 200.8	0.001 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Barium	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Beryllium	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Cadmium	EPA 200.8	0.0005 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Chromium	EPA 200.8	0.001 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Copper	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Lead	EPA 200.8	0.0005 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Molybdenum	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Nickel	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Selenium	EPA 200.8	0.005 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Silver	EPA 200.8	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Strontium	EPA 200.7	0.002 mg/L	Westminster Contract Lab	Quarterly
Total and Dissolved Vanadium	EPA 200.8	0.0005 mg/L	Westminster Contract Lab	Quarterly
Total Hardness (as $CaCO_3$)	EPA 130.2	5 mg/L	Thornton	Quarterly

[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.
[2] Reporting limit goals are matrix dependent and may be increased for complex matrices and may be lower depending on laboratory capability.
[3] YSI/Xylem ProDSS used for field measurements.
[4] Samples collected for nutrients (nitrogen and phosphorus) with a turbidity reading of greater than 100 NTU may be analyzed by commercial laboratories that have demonstrated proficiency in analyzing complex matrices for nutrients.
[5] Quarterly parameters are analyzed in March, June, September and December at all sampled locations.

TRIB AMBIENT GRAB SAMPLES

Program Coordination and Sampling Team: Northglenn

Before the scheduled Tributary sampling date:

- Ensure an adequate supply of sample containers is available from Thornton. Westminster's bottles will be picked up at Westminster on sampling day before the start of sampling at T-24.
- Label the Trip blank bottle and fill with laboratory DI water.
- Calibrate the field equipment.
- Analyze the Trip Blank for field parameters.
- Pack Trip Blank in cooler to monitor field activities for phosphorus contamination.

Sample Bottle Kit – Tribs Monthly and Quarterly

Quantity (Dependent on which canals are delivering water to SL)	Volume	Bottle Type	Parameter	Laboratory
9	500 mL	Rectangular plastic	Phosphorus series	Northglenn
1 (Trip blank)	500 mL	Rectangular plastic	Phosphorus series	Northglenn
9	500 mL	Plastic	TSS, Total Hardness, Chloride, Sulfate, Bromide	Thornton
9	40 mL	Glass vial	TOC	Thornton
9	125 mL	Plastic	E. coli	Thornton
9	500 mL	Plastic	Total Metals	Westminster
9	500 mL	Plastic	Dissolved Metals	Westminster
9	125 mL	Brown plastic	Nitrogen series	Westminster
9	1 L	Plastic	Rads	Westminster

Sample Collection

Equipment required:

- Key to access T-2
- Key to access T-27
- Gate Code for access at T-22A
- Field data book
- Cooler with blue ice or ice
- Trip blank filled with DI
- Sample bottles as detailed above
- Bucket for sample collection
- YSI/Xylem ProDSS and probes

- Ballpoint pen
- Waterproof marker
- Chain of custody forms
- NOTE – Four wheel drive vehicle recommended for sampling due to steep inclines at some locations and potentially rugged or muddy conditions.

Sample collection procedure:

1. Meet with Westminster staff at Semper. Drop off bottles for Westminster staff to collect sample at T-25, if necessary.
2. Starting with T-24, collect field samples in the order detailed in the next section at each location where water is flowing.
3. Rinse the sample bucket with the field sample water repeatedly at each location before collecting the sample.
4. Collect enough volume of the field sample in the bucket to fill all sample bottles for the location.
5. Fill the appropriate sample bottles from the bucket.
6. Label the sample bottles with location, date and time of collection.
7. Analyze the field parameters and record data in the field notebook.
8. Repeat the process at each location.
9. Return to Westminster's Semper WTP. Receive T-25 sample from Westminster staff if necessary. Sign COC and keep the original copy of the COC.
10. Leave an unsigned copy of the Thornton COC at Westminster so the samples can be logged into the Excel spreadsheet by Westminster staff.
11. Complete the COCs and relinquish custody of the samples to Westminster staff. Sign COC and keep a copy of the COC. Leave the original COC with the samples.
12. Return to Northglenn Lab.
13. Contact Thornton to pick up collected field samples. Request replenishment of bottles for the next sampling event as needed.
14. Relinquish samples to Thornton and sign COCs. Retain a copy of the COC. Thornton takes possession of the original COC.
15. Northglenn retains a copy of all COCs and field documentation for permanent archive.

TRIB AMBIENT GRAB SAMPLES

Sampling Locations Directions and Narrative Descriptions

Tributary sampling occurs generally in an upstream to downstream fashion. Samples are collected at designated locations when water is flowing.

Trib 24
T-24 is located at Westminster's Semper Water Treatment Plant at 8900 Pierce Street. The sample is collected from the RAW water tap in the Operator's Laboratory. Do **NOT** increase the flow at the tap at this location. First tap on the left labeled 24.

Trib 22A
T-22A is the upstream sample point on the Kinnear Ditch pipeline. It is accessed through a gate located at Hwy. 72 and Plainview Rd. A key is required to access the location. The sample point is approximately 0.2 miles from Plainview Rd. Sample is taken at the flume where Coal Creek enters the pipeline.

Trib 1
T-01 is located at the Church Ditch headgate on Clear Creek. This site is accessed via Hwy 6 approximately 0.5 miles west of Hwy 93. There is a diversion from Clear Creek above this location which diverts water from Clear Creek and runs it parallel to the Creek. There are two gates at this location one sends water back into Clear Creek and the other is the Church Ditch headgate. Sample is taken from the bridge just above both gates.

Trib 2
T-2 is located at the Farmers Highline headgate on Clear Creek.
The site is accessed behind the Coors office building at the end of Archer St. Sample is taken from the bridge just inside the gate. Sample the downstream side of the headgate if it is open or on the upstream side if the headgate is closed (Clear Creek side).

Trib 3
T-3 is located at the Croke Canal headgate on Clear Creek.
This site is on Coors property. It is along the frontage road through Coors, on the east side of a small "pond". Sample the downstream side of the headgate if it is open or on the upstream side if the headgate is closed (Clear Creek side).

Trib 22D
T-22D is on the Kinnear Ditch Pipeline between 96th Ave and 88th Ave on Alkire St.
The sample is taken just downstream of the culvert on the east side of Alkire St.

Trib 04 and Trib 11

The Croke Canal (T-04) passes UNDER the Farmers Highline (T-11) in the area just west of 86th and Kipling prior to entering Standley Lake. The Farmers Highline passes OVER the Croke in a concrete structure. Sample the Croke on the south side of the Farmers Highline concrete structure. Sample the Farmers next to the white autosampler housing box.

Trib 25
Located at Westminster's Northwest Water Treatment Plant located at 104th & Wadsworth. The sample is collected by Westminster from the raw water tap on the west wall in the membrane filter gallery. Sample only if T-24 is not running.

Trib 27
T-27 is located on the south side of Standley Lake at the Church Ditch delivery structure. From Alkire, take 88th Ave east. Open Standley Lake Park gate number 23-D using a master lock key number 2006. Drive north down the trail; it curves east and intersects with a trail going south. Drive down the south trail to the delivery structure.

Photographs of the sampling locations and GPS coordinates are included in Appendix D.

TRIB CONTINUOUS MONITORING

Program Coordination and Sampling Team: Westminster

At least one YSI multi-parameter sonde and data logging equipment are deployed year-round at the trib location where the Farmers Highline Canal (T-11) crosses over the Croke Canal (T-04), provided there is sufficient flow in one of the canals. Sondes were installed at the new Church Ditch inlet (T-27) in 2009, the FHL headgate (T-02) in 2014 and the Croke headgate (T-03) in 2015 to provide continuous in-stream monitoring of pH, ORP, turbidity, temperature, conductivity and fDOM during the months when each canal is diverting water to Standley Lake. Remote access to the data logger data facilitates monitoring of water quality at these inflow locations to Standley Lake.

TRIB CONTINUOUS MONITORING

Sample Locations

[1]CCAST02	FHL at Headgate on MSCC
CCAST03	Croke Canal at Headgate on MSCC
CCAST04	Croke Canal approximately 0.5 mile from Standley Lake inlet
CCAST11	Farmers Highline Canal approximately 0.5 mile from Standley Lake inlet
CCAST27	Church Ditch at Standley Lake inlet

[1] Limited historical data from these locations are available as part of the Clear Creek Canal Program that was eliminated in 2008. The sample location identifications associated with the Clear Creek Canal Program have been retained.

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Program Coordination and Sampling Team: Westminster

Autosampler sites in the Tributary Basin are located at the canal headgates and inlets to Standley Lake. The 24-hour ambient composites are collected with programmable automatic sampling devices as described in the UCC autosampler 24-hr ambient program section of this plan (page 17) in order to assess any water quality impacts introduced to or removed from the canals.

Ambient samples are collected approximately seven times per year on a monthly schedule starting in April and ending in October as a continuation of the UCC autosampler 24-hr ambient sample program. To assist with sample pick-up logistics between the cities of Northglenn and Thornton, efforts will be made to set these sampling periods to be collected on Monday or Tuesday of the fourth week of the month. This may not always be possible due to weather forecasts, stream flows, or other uncontrollable factors.

Time of travel is estimated between CCAS59 and T-02, then a time of travel table is used to set the start time for sample collection at T-11 in order to capture approximately the same slug flow of water collected at the upstream sites. Composite samples are not collected on the Croke Canal or Church Ditch due to season of operation or limited flow volumes.

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Sample Locations

CCAST02	FHL at Headgate on MSCC
CCAST03	Croke Canal at Headgate on MSCC
CCAST04	Croke Canal approximately 0.5 mile from Standley Lake inlet
CCAST11	Farmers Highline Canal approximately 0.5 mile from Standley Lake inlet
CCAST27	Church Ditch at Standley Lake inlet

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Flow Monitoring

Flow in the canals is tracked by the ditch operators and water accountants.

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Analytical Parameters

Analyte	Analytical Method Reference[1]	Reporting Limit Goal[2]	Responsible Laboratory[3]
Total Nitrogen[4]	SM 4500-NO3 I	0.02 mg/L	Westminster
Nitrate/Nitrite-N	SM 4500-NO3 I	0.01 mg/L	Westminster
Ammonia-N	SM 4500-NH3 H	0.01 mg/L	Westminster
Total Phosphorus	SM 4500-P E	0.005 mg/L	Northglenn
Ortho-phosphate-P (dissolved) or DRP	SM 4500-P E	0.005 mg/L	Northglenn
Total Suspended Solids (TSS)	SM 2540 D	1 mg/L	Thornton
Total Organic Carbon (TOC)	SM 5310 B	0.5 mg/L	Thornton
Chloride	EPA 300	5 mg/L	Thornton
Bromide	EPA 300	0.1 mg/L	Thornton
Sulfate	EPA 300	10 mg/L	Thornton
Total and Dissolved Cadmium[5]	EPA 200.8	0.0005 mg/L	Westminster Contract Lab
Total and Dissolved Copper	EPA 200.8	0.002 mg/L	Westminster Contract Lab
Total and Dissolved Iron	EPA 200.7	0.05 mg/L	Westminster Contract Lab
Total and Dissolved Lead	EPA 200.8	0.0005 mg/L	Westminster Contract Lab
Total and Dissolved Manganese	EPA 200.8	0.002 mg/L	Westminster Contract Lab
Total and Dissolved Zinc	EPA 200.8	0.020 mg/L	Westminster Contract Lab
pH (field)[6]	SM 4500-H+ B-2000	1.0 Std Units	Westminster
Temperature (field)	SM 2550 B	1.0 °C	Westminster
Conductivity (field)	SM 2510 B-1997	10 µS/cm	Westminster
Turbidity (field)	ASTM D7315	1.0 NTU	Westminster

[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.

[2] Reporting limit goals are matrix dependent and may be increased for complex matrices and may be lower depending on laboratory capability.

[3] EPA recommended holding times less than 72 hours may not be met due to the extended sampling routine.

[4] Samples collected for nutrients (nitrogen and phosphorus) with a turbidity reading > 100 NTU may be analyzed by commercial laboratories that have demonstrated proficiency in analyzing complex sample matrices for nutrients.

[5] Metals will be analyzed in May, July and October on the canals operating at that time intended to capture low, medium and high canal flows delivered to Standley Lake

[6] YSI/Xylem 6-series or EXO sondes are used for field measurements.

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Program Coordination and Sampling Team (Westminster)

Field Equipment

Equipment Installed At Autosampler Locations

- Permanent and tamper-proof enclosure box with lock
- American Sigma 900, 900 Max or other automated sampler
- Power supply – solar panel, rechargeable battery or direct power
- Sample tubing long enough to reach from the autosampler to the streambed. Probes must be contained in protective piping secured in the creek bed
- Sondes equipped with dedicated field probes for turbidity, temperature, conductivity, pH, and depth/pressure sensor
- Rain gage at T-02 and T-04/T-11
- 24 discrete HCl or Citric Acid washed and rinsed bottles with caps. Bottles must be numbered and inserted in the designated position in autosampler (positions numbered 1 through 24). Though samples will only be collected in bottles 1-12, a full rack of sample bottles is required to secure sample bottles in place.
- Continuous recording datalogger
- Cellular modem and antenna at T-02, T-03, T-04/T-11 and T-27

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Autosampler Operation

On a monthly basis between April and October, autosamplers are set to collect time-weighted discrete samples for a 24 hour period. The autosamplers are located at the canal head-gates and inlets to Standley Lake. In order to associate the relative impacts of the point and nonpoint pollutant sources located between the last autosampler location on Clear Creek (CCAS59), it is advisable to observe the same "slug" of water at the canal inlets to Standley Lake. The time of travel in the Farmer's Highline canal is calculated from the inflows to the canal at the headgate on Clear Creek.

Total flow into the Farmers Highline canal is determined from the Colorado DNR website, and time-of-travel from the head-gate to the lake is calculated using a formula developed by observing turbidity peaks during storm events at different flow rates.

The time of travel estimates table for the Farmer's Highline Canal is included in Appendix E. Time of travel estimates have not been established for the Croke Canal. The Ditch operators assist in estimating when water will arrive at Standley Lake after the ditch is turned on.

Autosampler Setup:

Equipment required:

- 24 discrete HCl or Citric Acid washed and rinsed autosampler bottles with caps. Though samples will only be collected in bottles 1-12, a full rack of sample bottles is required to secure sample bottles in place.
- Keys and/or tools to access autosampler enclosure.
- Field data collection/station audit sheets.

Setup Procedure:

1. Unlock sample enclosure and remove sampler head. Set aside without disturbing or bumping the distributor arm.
2. Ensure a full set of clean bottles are deployed or load uncapped bottles in the correct positions in the bottom of the sampler.
3. Secure bottles in place with the retaining ring. Store caps in a ziplock bag inside the autosampler until sample collection.
4. Program the sampler according to manufacturer's instructions to collect two 450 ml storm samples per bottle, one sample per pulse.
5. After starting the autosampler, ensure that the distributer arm is positioned above bottle #1.
6. Replace sampler head and lock in place.
7. Record station/equipment information on field sheet.
8. Make sure the autosampler program is ***RUNNING*** before locking the enclosure.
9. The autosampler may be set up ahead of a scheduled start time.

Sample Collection

Additional equipment required:

- Keys and/or tools to access autosampler enclosures
- Large cooler with ice to collect sample bottles
- 12 pre-cleaned, HCl or Citric Acid washed and rinsed, discrete sample replacement bottles
- Field data sheets/station audit sheets
- Chain of custody forms
- Laptop with Loggernet software and data cable (9 pin serial cable with SC32B adapter) if retrieving data directly from datalogger
- One 3-liter Nalgene bottle (clean and rinsed with 1:1 hydrochloric acid) for compositing samples
- 250 mL graduated cylinder (clean and rinsed with 1:1 hydrochloric acid) for compositing samples
- Prepared sample bottles provided by participating Cities for nutrients, solids and metals analyses
    - 500 mL square plastic – phosphorus series (Northglenn)
    - 125 mL brown plastic – nitrogen series (Westminster)
    - 500 mL plastic bottle – TSS (Thornton)
    - 40 mL amber glass vial with septa cap – TOC (Thornton)
    - 500 mL plastic – Chloride/Bromide/Sulfate (Thornton)

    - 500 mL non-preserved total metals (Westminster)
    - 500 mL non-preserved bottle – dissolved metals (Westminster)
- Chain of Custody forms – Refer to Appendix C
- Field Sampling form - Refer to Appendix C

Sample Collection Procedure:

1. Unlock enclosure and remove sampler head.
2. Retrieve date/time information from autosampler if required. To collect sample history on American Sigma samplers, press <Change/ Halt> button, press <time/read> button for 5 seconds. The sample collection time for the first sample will appear. Record data on the field sheet. Press <yes> for next sample time to appear. Continue until all data is recorded.
3. Date and time information for samples is also automatically stored in a data file by the dataloggers at all sites.
4. Record station/equipment information on field sheet.
5. Make note of any samples with high turbidity determined by visual observance or data obtained from the datalogger.
6. Optional compositing of samples in the field is performed by pouring off equal volumes into a 3-liter (or larger) pre-cleaned bottle. The 12 sample bottles may also be brought back to a laboratory for compositing. Refer to the Sample Compositing Procedure Step 1. Save remaining volume of any high turbidity samples to take back to the lab. Discard remaining sample.
7. Clean out autosampler base and reload with a new set of pre-cleaned bottles.
8. Reset the autosampler by pressing the START button (Sigma 900 autosampler). Ensure that the distributor arm is parked over bottle #1 and the display reads "Program Running" before closing the autosampler and placing it back in the enclosure.
9. Return to the Westminster Water Quality Laboratory for sample splitting and distribution.

TRIB AUTOSAMPLER 24-HOUR AMBIENT SAMPLES

Sample Compositing

1. Composite samples in the laboratory if compositing was not performed in field. Shake sample bottles and pour equal volumes of sample from the first 12 bottles into a composite bottle.
2. Perform turbidity, temperature, pH and conductivity field measurements on the composited sample. Enter data on the Sampling Form.
3. Use the well mixed composite sample to fill the appropriate bottles for the Northglenn, Thornton and Westminster labs.
4. If any discreet bottle(s) appears to have an unusually high turbidity and enough sample is available, analyze for turbidity and conductivity. Record on Sampling Form. If there is enough sample, pour the high turbidity discreet samples into separate nutrient and solids bottles for individual analysis.
5. Complete the COCs.
6. Relinquish to each city their respective samples (Westminster-nitrogen series and metals, Thornton-TSS and TOC, Northglenn-phosphorus series) and sign COCs as appropriate.
7. Original field data sheets and COCs are retained by the Cities of Westminster for permanent archive.
8. Samples are created in the web-accessible Excel spreadsheet by Westminster for data entry and results archive.

TRIB AUTOSAMPLER EVENT SAMPLES

Program Coordination and Sampling Team (Westminster)

The event autosampler program was initiated on the Tributaries in 2009 at CCAST11 to assess the pollutant concentrations mobilized during significant snow melt (runoff) or rain events at the location closest to Standley Lake. Automated sample collection of stormwater is triggered based on a turbidity reading of 100 NTU. The autosampler may also be activated remotely to begin sampling immediately or programmed to start sampling at a designated time in an attempt to capture the downstream effects of a storm in the upper watershed based on time of travel. The autosampler collects discrete samples every 15 minutes until the ambient condition drops below the trigger level or until the maximum number of samples is collected. The discrete samples may be analyzed individually or multiple discrete samples may be composited based on the field observations. Automated collection of storm event samples was initiated in 2014 at the headgates for the FHL and in 2015 in the Croke Canal. These locations trigger sample collection when the turbidity is greater than the trigger value for each specific site. The event samples collected on the Croke Canal and Church Ditch when water is first delivered to the lake during seasonal startup of the canals/ditches are considered first flush samples.

TRIB AUTOSAMPLERS EVENT MONITORING

Sample Locations

Localized events may trigger sample collection at any of the Trib Autosampler Continuous Monitoring locations.

[1]CCAST02 Event	FHL at Headgate on MSCC
CCAST03 Event	Croke Canal at Headgate on MSCC
CCAST04 Event	Croke Canal approximately 0.5 mile from Standley Lake inlet
CCAST11 Event	Farmers Highline Canal approximately 0.5 mile from Standley Lake inlet
CCAST27 Event	Church Ditch at Standley Lake inlet

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[1] Historical data from these locations may be available as part of the Clear Creek Canal Program which was eliminated in 2008. The sample location identifications associated with the Clear Creek Canal Program have been retained

TRIB AUTOSAMPLER EVENT SAMPLES

Flow Monitoring

Flow in the canals is tracked by the ditch operators and water accountants. The average daily flow data corresponding with the time-event composited samples will be used for loadings calculations for storm events.

Refer to Appendix E for the time of travel data for the Farmers Highline Canal. Time of travel studies have not been performed from the canal headgates on Clear Creek to Standley Lake for the Croke Canal or the relocated Church Ditch inlet structure.

TRIB AUTOSAMPLER EVENT SAMPLES

Analytical Parameters

Storm event samples are analyzed for the suite of analytical parameters listed below.

Analyte	Analytical Method Reference[1]	Reporting Limit Goal[2]	Responsible Laboratory[3]
Temperature (field)[4]	SM 2550 B	1.0 °C	Westminster
pH (field)	SM 4500-H+ B-2000	1.0 Std Units	Westminster
Conductivity (field)	SM 2510 B-1997	10 µS/cm	Westminster
Turbidity (field)	ASTM D7315	1.0 NTU	Westminster
Total Nitrogen[5]	SM 4500-NO3 I	0.02 mg/L	Westminster
Nitrate/Nitrite as N	SM 4500-NO3 I	0.01 mg/L	Westminster
Ammonia as N	SM 4500-NH3 H	0.01 mg/L	Westminster
Gross Alpha and Gross Beta	EPA 900.0	0.1 pCi/L	Westminster Contract Laboratory
Total Phosphorus	SM 4500-P E	0.005 mg/L	Northglenn
Ortho-phosphate as P (dissolved) or DRP	SM 4500-P E	0.005 mg/L	Northglenn
Total Organic Carbon	SM 5310 B	0.5 mg/L	Thornton
Total Suspended Solids	SM 2540 D	1 mg/L	Thornton
Chloride	EPA 300	5 mg/L	Thornton
Bromide	EPA 300	0.1 mg/L	Thornton
Sulfate	EPA 300	10 mg/L	Thornton
Total and Dissolved Arsenic	EPA 200.8	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Barium	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Beryllium	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Cadmium	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Chromium	EPA 200.8	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Copper	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Iron	EPA 200.7	0.05 mg/L	Westminster Contract Laboratory
Total and Dissolved Lead	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Manganese	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Molybdenum	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Nickel	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Selenium	EPA 200.8	0.005 mg/L	Westminster Contract Laboratory
Total and Dissolved Silver	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Strontium	EPA 200.7	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Vanadium	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Zinc	EPA 200.8	0.020 mg/L	Westminster Contract Laboratory

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[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.
[2] Reporting limit goals are matrix dependent and may be increased for complex matrices and may be lower depending on laboratory capability.
[3] EPA recommended holding times less than 72 hours may not be met due to the extended sampling routine.
[4] YSI/Xylem 6-series or EXO sondes are used for field measurements.
[5] Samples collected for nutrients (nitrogen and phosphorus) with a turbidity reading of greater than 100 NTU are analyzed by commercial laboratories that have demonstrated proficiency in analyzing complex matrices for nutrients

TRIB AUTOSAMPLER EVENT SAMPLES

Field Equipment

Storm event sampling utilizes the same equipment listed in the previous section for the 24-hr ambient samples.

Autosampler Operation

Field equipment used for storm event sampling is operated using the same techniques as described in the previous section for 24-hr ambient sampling.

Sample Compositing

Sample compositing is performed similarly to the procedure described in the previous section for 24-hr ambient sampling; however, fewer samples are typically composited based on the intensity and/or duration of a storm event.

Sampling Standley Lake –photo courtesy of Eric Scott

STANDLEY LAKE MONITORING PROGRAM

Standley Lake is a storage reservoir that serves as the raw drinking water source for the SLC. Over 250,000 consumers rely on Standley Lake for their drinking water. The Standley Lake ("SL") Monitoring Program is designed to provide water quality information in order to evaluate internal loadings in Standley Lake and the effects of nutrient reduction measures and best management practices on the trophic status of Standley Lake. Regularly spaced and frequent sampling is necessary to provide sufficient data for monitoring trends for the analytes used to evaluate trophic status including dissolved oxygen, chlorophyll and nutrients.

The main water quality monitoring efforts on Standley Lake include:

- Daily top to bottom lake profiles
- Bimonthly grab samples
- Zooplankton tows
- Invasive species monitoring and control

SL – DAILY LAKE PROFILES

Program Coordination (Westminster)

The sampling location in Standley Lake (Site 10-00) is situated 225 meters south of the lower lake outlet structure, between the lake outlets and the two main inlets to the lake. The lake site was selected based on the lengthy historical record of water quality monitoring data and because the water is drawn from the lake near this location via pipelines to the SLC's water treatment plants. Sampling at varying depths in the lake provides extensive information for use in drinking water treatment process decisions and evaluating water resource management options.

Standley Lake is monitored at Site 10-00 using an automated profiler equipped with a multi-probe sonde four times each day from early spring to late fall for the analytes listed in the following table. The profiler is removed from the lake prior to freezing of the lake surface. Refer to the watershed map in Appendix B for the location of the SL monitoring location. The solar powered unit collects data from the surface of the lake to within one meter off the bottom and every meter in between. The profiler data is telemetered using a cellular telephone modem and provides a depth-integrated profile of the lake water quality.

SL – DAILY LAKE PROFILES

Analytical Parameters

Analyte	Analytical Method Reference[1]	Reporting Limit Goal[2]
Temperature[3]	SM 2550 B	1.0 °C
pH	SM 4500-H+ B-2000	1.0 Std Units
Conductivity	SM 2510 B-1997	10 µS/cm
Turbidity	ASTM D7315	1.0 NTU
Dissolved Oxygen	ASTM D888-09 (C)	1.0 mg/L
Chlorophyll	YSI (optical probe)	1.0 µg/L
ORP	SM 2580 A	1.0 mv
fDOM	YSI (optical probe)	1.0 µg/L

[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.
[2] Reporting limits are matrix dependent and may be increased for complex matrices.
[3] YSI/Xylem EXO sondes are used for all lake profile measurements.

SL – BIMONTHLY GRAB SAMPLES

Program Coordination and Sampling Team: Westminster

The same sampling location in Standley Lake (Site 10-00) is used for both the daily lake profiles and the bimonthly grab samples. Sampling at varying depths in the lake provides extensive information for use in drinking water treatment process decisions and evaluating water resource management options. Refer to the watershed map in Appendix B for the location of the SL monitoring location.

Locations

Grab samples are collected twice each month as long as the lake is not frozen and weather permits. The raw water pipeline at Semper (T-24) may be sampled for a subset of the routine analytical parameters when the lake is frozen or when safety of the sampling team is a concern (i.e. high winds, frozen boat ramp, etc.).

Sample Identification	Sample Location
SL 10-00	SL surface
SL 10-03	SL at one meter depth
SL 10-PZ	SL at two times the Secchi depth
SL 10-70	SL at one meter above the lake bottom. (The depth of the lake is 23.7 meters (77.75 ft) at Site SL 10-00 when the lake is full at gage height 96.)
SL 69-00	SL surface at the boat dock
T-24	Raw water line coming into Semper Water Treatment Plant. Comes from either the lower intake, upper intake, or a combination of both intakes in Standley Lake. Intake flow is changed seasonally. The upper and lower intakes are located approximately 11 meters and 20 meters below lake surface level when the lake is full (gage height 96).

SL – BIMONTHLY GRAB SAMPLES

Analytical Parameters

Analyte	Analytical Method Reference[1]	Reporting Limit Goal[2]	Responsible Laboratory
Temperature (field)[3]	SM 2550 B	1.0 °C/	Westminster
pH (field)	SM 4500-H+ B-2000	1.0 Std Units	Westminster
Conductivity (field)	SM 2510 B-1997	10 µS/cm	Westminster
Turbidity (field)	ASTM D7315	1.0 NTU	Westminster
Dissolved Oxygen (field)	ASTM D888-09 (C)	1.0 mg/L	Westminster
ORP (field)	YSI (electrode)	1 mv	Westminster
Chlorophyll (field)	YSI (electrode)	1.0 µg/L	Westminster
fDOM (field)	YSI optical probe	1.0 µg/L	Westminster
Secchi Depth (field)	Secchi disk	0.1 meter	Westminster
Total Nitrogen	SM 4500-NO3 I	0.02 mg/L	Westminster
Nitrate/Nitrite as N	SM 4500-NO3 I	0.01 mg/L	Westminster
Ammonia as N	SM 4500-NH3 H	0.01 mg/L	Westminster
Gross Alpha and Gross Beta	EPA 900.0	0.1 pCi/L	Westminster
Zooplankton	SM 10900	1 per L	Westminster
Algae	SM 10900	1 per mL	Westminster
Chlorophyll *a*	SM 10200-H	1.0 µg/L	Westminster
Total Phosphorus	SM 4500-P E	0.005 mg/L	Northglenn
Ortho-phosphate as P (dissolved) or DRP	SM 4500-P E	0.005 mg/L	Northglenn
Total Organic Carbon	SM 5310 B	0.5 mg/L	Thornton
Total Suspended Solids	SM 2540 D	1 mg/L	Thornton
Total Hardness (as $CaCO_3$)	EPA 130.2	5 mg/L	Thornton
Chloride	EPA 300	5mg/L	Thornton
Bromide	EPA 300	0.1 mg/L	Thornton
Sulfate	EPA 300	10 mg/L	Thornton
E. coli	Hach 10029	1 cfu/100mL	Westminster
Total and Dissolved Arsenic	EPA 200.8	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Barium	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Beryllium	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Cadmium	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Chromium	EPA 200.8	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Copper	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Iron	EPA 200.7	0.05 mg/L	Westminster Contract Laboratory
Total and Dissolved Lead	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Manganese	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Molybdenum	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Nickel	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Selenium	EPA 200.8	0.005 mg/L	Westminster Contract Laboratory
Total and Dissolved Silver	EPA 200.8	0.002 mg/L	Westminster Contract Laboratory
Total and Dissolved Strontium	EPA 200.7	0.001 mg/L	Westminster Contract Laboratory
Total and Dissolved Vanadium	EPA 200.8	0.0005 mg/L	Westminster Contract Laboratory
Total and Dissolved Zinc	EPA 200.8	0.020 mg/L	Westminster Contract Laboratory
Dissolved Silica	EPA 200.8	0.1 mg/L	Westminster Contract Laboratory
Total Mercury	EPA 245.1	0.0002 mg/L	Westminster Contract Laboratory

[1] SM refers to the 23rd Edition of Standard Methods for the Examination of Water and Wastewater.
[2] Reporting limit goals are matrix dependent and may be increased for complex matrices and may be lower depending on laboratory capability.
[3] YSI/Xylem EXO sondes are used for all lake field measurements except for secchi depth.

SL – BIMONTHLY GRAB SAMPLES

Analytical Scheme

The analytical scheme for Standley Lake was designed to capture the biological, physical and chemical changes occurring in the lake ecosystem throughout the year. Seasonality plays an important role in lake dynamics and subsequently, on the water treatment processes. The table below details the variable analytical scheme, with the caveat that weather patterns may require modification to the plan.

Month	Lake Sample Location		Analytes														
		Hand Profile[1]	Secchi depth	Rads[2]	E coli	Zooplankton	Nutrients[3]	Metals[4]	Algae	Chlorophyll *a*	TOC	TSS	Total Hardness[5]	Chloride	Bromide	Sulfate	Silica (dissolved)
January 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X	X	X	X	X	X	X	X	X	X	X
	10-70	X			X		X	X			X	X	X	X	X	X	X
January 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
February 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X		X	X	X	X		X	X	X	X
	10-70	X			X		X				X	X		X	X	X	X
February 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
March 1st week	10-00	X	X	X	X	X											
	10-03	X					X			X	X	X					
	10-PZ			X			X	X	X	X	X	X	X	X	X	X	X
	10-70	X		X	X		X	X			X	X	X	X	X	X	X
March 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
April 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X		X	X	X	X		X	X	X	X
	10-70	X			X		X				X	X		X	X	X	X

Month	Lake Sample Location	Analytes															
		Hand Profile[1]	Secchi depth	Rads[2]	E coli	Zooplankton	Nutrients[3]	Metals[4]	Algae	Chlorophyll *a*	TOC	TSS	Total Hardness[5]	Chloride	Bromide	Sulfate	Silica (dissolved)
April 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
May 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X		X	X	X	X		X	X	X	X
	10-70	X			X		X				X	X		X	X	X	X
May 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
June 1st week	10-00	X	X	X	X	X											
	10-03	X					X			X	X	X					
	10-PZ			X			X	X	X	X	X	X	X	X		X	X
	10-70	X		X	X		X	X			X	X	X	X		X	X
June 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
July 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X		X	X	X	X		X	X	X	X
	10-70	X			X		X				X	X		X	X	X	X
July 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
August 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X		X	X	X	X		X	X	X	X
	10-70	X			X		X				X	X		X	X	X	X
August 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X

Month	Lake Sample Location		Analytes														
		Hand Profile[1]	Secchi depth	Rads[2]	E coli	Zooplankton	Nutrients[3]	Metals[4]	Algae	Chlorophyll *a*	TOC	TSS	Total Hardness[5]	Chloride	Bromide	Sulfate	Silica (dissolved)
September 1st week	10-00	X	X	X	X	X											
	10-03	X					X			X	X	X					
	10-PZ			X			X	X	X	X	X	X	X	X	X	X	X
	10-70	X		X	X		X	X			X	X	X	X	X	X	X
September 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
October 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X	X	X	X	X	X	X	X	X	X	X
	10-70	X			X		X	X			X	X	X	X	X	X	X
October 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X	X	X	X	X	X	X	X	X	X	X
	10-70	X					X	X			X	X	X	X	X	X	X
November 1st week	10-00	X	X		X	X											
	10-03	X					X			X	X	X					
	10-PZ						X		X	X	X	X		X	X	X	X
	10-70	X			X		X				X	X		X	X	X	X
November 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X
December 1st week	10-00	X	X	X	X	X											
	10-03	X					X			X	X	X					
	10-PZ			X			X	X	X	X	X	X	X	X	X	X	X
	10-70	X		X	X		X	X			X	X	X	X	X	X	X
December 3rd week	10-00	X	X			X											
	10-03	X					X			X							
	10-PZ						X		X	X							X
	10-70	X					X										X

[1] Hand profile collects data using the sonde for temperature, pH, conductivity, turbidity, DO, chlorophyll and ORP at 0.5 meter intervals from the surface of the lake to 10 meters depth, then at 1 meter intervals to the bottom of the lake.

[2] Rads includes Gross Alpha and Gross Beta.

[3] Nutrients include the phosphorus series and the nitrogen series analytes. Phosphorus series includes total P and dissolved ortho-phosphate-P (also referred to as DRP). Nitrogen series includes total N, ammonia-N and nitrate/nitrite-N.

[4] The full list of metals will be analyzed during the first week of Jan, Mar, June, Sept and Dec and the third week in October (after turnover).

[5] Total Hardness is reported as $CaCO_3$

SL – BIMONTHLY GRAB SAMPLES

Program Coordination (Westminster)

SL Sample bottle kit

The sample containers required for each monitoring event varies depending on the parameters to be analyzed. Westminster will assemble sample bottle kits for each event. The following table details the sample containers for various parameters.

Parameter	Volume	Bottle Type	Laboratory
Phosphorus series[1]	500 mL	Rectangular plastic	Northglenn
Nitrogen series[2], UV-254	125 mL	Rectangular brown plastic	Westminster
Rads[3]	1 L	Plastic	Westminster
Zooplankton	250 mL	Plastic	Westminster
Algae	1 L	Plastic	Westminster
Chlorophyll *a*	1 L	Brown plastic	Westminster
Total metals, Total Hg, Dissolved Silica	500 mL	Plastic	Westminster
Dissolved metals	500 mL	Plastic	Westminster
Chloride/Bromide/Sulfate	500 mL	Plastic	Thornton
TOC	40 mL	Glass vial	Thornton
TSS, Total Hardness	16 oz	Plastic	Thornton
E. coli	125 mL	Plastic	Westminster

[1]Phosphorus series includes total P and dissolved ortho-phosphate-P (also referred to as DRP).
[2] Nitrogen series includes total N, ammonia-N and nitrate/nitrite-N.
[3] Rads includes Gross Alpha and Gross Beta

SL – BIMONTHLY GRAB SAMPLES

Sample Collection

Equipment

- Pontoon Boat
- Marking Pen – Waterproof
- Depth Finder
- Secchi Disk
- Log book and pen
- Van Dorn bottle
- Labeled sample bottles (refer to individual monitoring plans)
- Churn sample splitter
- PZ tube sampler
- Ice packs
- Coolers
- Chain of custody forms
- YSI EXO2 Sonde – calibrated for hand profile/swap out
- Handheld anemometer/%Relative humidity meter
- Cellular phone
- GPS unit
- Digital camera
- Boat Tool Kit
- Laptop computer – fully charged with communication cable and Loggernet application installed

- Water pitcher and wide bristle brush for cleaning sonde cage
- Jackets, hats, gloves or other protective clothing as appropriate for the weather conditions
- First aid kit
- Personal flotation devices (one per person)
- Survival Suits – yellow (1 hr protection) and orange (1/2 hr protection) -as appropriate
- Profiler enclosure key
- Boat Anchor(s)
- Key for boat ramp during off-season
- Zooplankton tow net – 63 µm

Sample collection procedure

At Laboratory

- Prepare and label all required sampling containers.
- Complete basic information on the chain of custody (COC) forms.
- Update the YSI EXO2 file names using the format XXMMDDYY, where XX denotes the field sampling program identification (e.g. SL, CC, RC, etc.), MM denotes the month, DD denotes the day and YY denotes the year.
- Notify laboratories about the sampling event and schedule sample pickup.
- Assemble the sampling equipment and load into the truck.
- Calibrate a YSI EXO2 sonde for the hand profile. While the Profiler is deployed, swap out the profiler YSI EXO2 sonde with the newly calibrated sonde.

Sampling on Standley Lake

Van Dorn Bottle

- The Van Dorn bottle provides a means of collecting water samples at selected depths below the surface. It is made of an open-ended plastic cylinder that is attached to a rope, and lowered to any desired depth.
- Each end of the cylinder is fitted with a rubber cover. The Van Dorn bottle is attached to the length of rope, marked in 0.1 m increments, with the covers pulled out and attached to the trigger device.
- The depth of the lake is determined using the sonde. The bottle is lowered to a depth one meter above the bottom of the lake.
- A metal weight called a "messenger" is attached to the rope above the bottle. The water sample is taken by dropping a weighted “messenger" down the rope. When the weight hits the triggering device on the upper Van Dorn bottle, the catch releases the rubber end covers. The two covers are pulled together and seal off the ends.
- When the bottle has been closed, it is pulled to the surface.
- Water samples from the Van Dorn bottle are transferred to the appropriate sample containers.
- The Van Dorn sampler has a four liter capacity. If the volume of sample required is greater than the Van Dorn sampler can hold, multiple sample volumes can be collected and combined in the churn. The churn and churn spigot should be rinsed out with new sample water prior to sample collection in order to prevent cross-contamination from prior samples. Once the churn contains enough sample, it is thoroughly mixed and the sample is dispensed into the required sample containers.
- Sample containers are labeled with sample location, date and time of sample collection and the sampler’s initials. The label should indicate any preservative in the sample container.
- Full sample containers are placed in coolers with ice packs until they are returned to the laboratory.

PZ Tube Sampler

- The PZ (photic zone) sampler is used to sample a column of water from the surface of the lake to the depth of the photic zone. Photic zone is defined as twice the secchi depth. The PZ sampler is comprised of a churn sample splitter connected to a polypropylene tube equipped with a quick release connector on one end and a check valve on the other end.

- Measure the secchi depth through the floor port on the pontoon boat. Do not wear sunglasses. Record data in the logbook.
- Connect the end of the tube to the hose barb on the churn.
- The tube is marked in 0.5 meter lengths. Lower the end of the tube with the check valve into the water until it is at the depth of the photic zone.
- Pull the tube up out of the water and hold the end with the check valve upside-down at a height over your head, until the tube drains down to floor level, then quickly drop the check-valve end of the tube back into the water vertically to the depth of the photic zone. The water entering the end of the tube will push the air bubble and prior sample into the churn as the tube is lowered into the water. Use the first collected volume of sample to rinse the tube and churn. Waste the sample back to the lake. Start collecting the second volume of sample. Repeat this step until sufficient quantity of sample has been collected in the churn. The capacity of the churn is 12 liters.
- Once the churn contains enough sample, it is thoroughly mixed and the sample is dispensed into the required sample containers.
- Sample containers are labeled with sample location, date and time of sample location and the sampler's initials. The label should indicate any preservative in the sample container.
- Sample containers are placed in a cooler with ice packs until they are returned to the laboratory.

<u>Surface Sampling</u>

- Surface sampling is accomplished through the floor port of the pontoon boat. Sample containers are dipped into the water until full to collect samples.
- Sample containers are labeled with sample location, date and time of sample collection and the sampler's initials. The label should indicate any preservative in the sample container.
- Sample containers are placed in a cooler with ice packs until they are returned to the laboratory.

<u>Zooplankton Tows</u>

- Zooplankton samples are collected at SL-10 using a 63 µm tow net.
- A vertical tow sampling methodology involves lowering the tow net to the bottom of the lake and retrieving it at a slow speed of approximately one foot per second up to the surface.
- The zooplankton collected in the net are washed into a 250 mL sample bottle using multiple DI water rinses to ensure all organisms in the net are transferred to the sample container. The final volume in the bottle is not required to be consistent.
- The sample depth is recorded on the sample bottle along with date and location.

SL – AQUATIC INVASIVE SPECIES MANAGEMENT

Eurasian Watermilfoil

Eurasian Watermilfoil ("EWM"), *Myriophyllum spicatum L*, is a non-native, aquatic, noxious weed that grows rapidly and to a depth of 35 feet. EWM grows in dense mats that severely interfere with recreation and has been known to provide a substrate for blue-green algae growth. Blue-green algae blooms can ultimately cause taste and odor events in drinking water supplies. EWM was first observed in Standley Lake in 1998. It was positively identified in 2000. In 2012, it was confirmed that the Eurasian watermilfoil hybridized with a native Colorado species Northern watermilfoil (*Myriophillum sibiricum*). The hybrid species is more robust and grows even quicker than the Eurasian watermilfoil.

Annual surveys of weevil populations in the lake were performed by contractors until 2013, but beginning in 2014 will be performed by the city of Westminster.

Eurasian milfoil weevils have been stocked in the lake (on the west side) on four occasions from 2004 through 2011. The weevil larva bore into the stem of the milfoil which damages the plant. When an adequate weevil population is sustained, the weevils may be able to control the spread of the milfoil.

As lake conditions permit, bathymetric studies are performed on Standley Lake during the early summer for mapping the submerged aquatic vegetation in order to assess milfoil growth and the effectiveness of the remedies.

Zebra and Quagga Mussels

Zebra and quagga mussels are non-native, aquatic invasive species that are introduced to new water bodies by the unintentional transfer of organisms from an infested water body via boats or fishing bait. Aquatic mussels cause serious damage to the ecosystem and result in costly control procedures for drinking water treatment facilities. Both zebra and quagga mussels were discovered in 2008 in a few of Colorado's lakes. Prevention of aquatic mussel infestation is key to protecting Standley Lake. An intensive boat inspection and decontamination program was initiated in 2008 to protect the lake from new invasive species. No live aquatic baits are allowed at Standley Lake.

Standley Lake is monitored for aquatic mussels every two weeks using the zooplankton tow procedure described previously. The tows are performed at the lake inlets, SL-10, and the boat ramp/outlet area. Several invasive species have a planktonic life stage and sampling with the plankton nets will provide early warning of infestation. In addition, substrate samplers, constructed and monitored by Colorado Parks and Wildlife are placed throughout the lake. Substrate samplers are made up of a float, rope, plastic plates and an anchor weight. A plate is located at every 10 feet of depth from the surface to the bottom of the lake at various locations. The plates and ropes are checked periodically for aquatic mussel growth. A plate or rope that feels like sand paper will be scraped and examined under the microscope for veligers (zebra or quagga mussel larvae).

Shoreline surveys are performed when the water level is at the lowest for the year. A shoreline survey consists of walking the shoreline in teams looking for adult mussels attached to any hard substrate.

SL – WEATHER STATION

A weather station is located at the northeastern end of the Standley Lake dam. The equipment is located inside the fenced area of the Shaft House. The weather station collects readings every ten minutes and can be accessed remotely through a cellular modem and datalogger.

Weather conditions collected at this location include: Rain rate/accumulation, Air Temperature, Relative Humidity, Barometric Pressure, Wind Speed and Wind Direction.

DATA MANAGEMENT AND REPORTING

The city of Westminster is responsible for management of the data collected in support of the IGA monitoring efforts. A Microsoft Excel spreadsheet is used for archival of monitoring data collected for all programs detailed in this document except the lake profile data. The IGA partners have access to the system via Dropbox. Backups are available as "previous versions" stored historically on the Dropbox system.

The city of Westminster logs in all samples collected by the various sampling teams. The coordinated sample creation effort reduces interpretation errors and subsequent reporting inconsistencies. Each IGA partner is responsible for data entry of the analytical results for their assigned analyses into the spreadsheet. On a semi-annual basis, a peer review team comprised of at least one representative from each of the SLC, evaluates the data and identifies possible errors or data anomalies. Each city makes corrections to the spreadsheet and submits a final version of the data.

Data results from this program, along with other reporting requirements as stated in the Joint Agreement, will be reported to the Colorado Water Quality Control Commission on an annual basis. Only data collected during the normal sampling schedule is included in the annual report. The data is reported in tabular and graphic formats.

Each laboratory must retain all records (i.e. field notebooks and logs, instrument logs, bench sheets, instrument printouts, electronic data files, chain of custody forms, etc.) pertaining to the monitoring programs until the SLC IGA representatives jointly, in writing, authorize disposal of the records.

The periods of record for monitoring data formats are summarized in the following table:

Program	Period of Record	Available Format
Clear Creek Grabs	1994 – 2001	MS Access/Excel
	2002 – current	MS Excel
Clear Creek Grabs - EPA Metals Data	1994 – current	MS Excel
Clear Creek Autosamplers Ambient	2006 – current	MS Excel
Clear Creek Autosamplers Event	2006 – current	MS Excel
Standley Lake Tributaries – grabs and autosamplers (includes data for the program formerly called Clear Creek Canals)	1988 – 2001	MS Access/Excel
	2002 - current	MS Excel
Standley Lake	1988 – 2001	MS Access/Excel
	2002 - current	MS Excel

Table Notes: The data archive includes phosphorus data from 1999-current, all Thornton data from 2001-current and all Westminster data from 2002-current.

SUPPLEMENTAL INFORMATION - 3

GRAPHICAL DISPLAY OF SELECT CLEAR CREEK / STANDLEY LAKE DATA - 2023

TABLE OF CONTENTS

I. INTRODUCTION

This document serves as a supplement to the 2023 Clear Creek / Standley Lake Watershed Annual Report. It provides graphical summaries of 2023 water-quality data from the Upper Basin, Canal Zone, and Standley Lake, and compares data from 2023 to data from the previous five years (2018-2022). Constituents included in these figures are discharge (flow), total suspended solids (TSS), total phosphorus (TP), and total nitrogen (TN). Constituent concentrations that are below the detection limit are analyzed and reported at ½ the detection limit.

II. UPPER BASIN FLOWS AND WATER QUALITY

This section presents water-quality data from the Upper Basin in 2023. The analysis is based on data from two sampling locations CC26 (the upper station - Clear Creek at Lawson Gage) and CCAS59/60 (the lower station - Clear Creek upstream of the Church Ditch headgate). The data from each location include both grab samples and composite samples. Grab samples represent the conditions at a single point of time. Composite samples, comprised of multiple samples collected over 24 hours, represent conditions occurring over the entire collection period. The data presentation and discussion in this section focus on ambient (non-event) samples. Loads were calculated using daily flows from USGS gage measurements and concentration data from CC26 and CCAS59/60. Consistent with previous analyses, a mid-point step function was used to fill in daily concentrations between available sample data. Annual loads were then calculated as the sum of individual daily loads. Volume-weighted concentrations were calculated by summing the annual load and dividing by the annual flow volume.

DISCHARGE

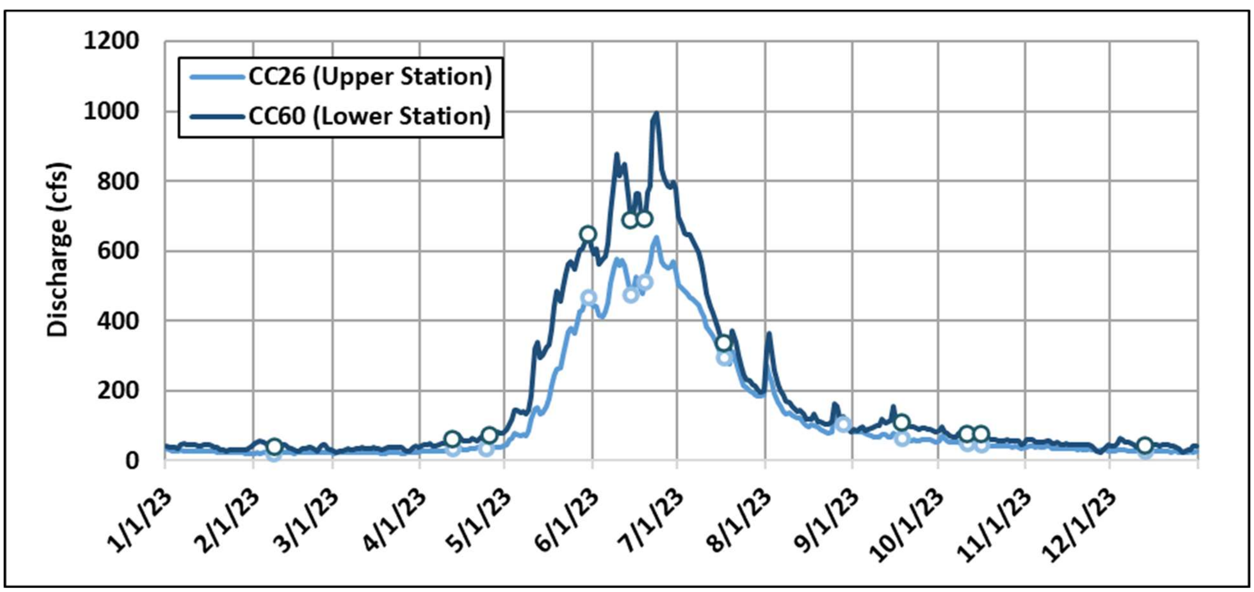

Figure 1. 2023 Clear Creek Hydrographs for the Upper Station (CC26) and the Lower Station (CC60), with Sampling Dates Indicated by Symbols

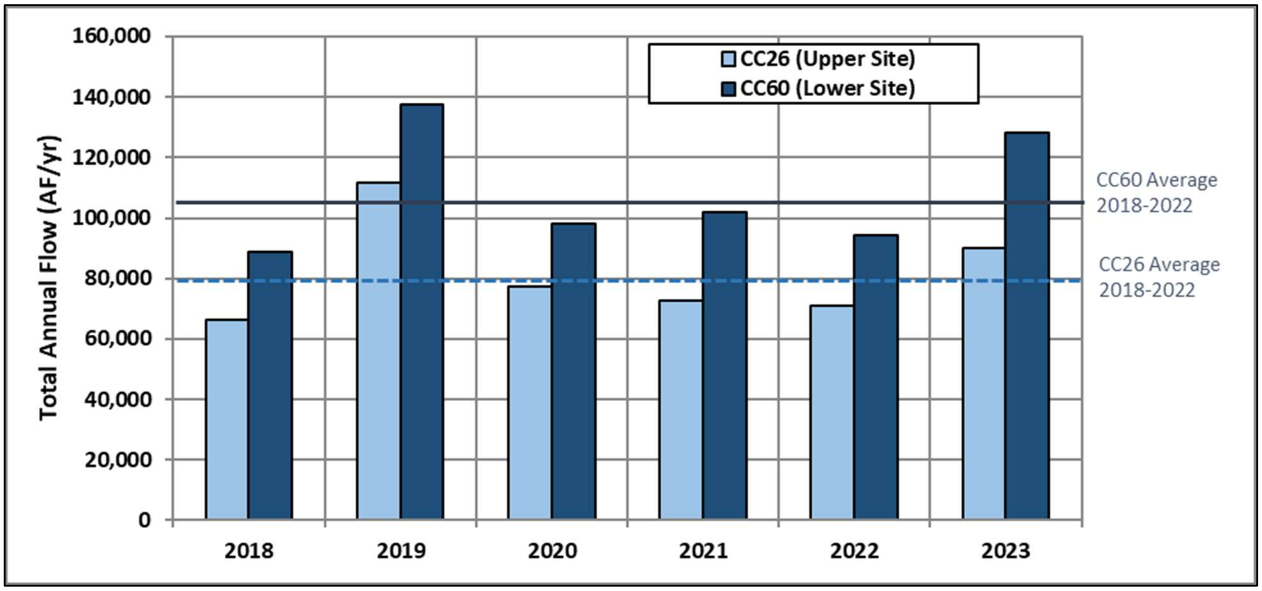

Figure 2. Total Annual Flow in Clear Creek at CC26 and CC60, 2018-2023

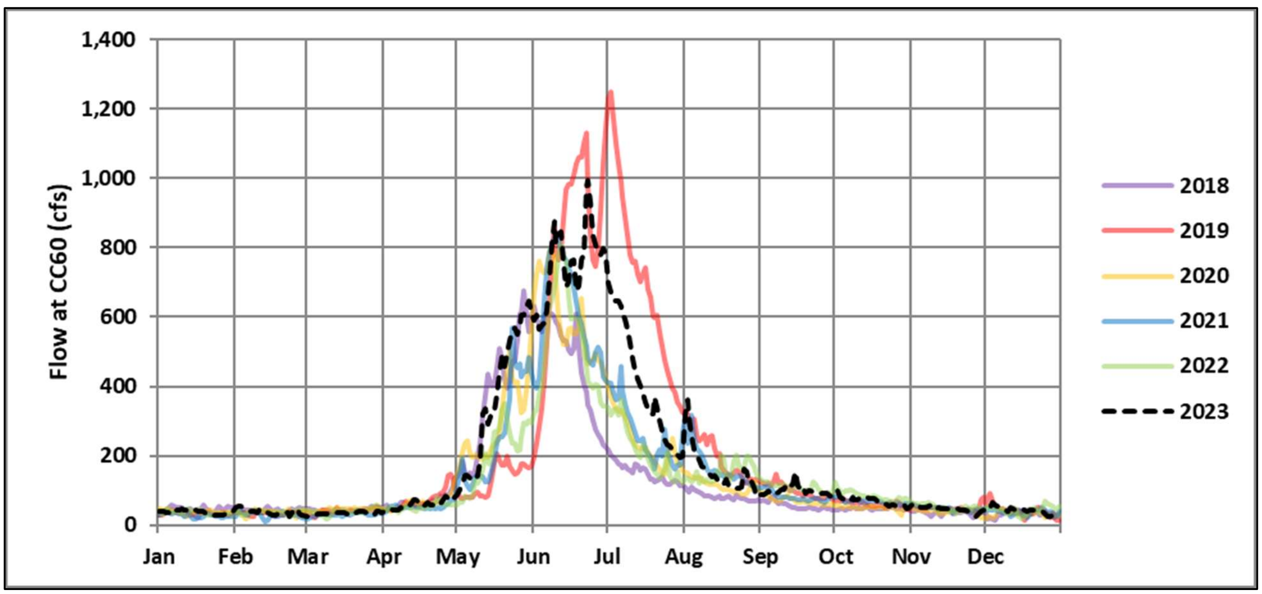

Figure 3. Annual Clear Creek Hydrographs for 2018-2023 (CC60)

WATER QUALITY AND NUTRIENT LOADING

Total Suspended Solids

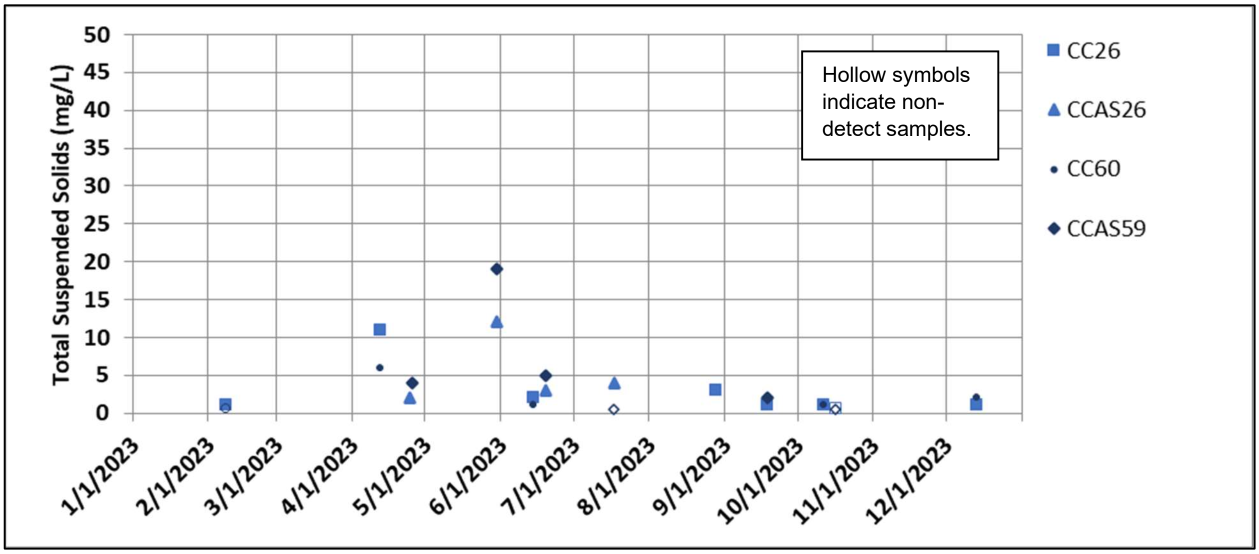

Figure 4. Total Suspended Solids Concentrations (Non-Event) in the Upper Basin, 2023

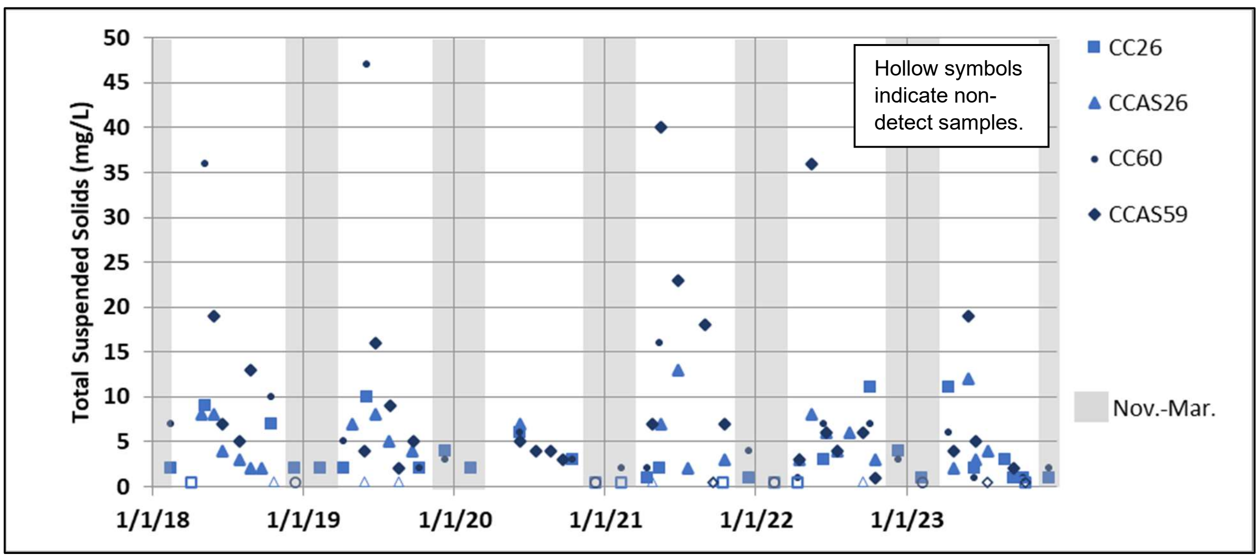

Figure 5. Total Suspended Solid Concentrations (Non-Event) in the Upper Basin, 2018-2023

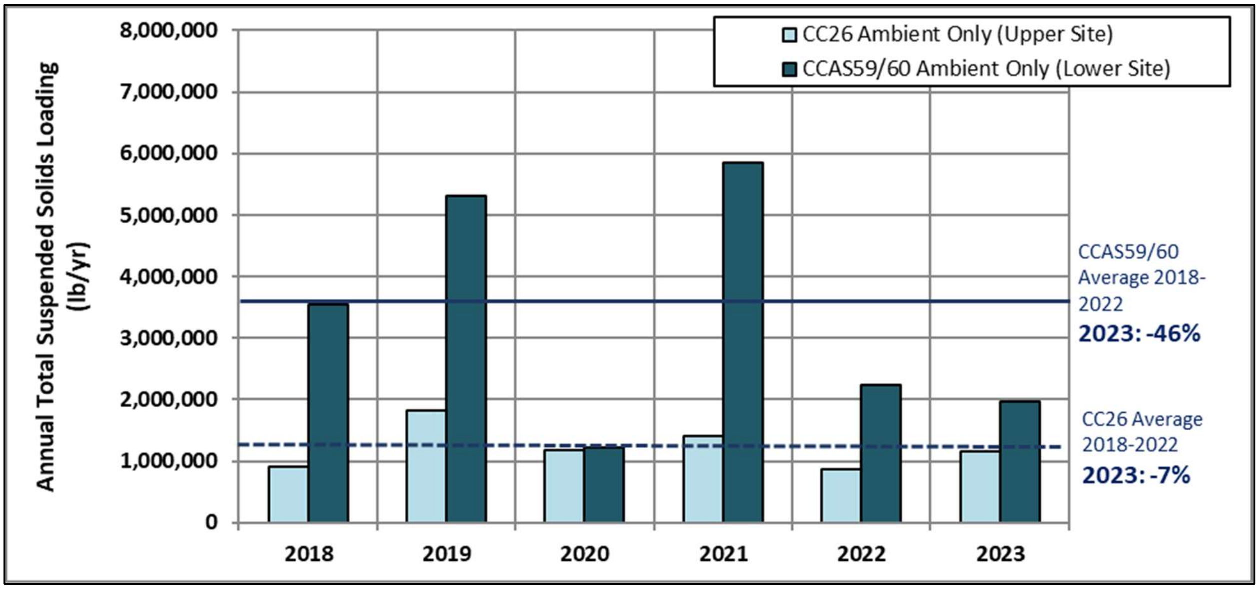

Figure 6. Total Suspended Solids Load Estimates in the Upper Basin, 2018-2023

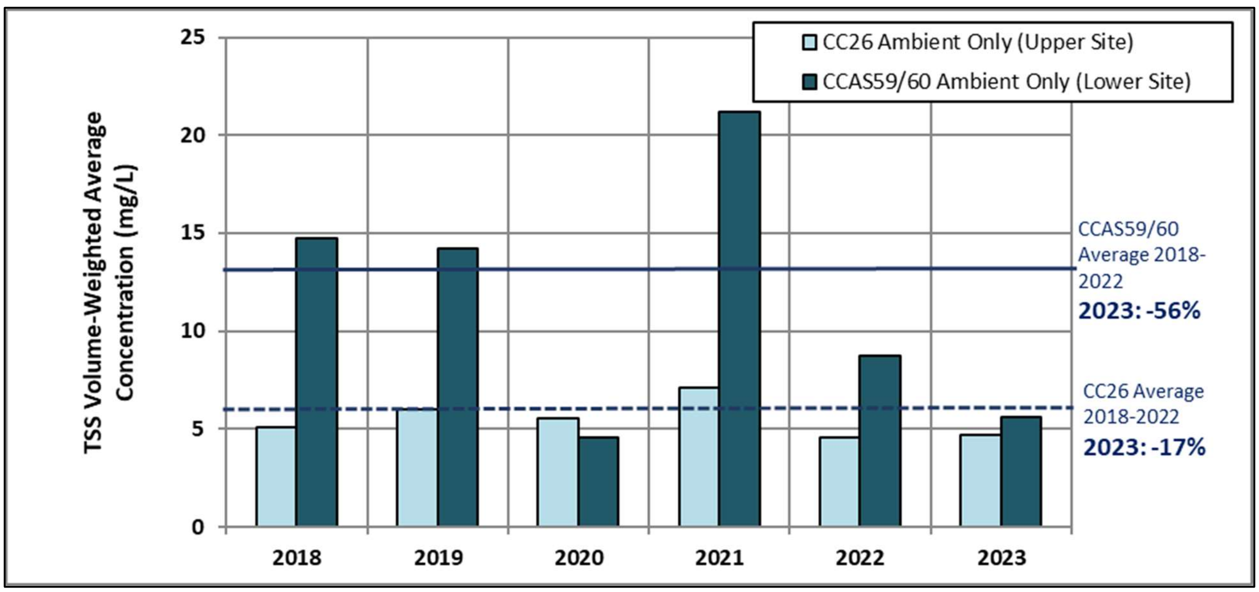

Figure 7. Total Suspended Solids Volume-Weighted Concentration Estimates in the Upper Basin, 2018-2023

Total Phosphorus

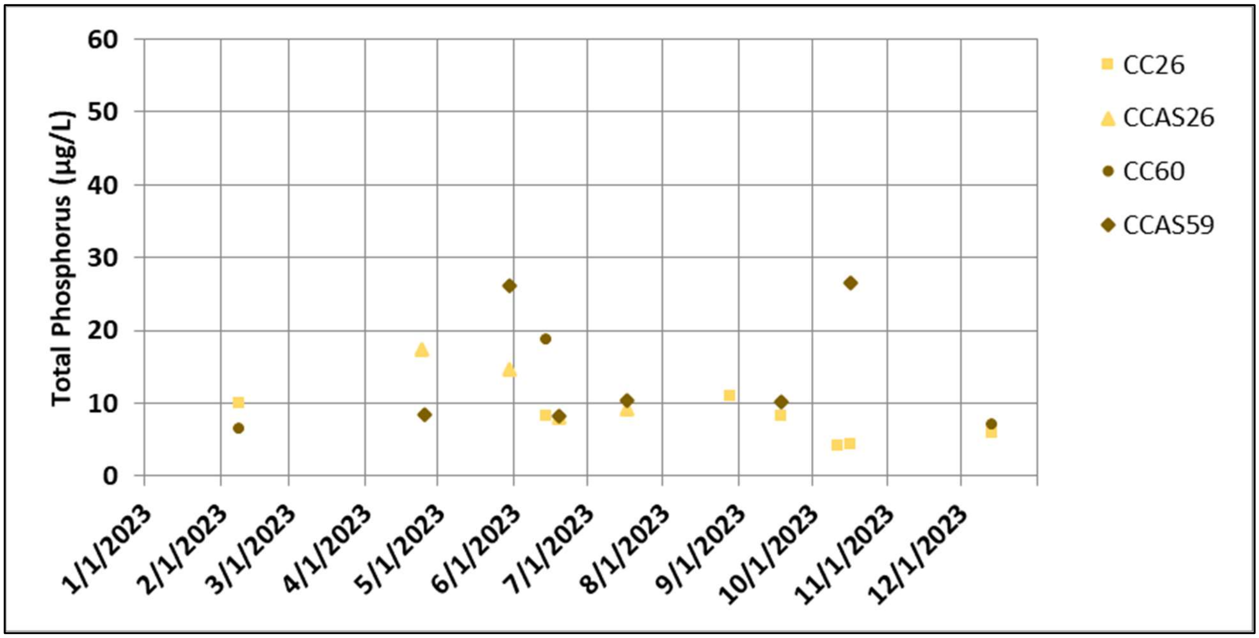

Figure 8. Total Phosphorus Concentrations (Non-Event) in the Upper Basin, 2023

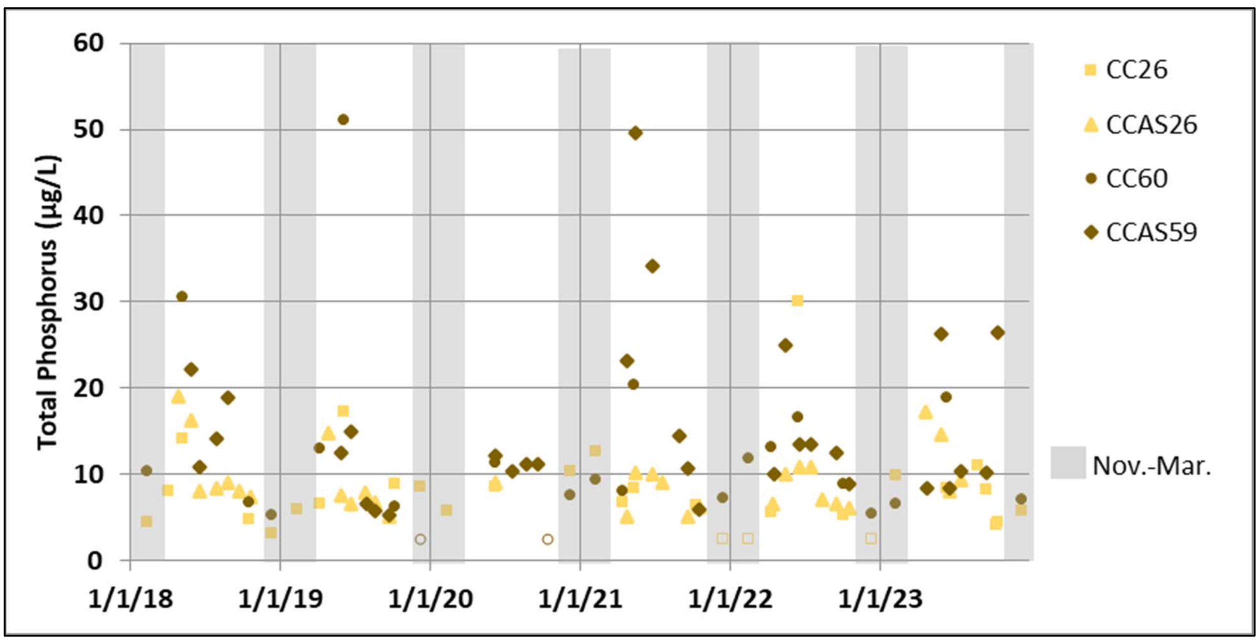

Figure 9. Total Phosphorus Concentrations (Non-Event) in the Upper Basin, 2018-2023

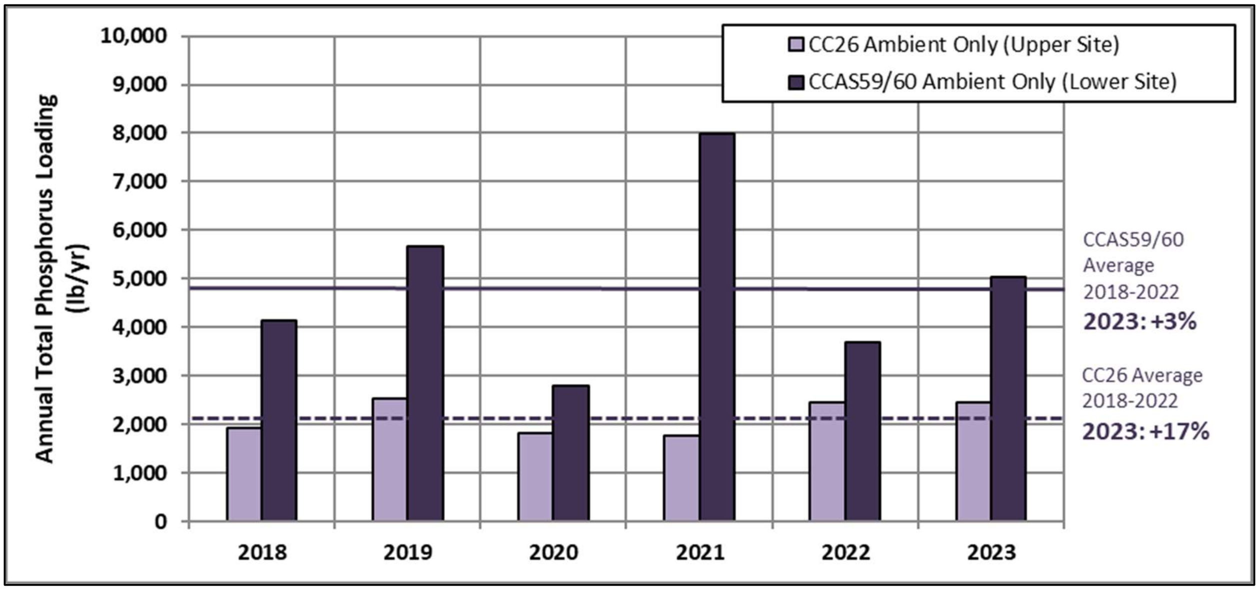

Figure 10. Annual Total Phosphorus Loading Estimates in the Upper Basin, 2018-2023

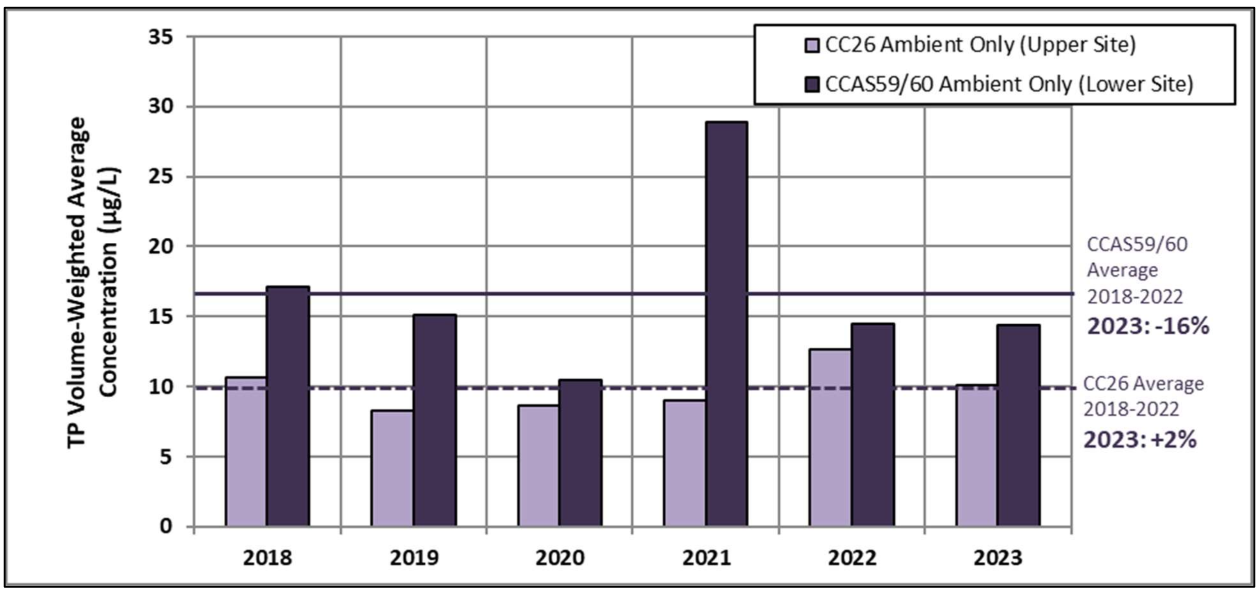

Figure 11. Volume-Weighted Total Phosphorus Concentration Estimates in the Upper Basin, 2018-2023

Total Nitrogen

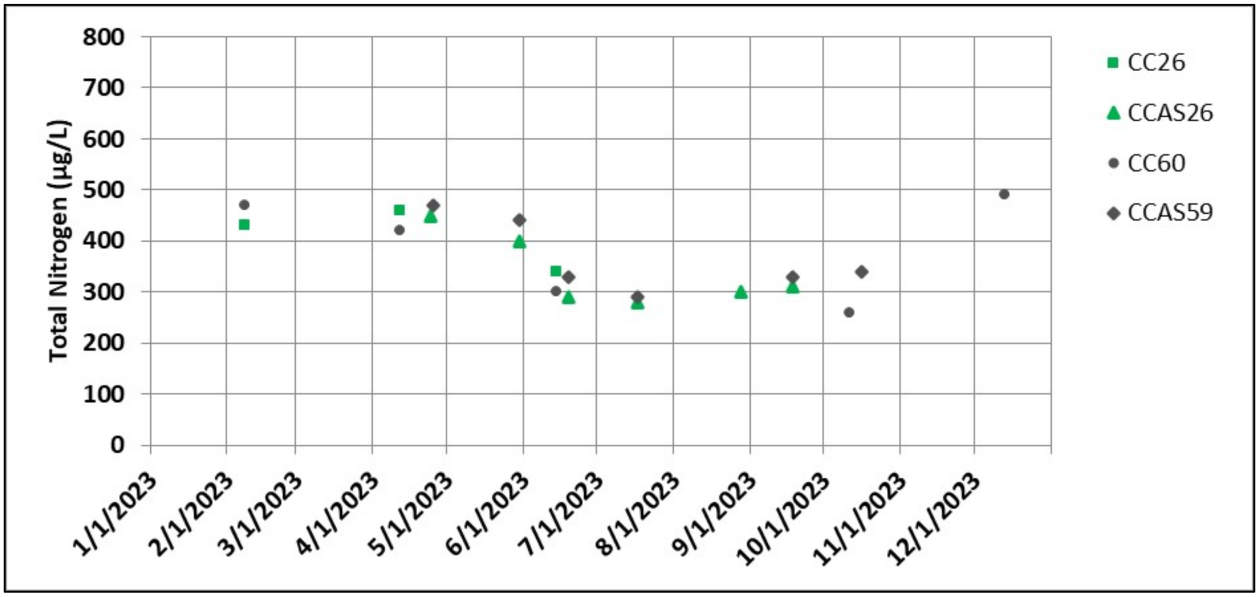

Figure 12. Total Nitrogen Concentrations (Non-Event) in the Upper Basin, 2023

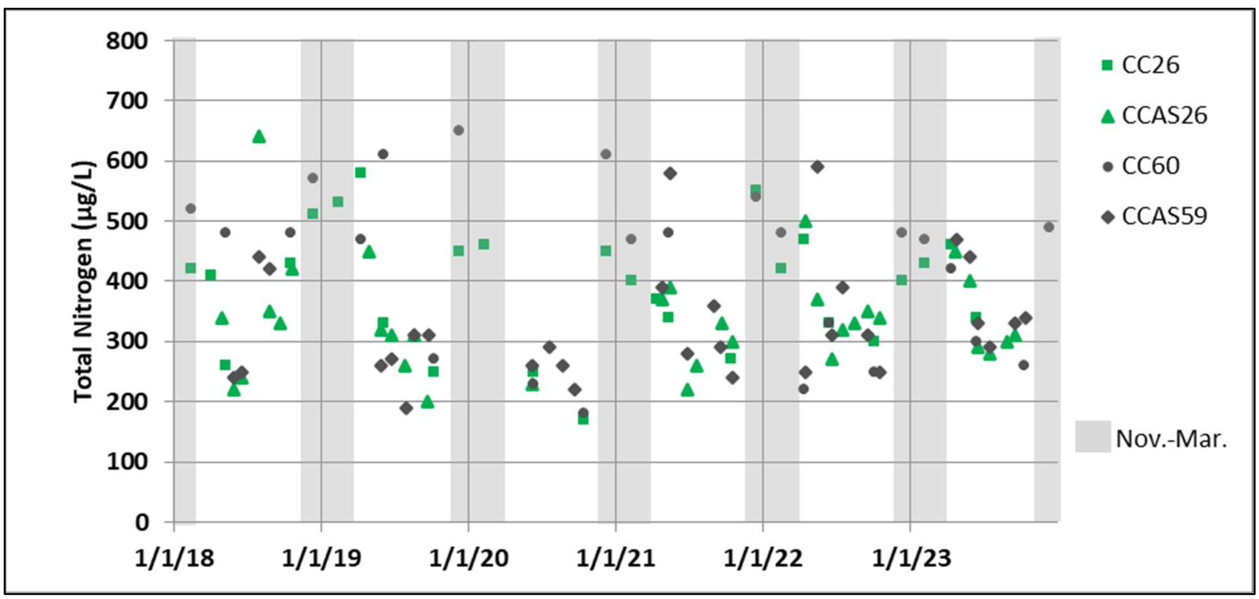

Figure 13. Total Nitrogen Concentrations (Non-Event) in the Upper Basin, 2018-2023

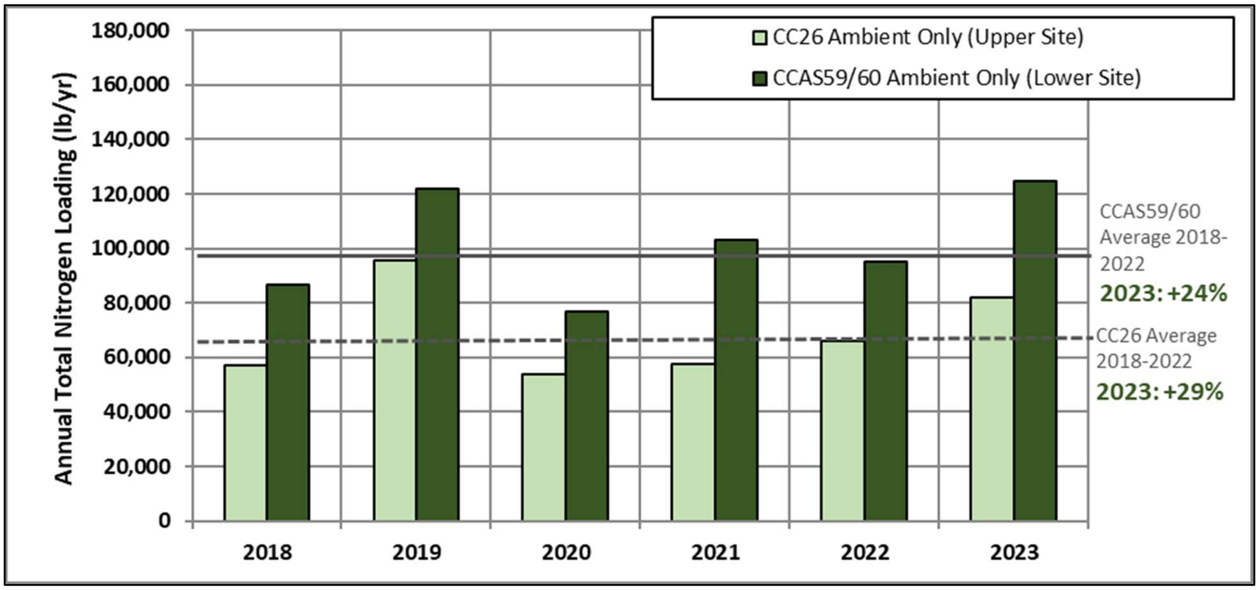

Figure 14. Total Nitrogen Loading Estimates in the Upper Basin, 2018-2023

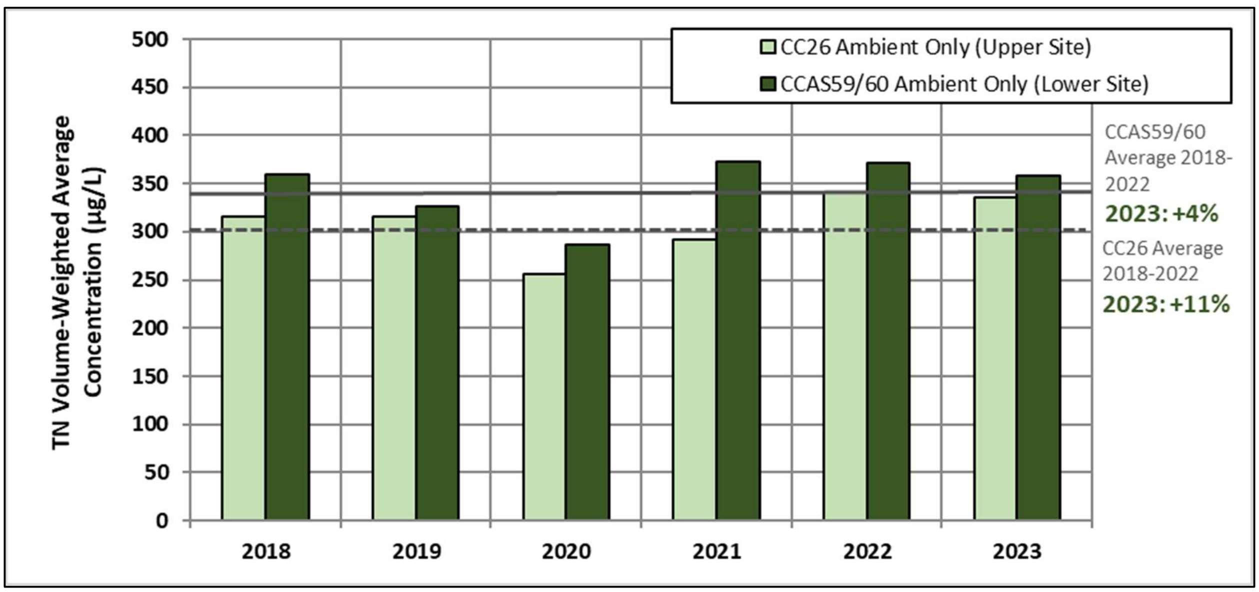

Figure 15. Volume-Weighted Total Nitrogen Concentration Estimates in the Upper Basin, 2018-2023

III.CANAL ZONE FLOWS AND WATER QUALITY

The Upper Basin is the source for the water diverted into four inflow canals (Church Ditch, Croke Canal, Farmers' High Line Canal (FHL), and Kinnear Ditch Pipeline (KDPL)) that lead to Standley Lake. This section presents the timing and volume of flows for the inflow canals. In addition, a description of water-quality changes along the two major inflow (FHL and Croke) canals from their points of diversion on Clear Creek to the reservoir are included.

FLOWS FROM CANALS AND KDPL

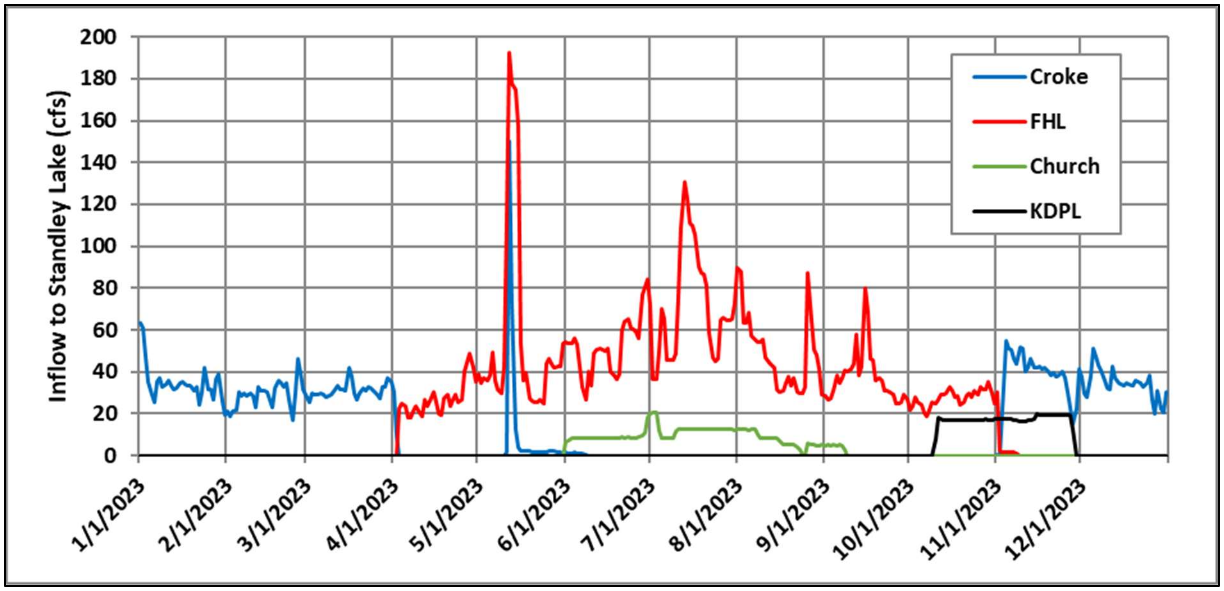

Figure 16. Inflow to Standley Lake, 2023

CHANGES IN WATER QUALITY FOR THE FHL AND CROKE CANALS

The Croke Canal and the FHL Canal are the dominant sources of water to Standley Lake. These canals follow parallel paths for approximately 15 miles between their headgates at Clear Creek and their turnouts to Standley Lake. Over this distance the canals pass through a diverse range of land uses. When a canal is in use, water-quality samples are collected at both the headgate and at the release point to Standley Lake. To better understand the effects of the Canal Zone on water quality, an analysis of concentration differences observed between the canal headgates and turnouts was performed. As with the Upper Basin and Standley Lake water-quality discussions, this analysis focused on TSS, TP, and TN. Median annual concentrations were calculated for TSS, TP, and TN. These medians were calculated for the canal headgate and at the release points into the lake for the Croke and FHL.

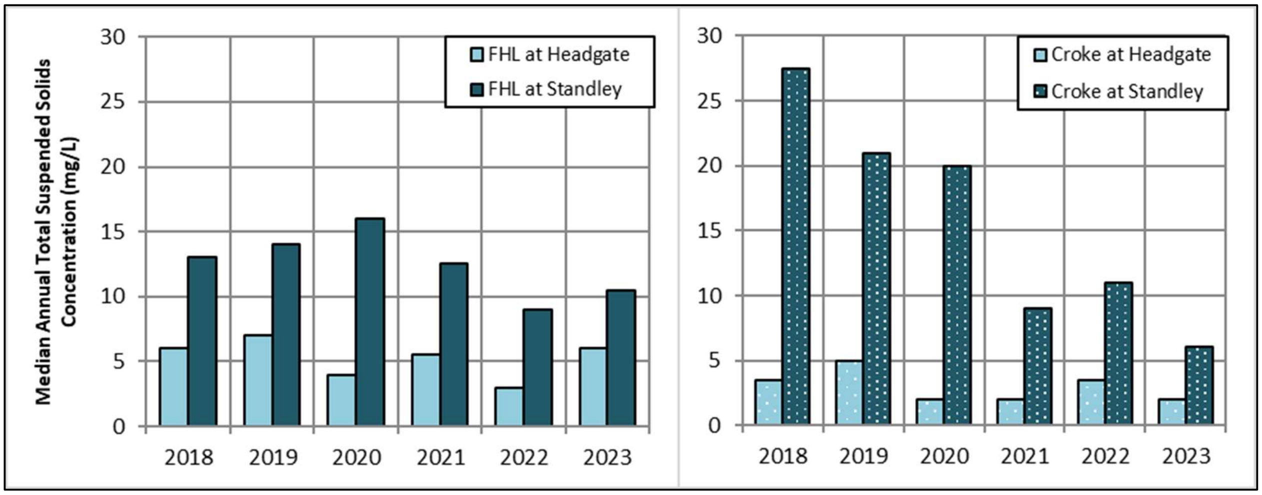

Figure 17. Median Total Suspended Solids Concentrations in FHL (left) and Croke (right) Canals

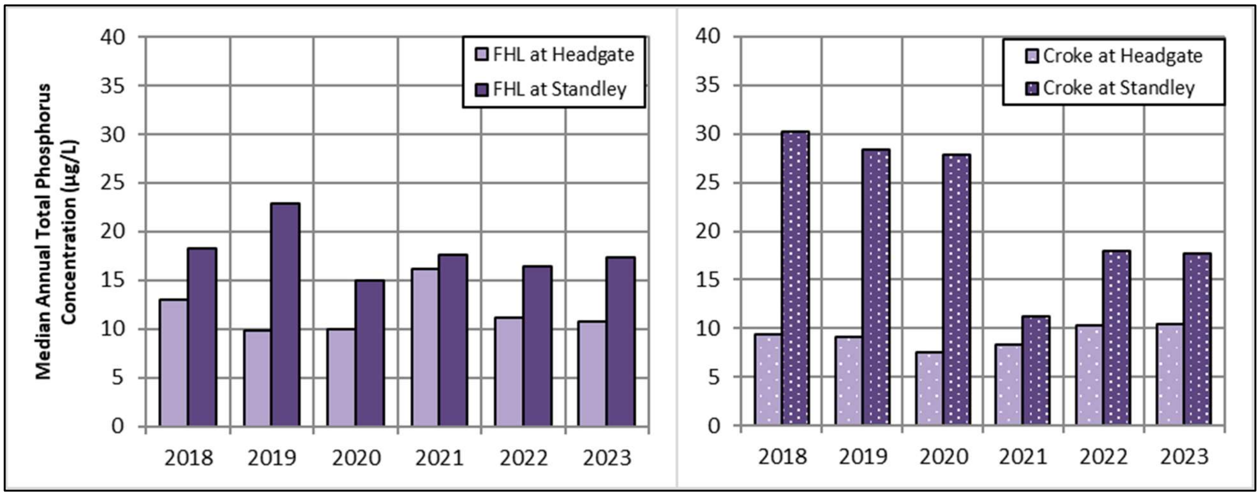

Figure 18. Median Total Phosphorus Concentrations in FHL (left) and Croke (right) Canals

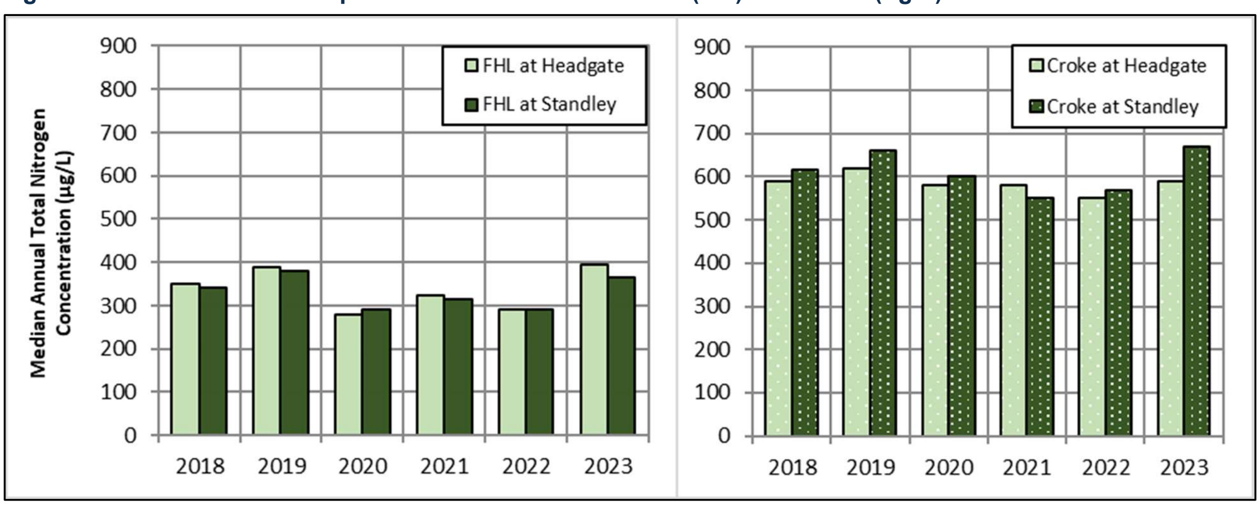

Figure 19. Median Total Nitrogen Concentrations in FHL (left) and Croke (right) Canals

IV. STANDLEY LAKE FLOWS, CONTENTS, AND LOADINGS

This section presents the quantity and quality of the inflows to and outflows from Standley Lake, based on samples collected as part of the Upper Clear Creek/Standley Lake Watershed Water Quality Monitoring Program. In addition, the loadings and flow-weighted concentrations of TSS, TN and TP were calculated as described above (Section II, page 1).

FLOWS AND CONTENTS

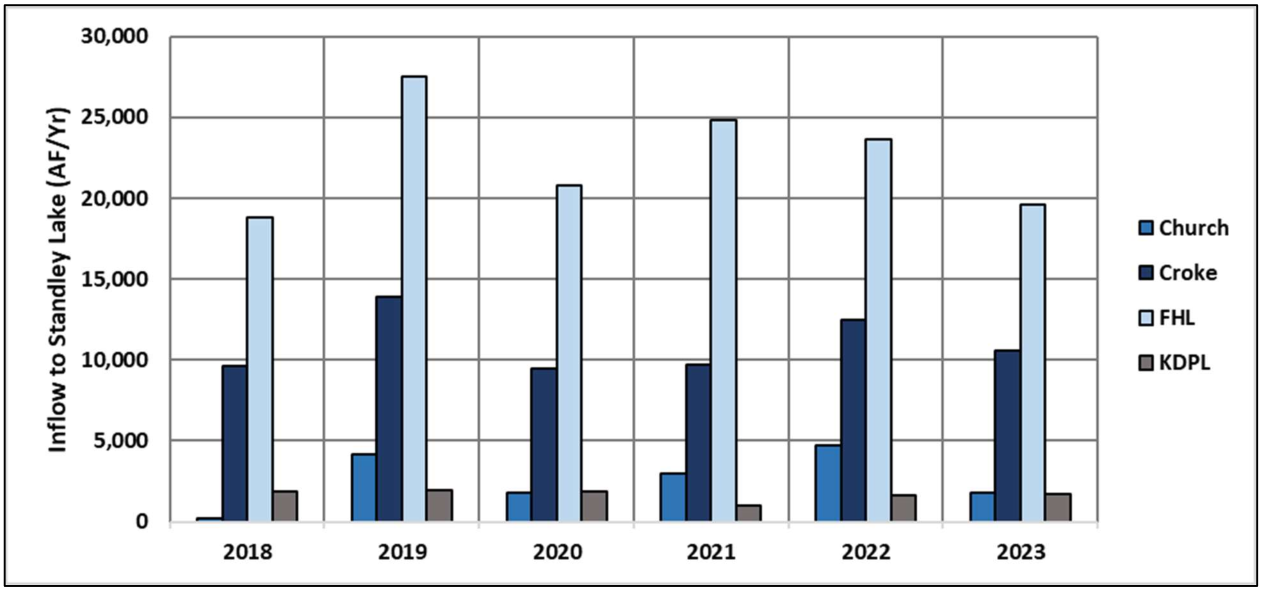

Figure 20. Inflow Volumes to Standley Lake by Source, 2018-2023

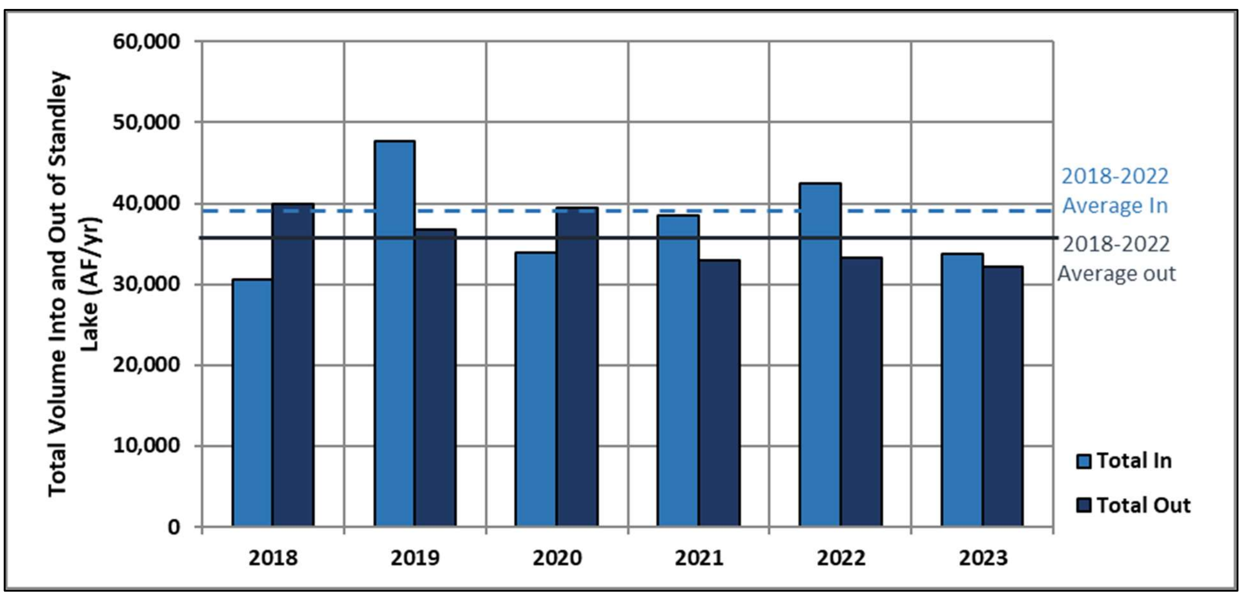

Figure 21. Total Measured Annual Standley Lake Inflow and Outflow, 2018-2023

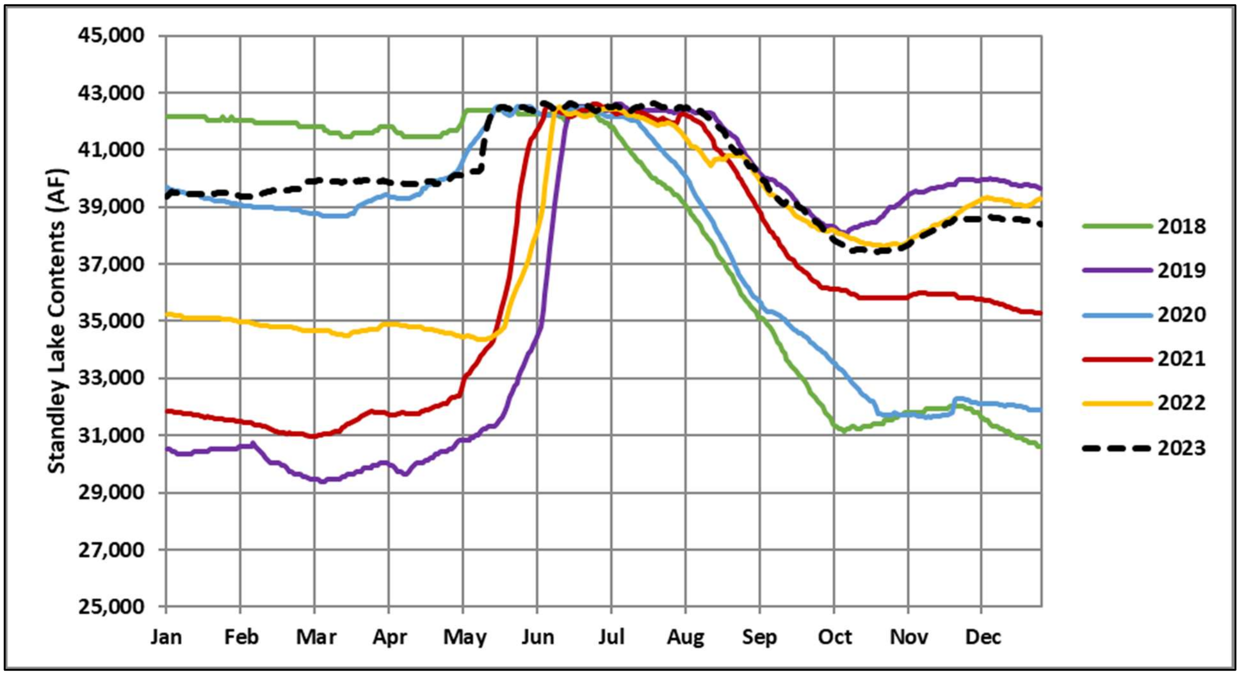

Figure 22. Standley Lake Contents, 2018-2023

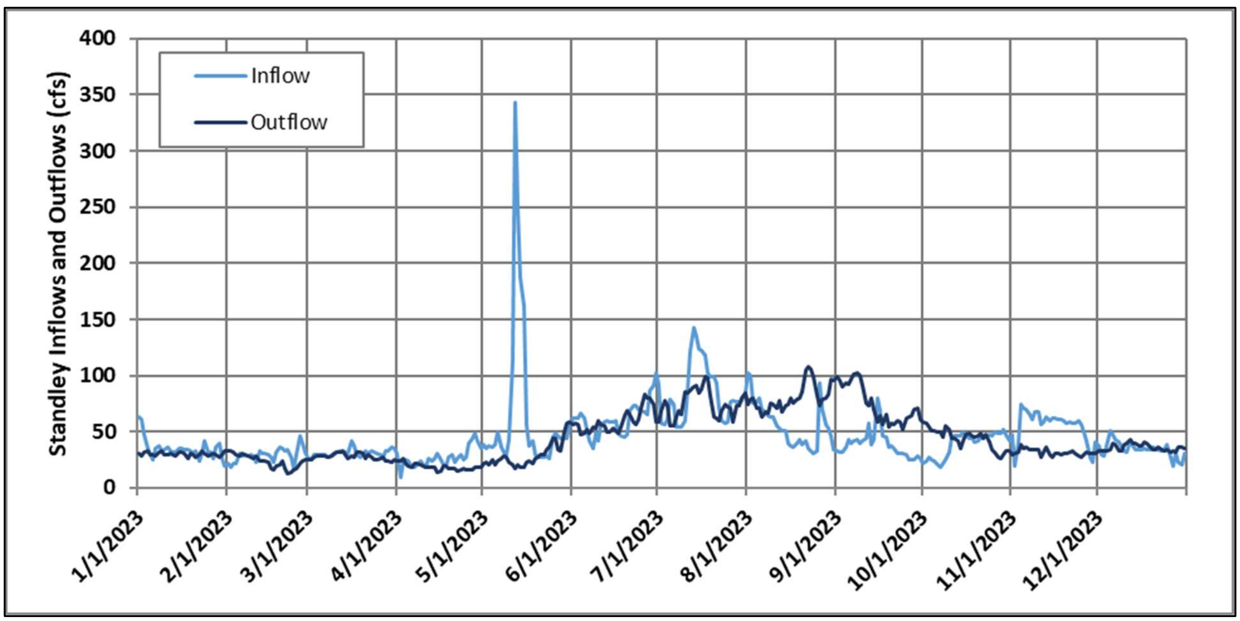

Figure 23. Inflows to and Outflows from Standley Lake, 2023

LOADING INTO AND OUT OF STANDLEY LAKE AND INFLOW WATER QUALITY

Total Suspended Solids

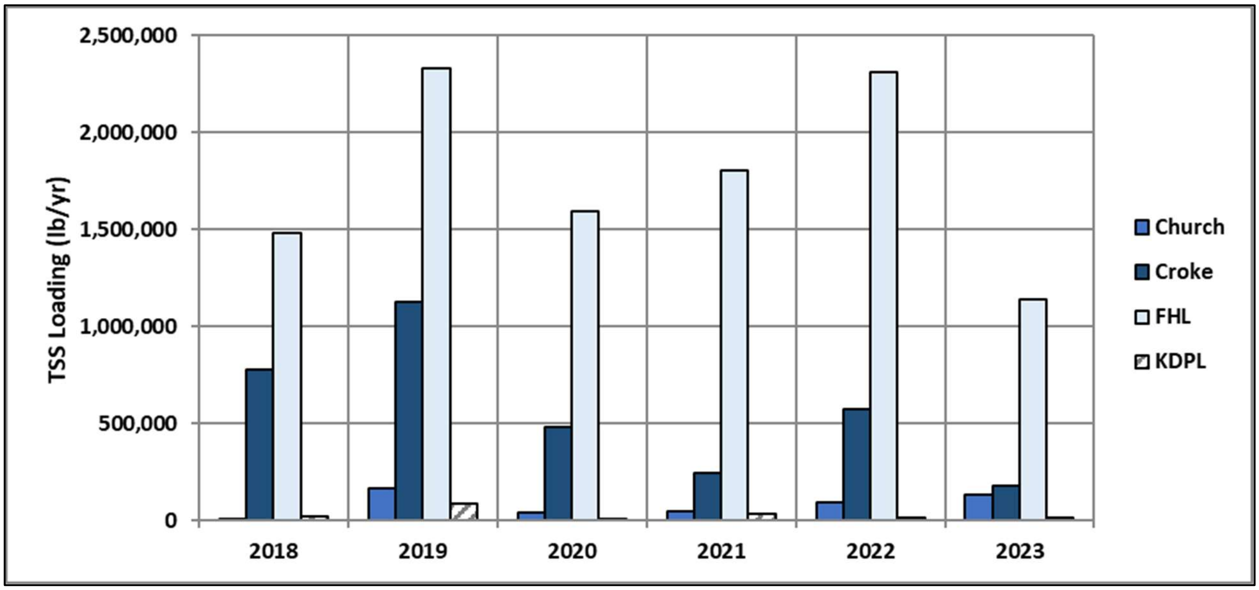

Figure 24. Total Suspended Solids Loading Into Standley Lake by Source, 2018-2023

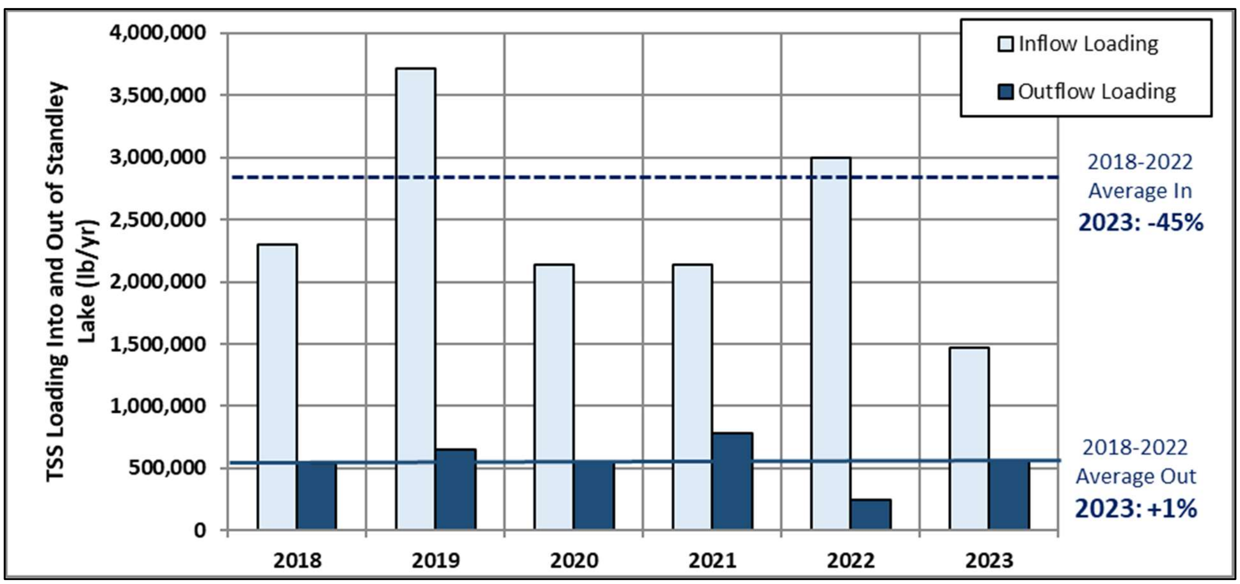

Figure 25. Total Suspended Solids Loading Into and Out of Standley Lake, 2018-2023

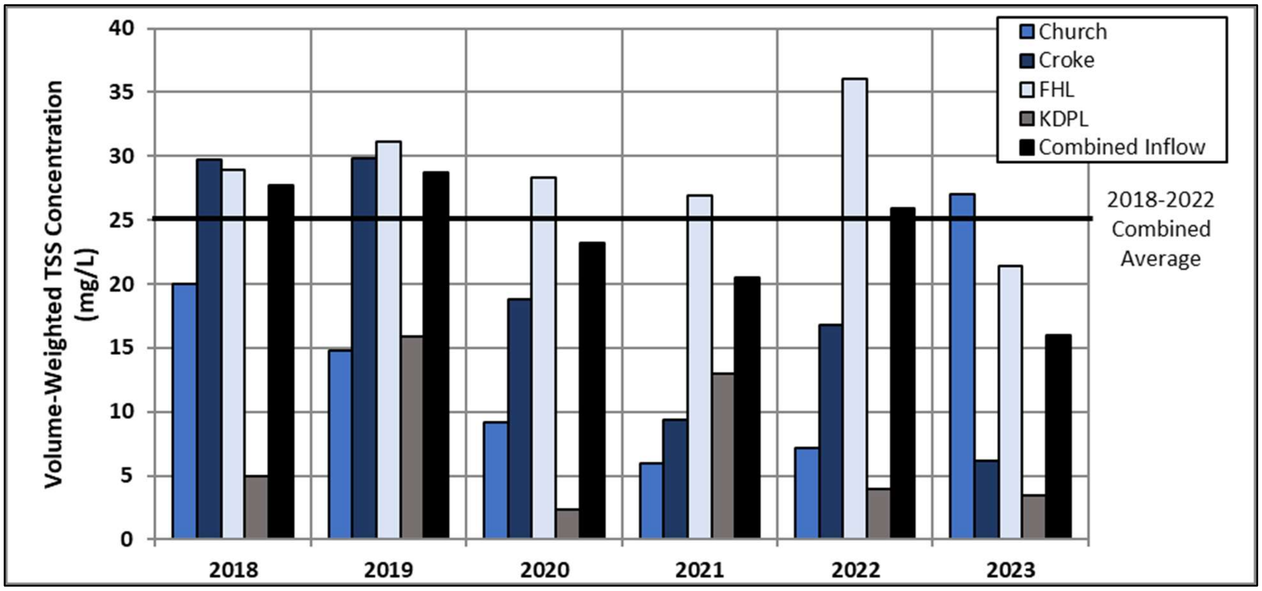

Figure 26. Volume-Weighted Total Suspended Solids Concentrations Into Standley Lake by Source, 2018-2023

Total Phosphorus

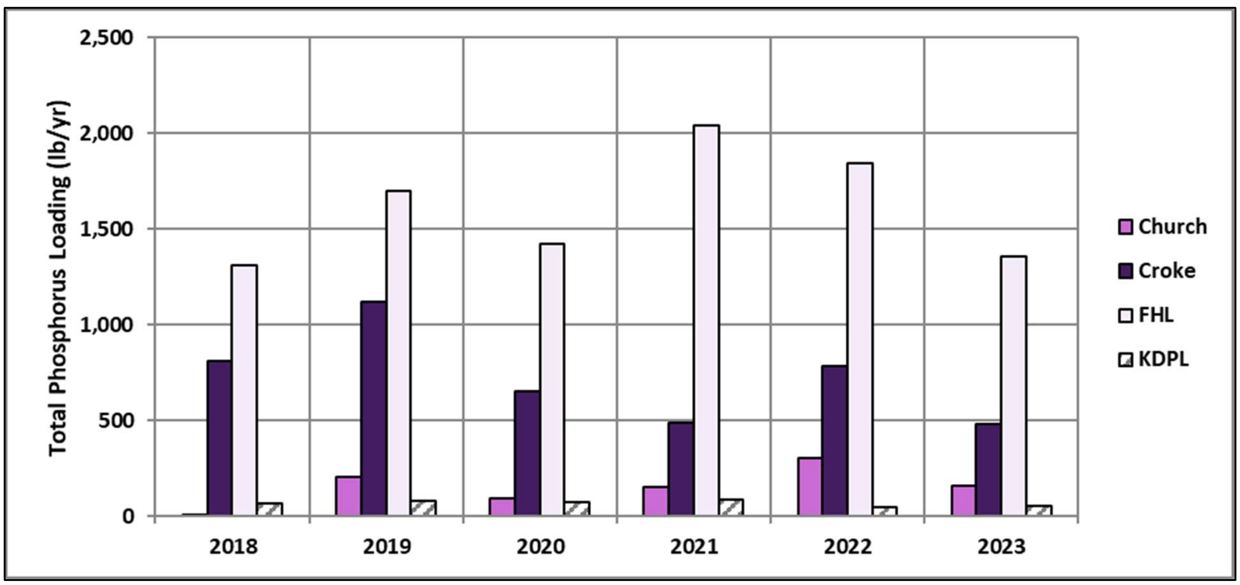

Figure 27. Total Phosphorus Loading Into Standley Lake by Source, 2018-2023

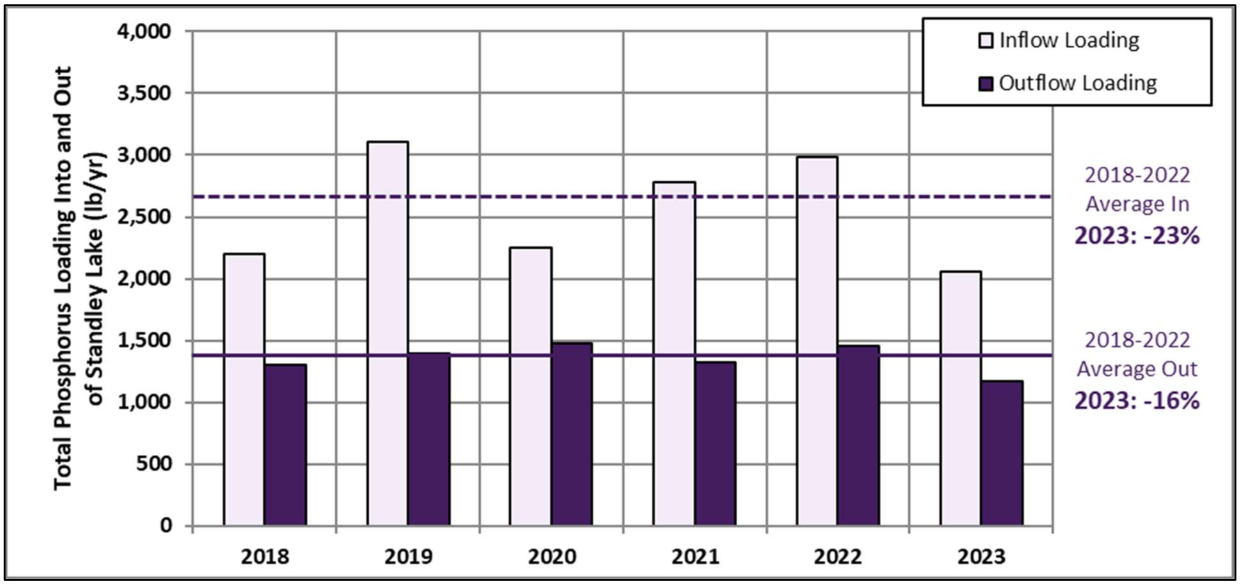

Figure 28. Total Phosphorus Loading Into and Out of Standley Lake, 2018-2023

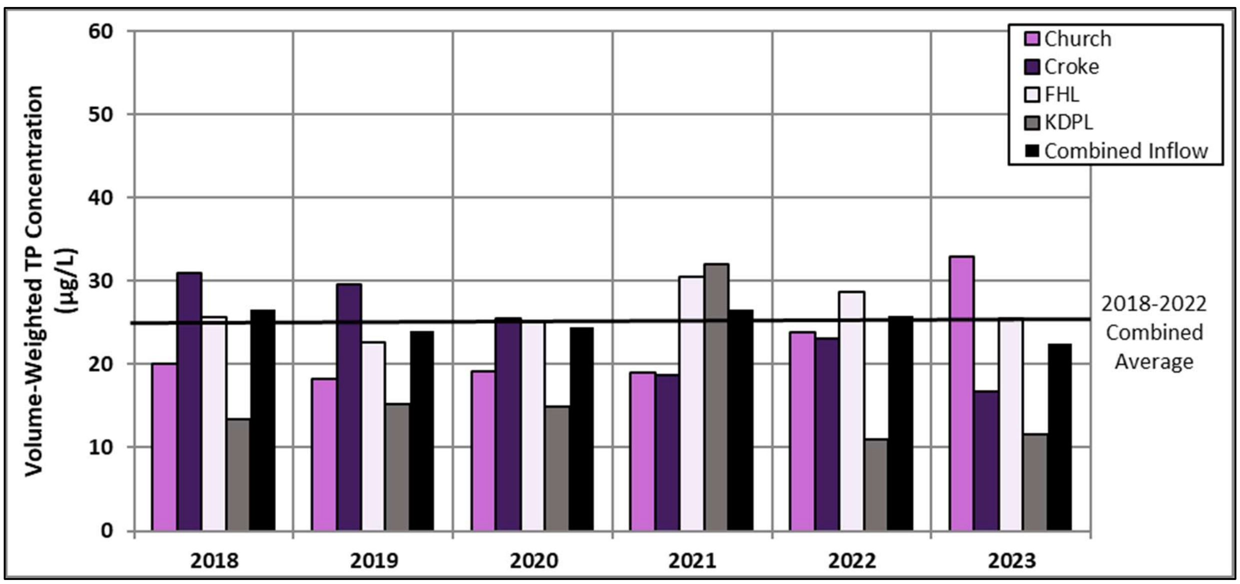

Figure 29. Volume-Weighted Total Phosphorus Concentrations Into Standley Lake by Source, 2018-2023

Total Nitrogen

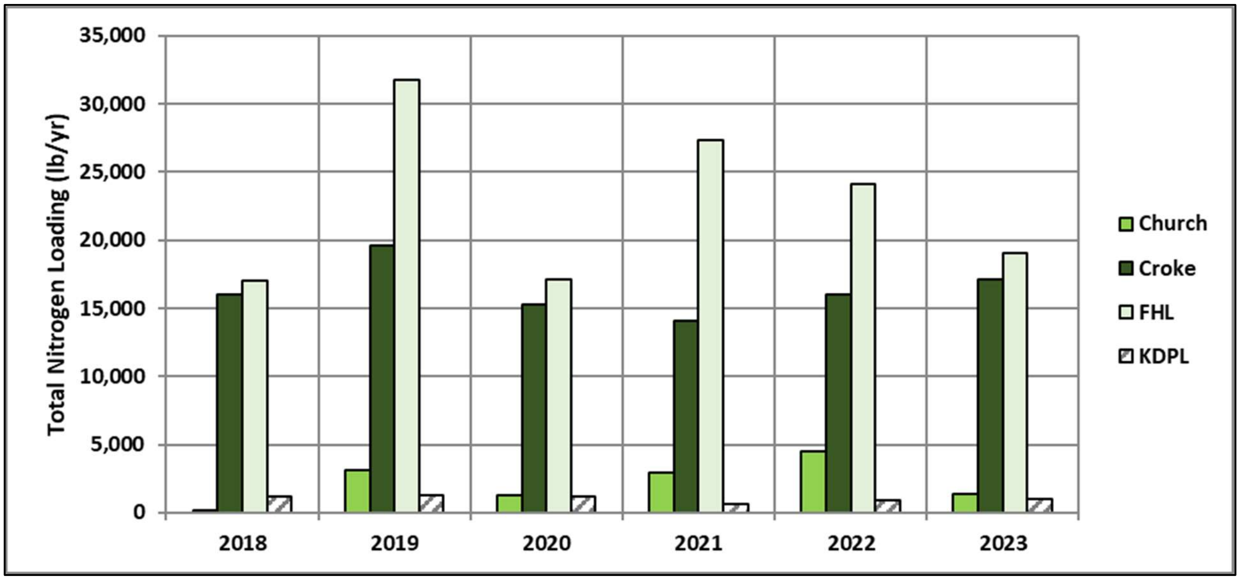

Figure 30. Total Nitrogen Loading Into Standley Lake by Source, 2018-2023

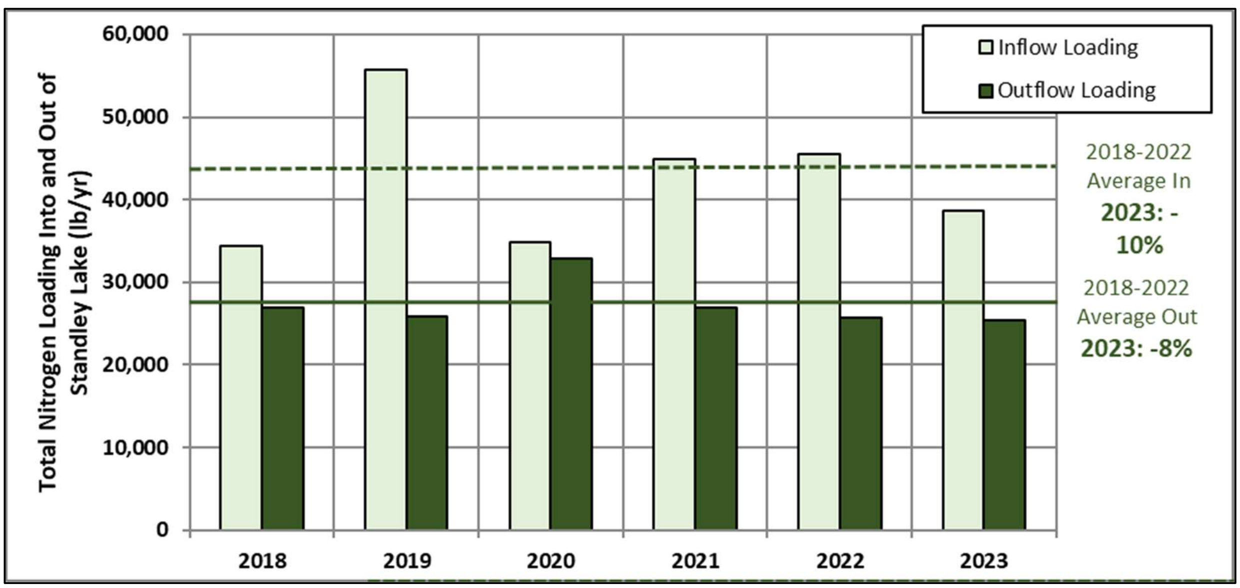

Figure 31. Total Nitrogen Loading Into and Out of Standley Lake, 2018-2023

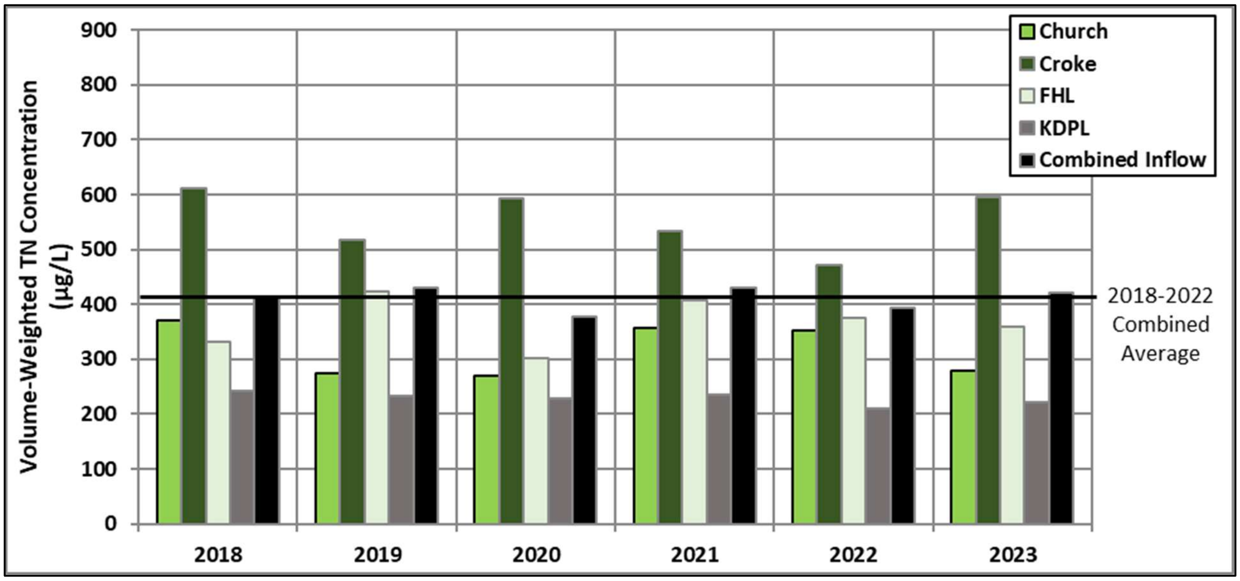

Figure 32. Volume-Weighted Total Nitrogen Concentrations Into Standley Lake by Source, 2018-2023

V. STANDLEY LAKE WATER QUALITY

In this section, the in-reservoir water-quality at sampling location SL-10 is presented for 2023 and compared with recent years. This sampling location was selected as it has an extensive sampling history, is directly relevant to water treatment plant operations, and is the location of the automated lake profiler station. The water-quality indicators discussed here include temperature, dissolved oxygen (DO), TP, TN, chlorophyll *a*, and water clarity (Secchi depth).

TEMPERATURE

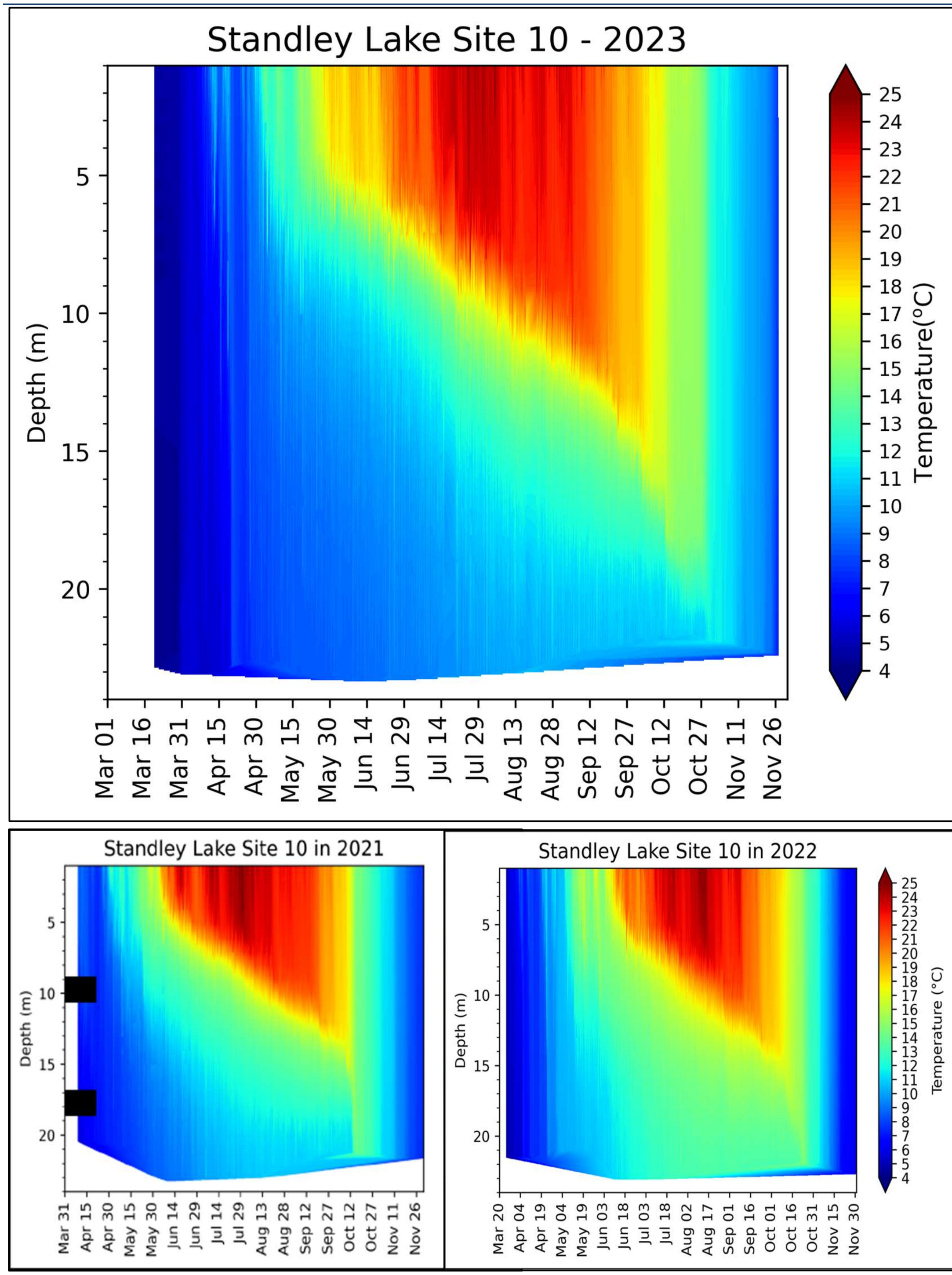

Figure 33. Contour Plots of Temperature in Standley Lake in 2023 (Top), with 2021 and 2022 shown for comparison. The Black Bars on the Lower Left Panel Indicate the Range of the Approximate Outlet Depths Based on Water Surface Elevation

DISSOLVED OXYGEN

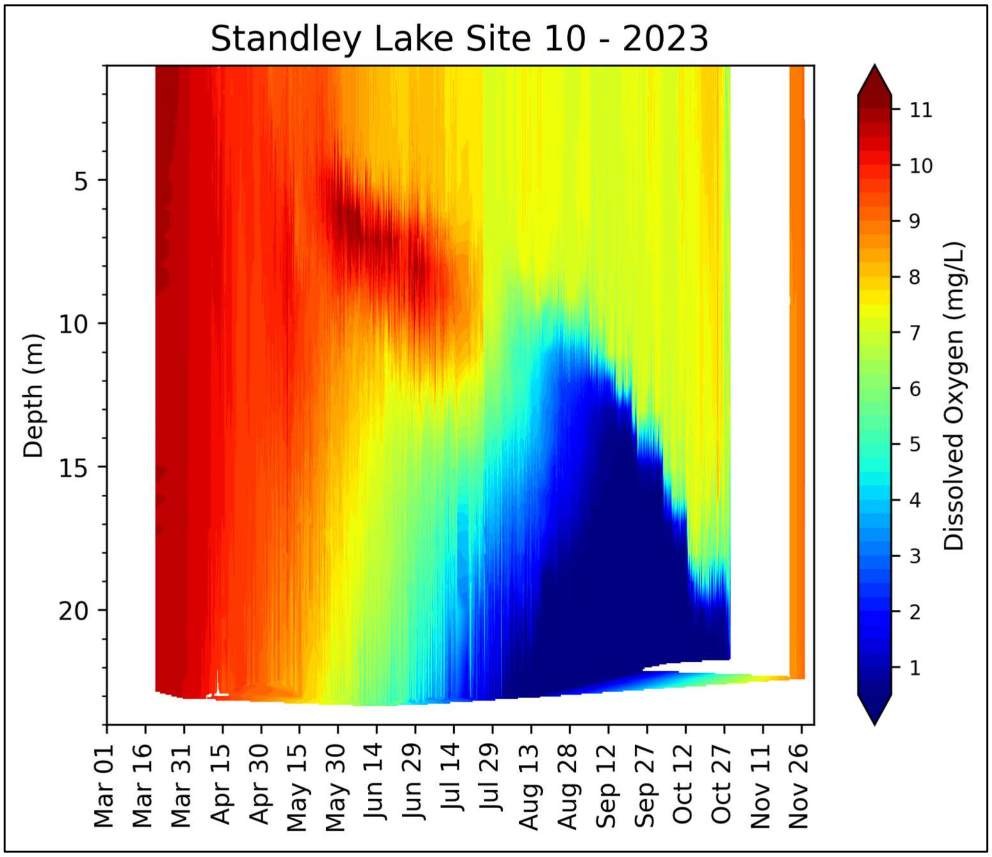

Figure 34. Contour Plot of Dissolved Oxygen in Standley Lake, March-November 2023

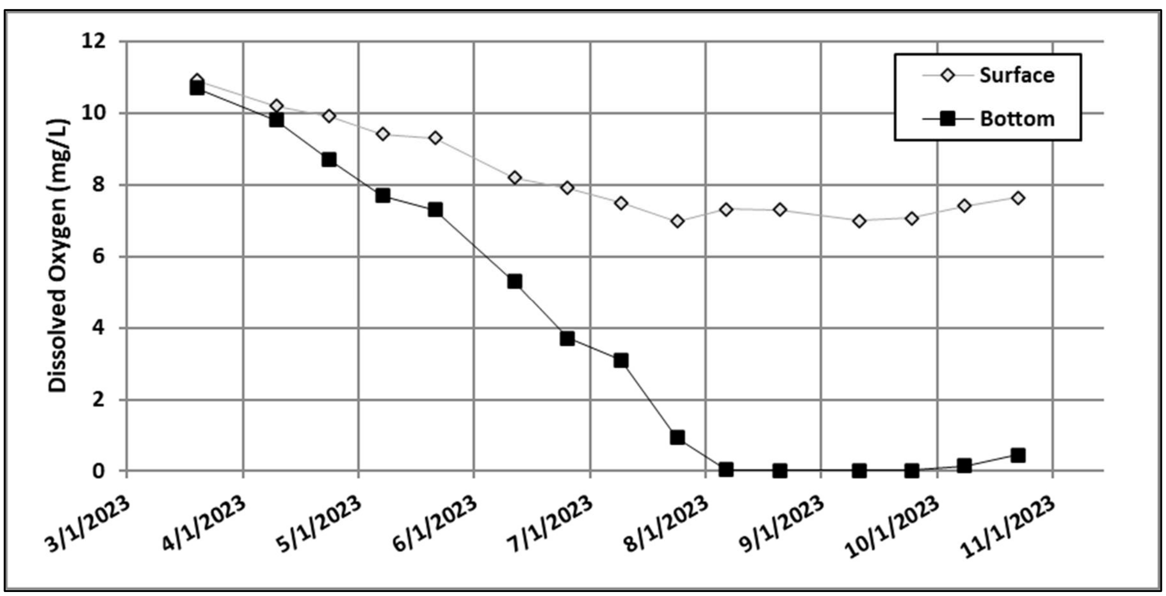

Figure 35. Dissolved Oxygen Concentrations in Standley Lake from Manual Profiles, 2023

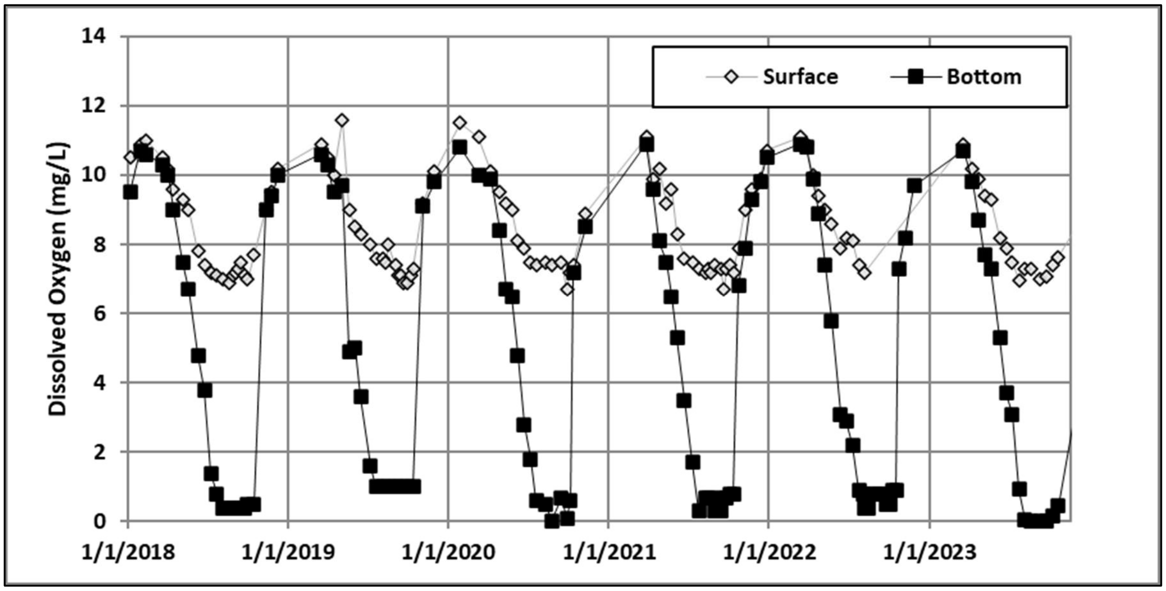

Figure 36. Dissolved Oxygen Concentrations in Standley Lake from Manual Profiles, 2018-2023

DAYS OF HYPOXIA

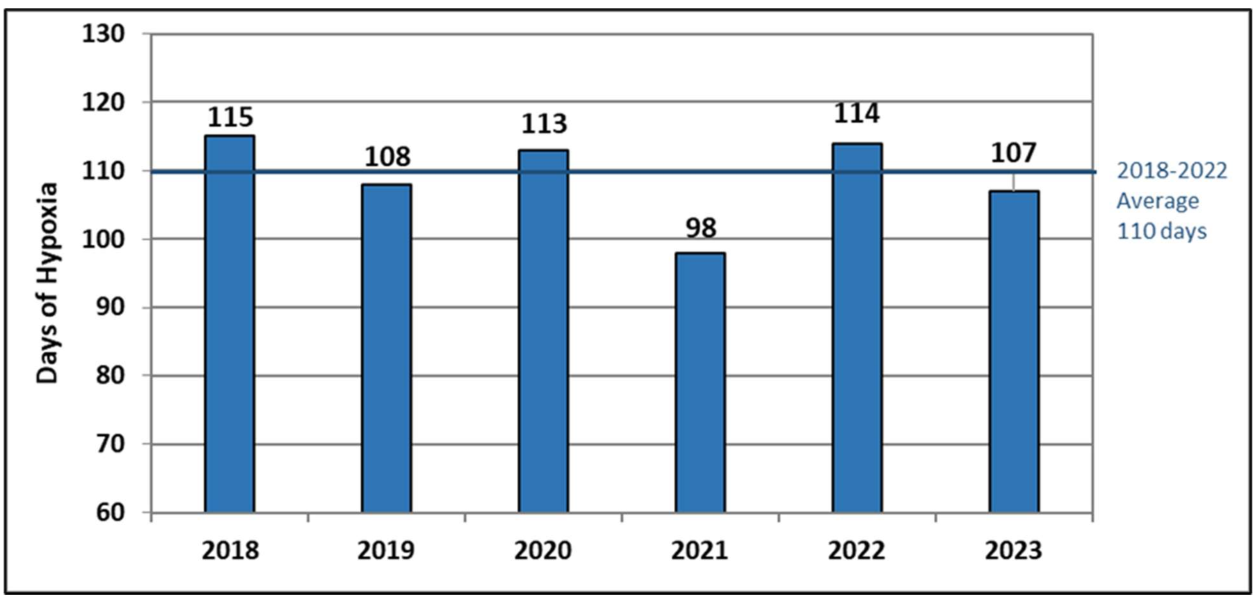

Figure 37. Days of Hypoxia (DO < 2.0 mg/l), 2018-2023

NUTRIENTS

Total Phosphorus

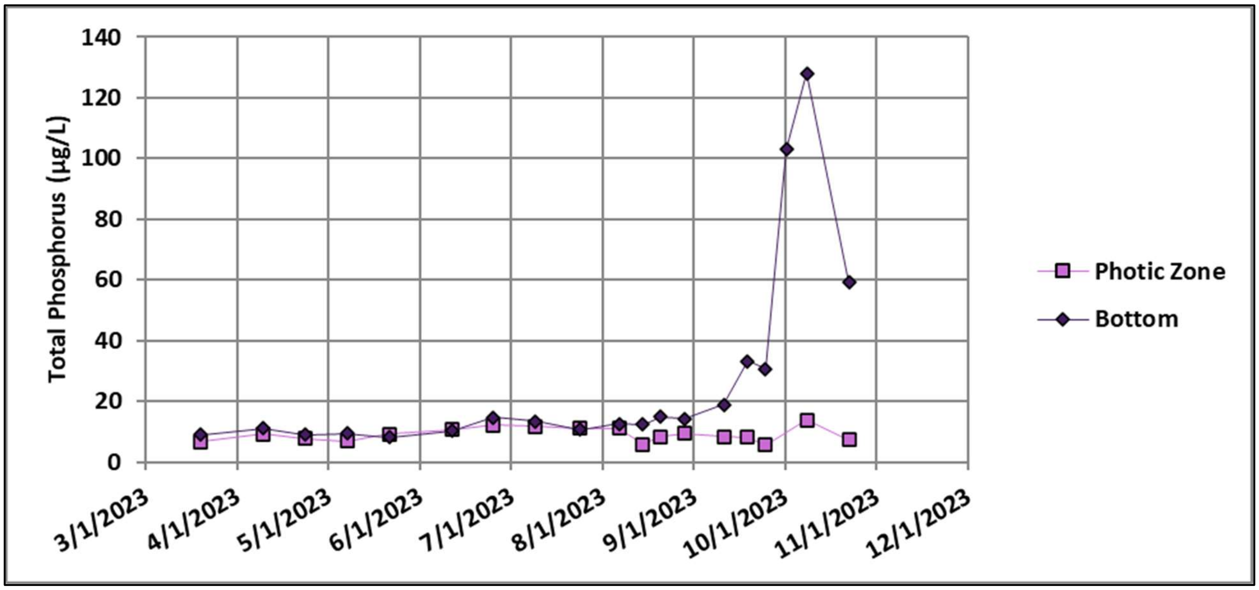

Figure 38. Total Phosphorus Concentrations in Standley Lake, 2023

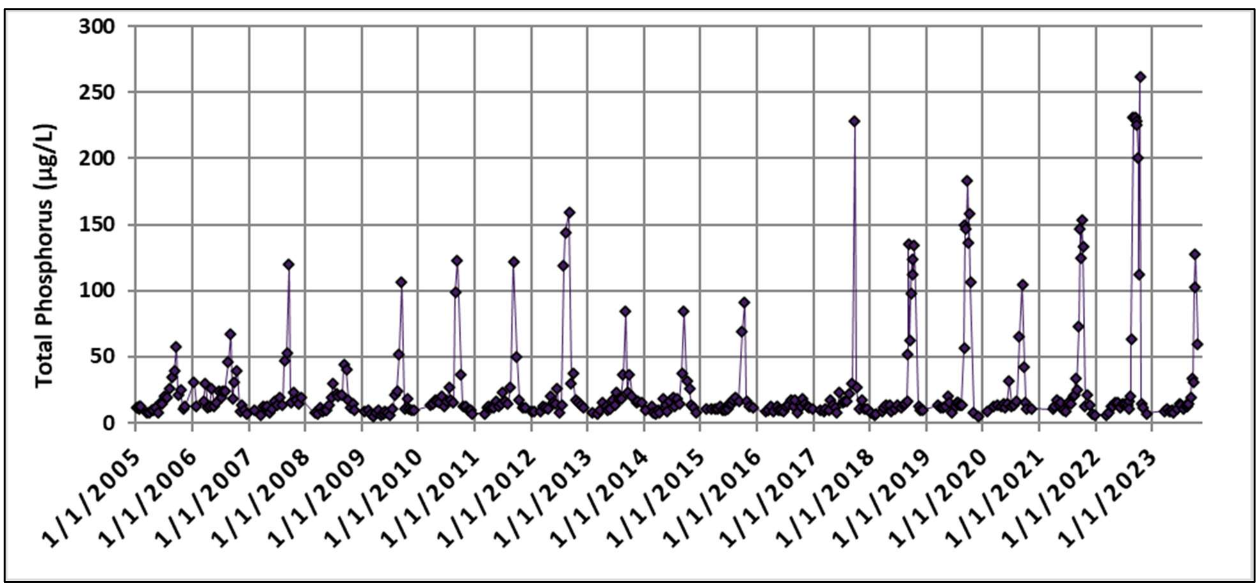

Figure 39. Total Phosphorus Concentrations in Standley Lake, Bottom, 2005-2023

Total Nitrogen

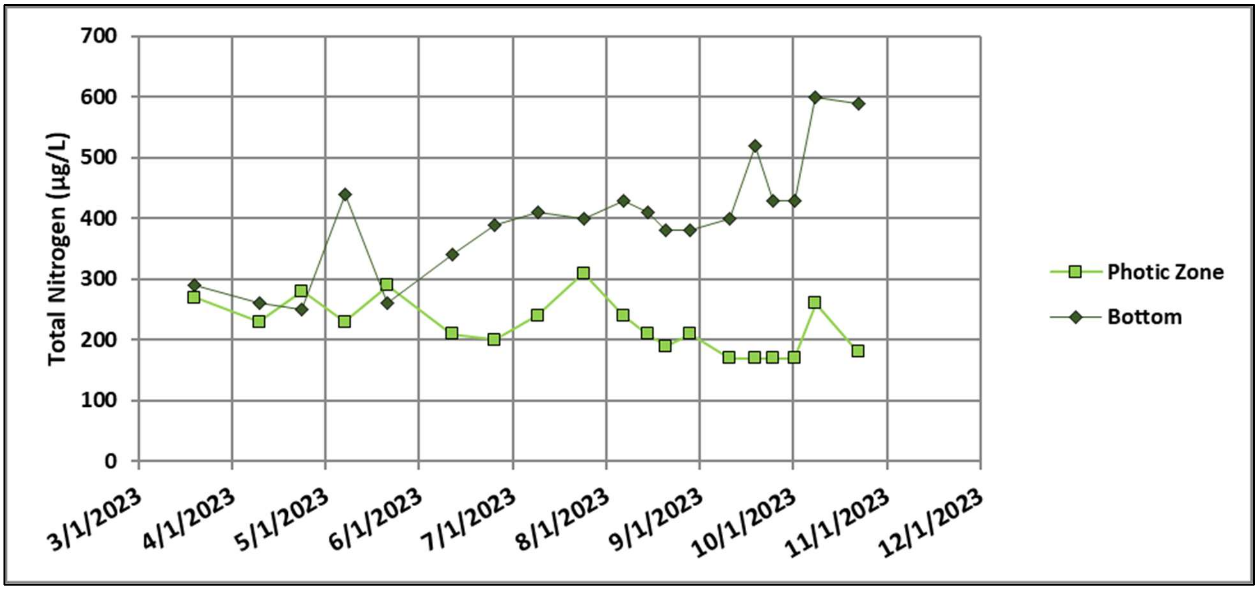

Figure 40. Total Nitrogen Concentrations in Standley Lake, 2023

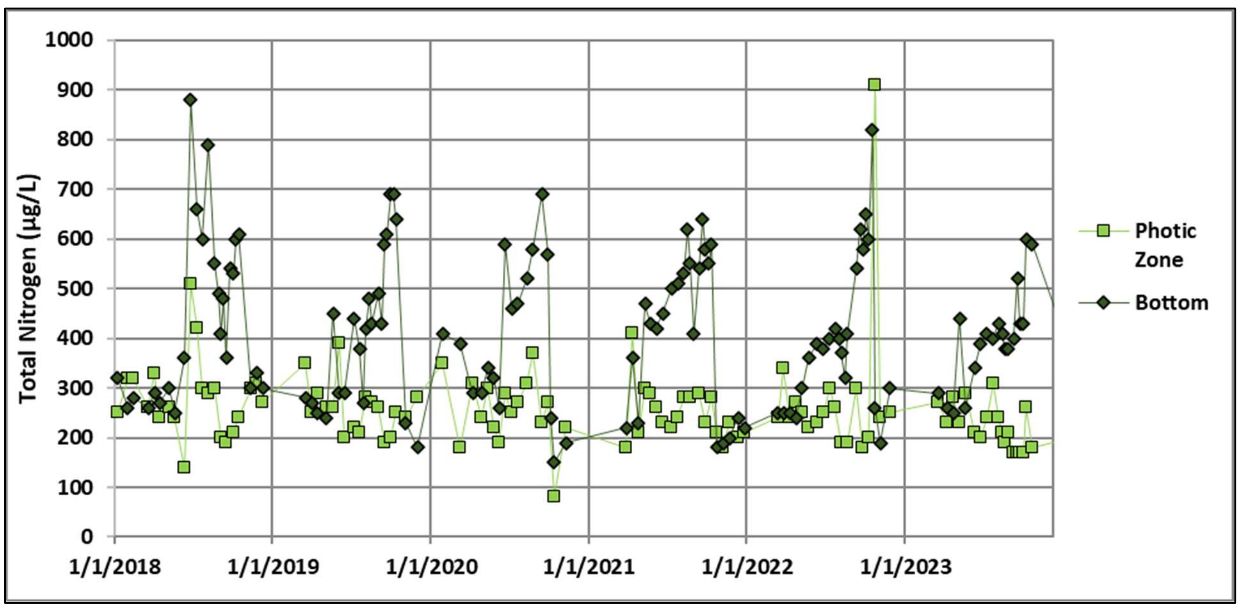

Figure 41. Total Nitrogen Concentrations in Standley Lake, 2018-2023

CHLOROPHYLL *a*

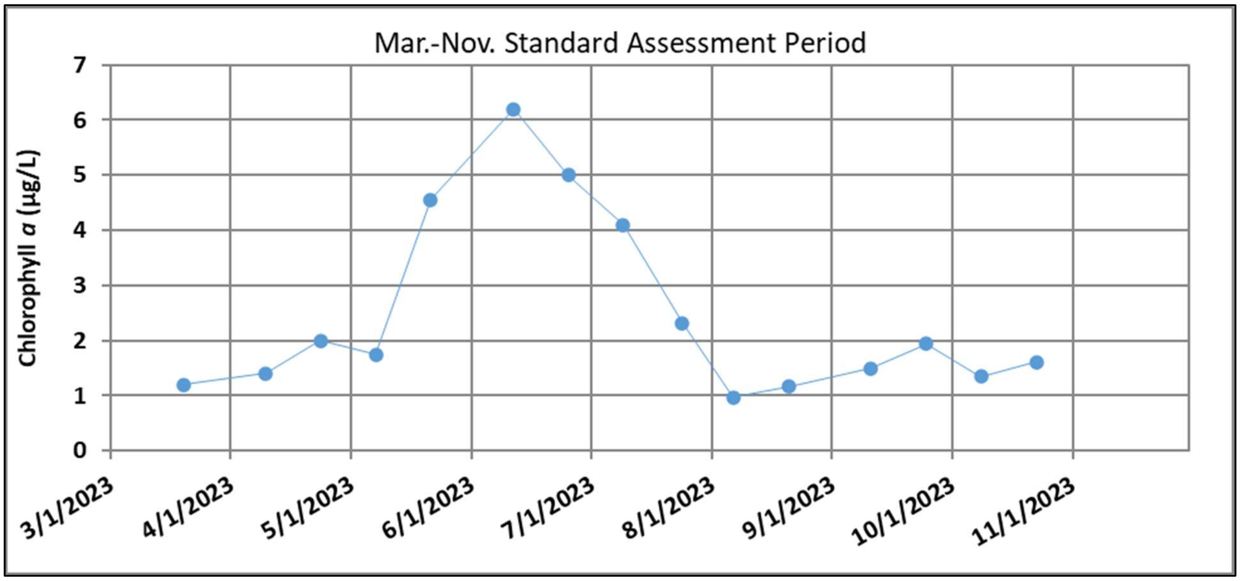

Figure 42. Chlorophyll *a* Concentrations in Standley Lake, 2023

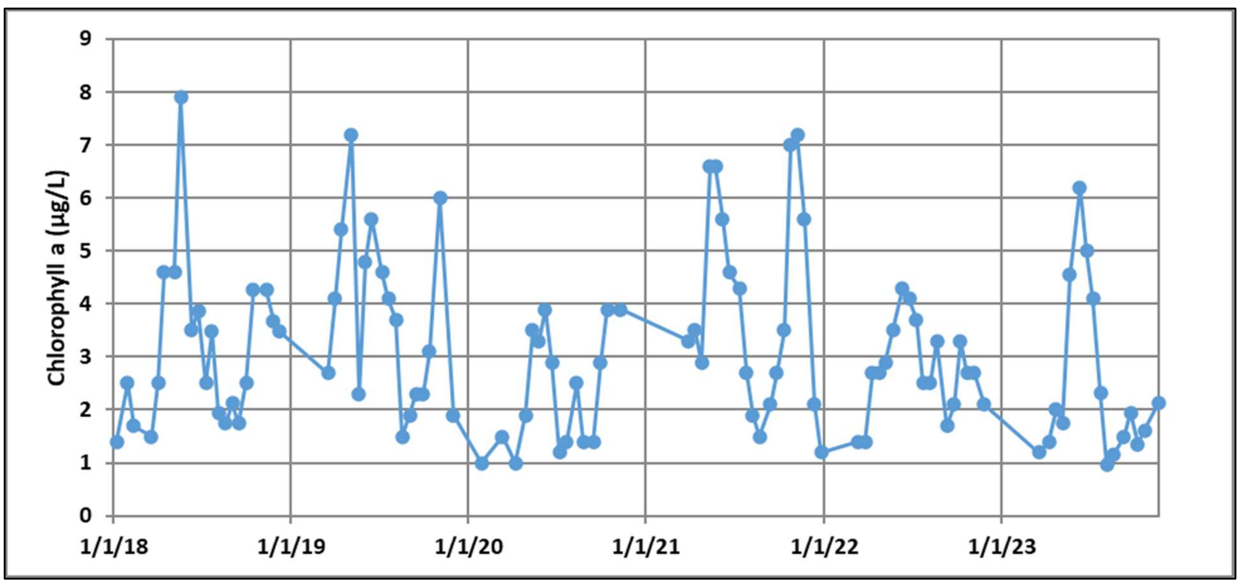

Figure 43. Chlorophyll *a* Concentrations in Standley Lake, 2018-2023

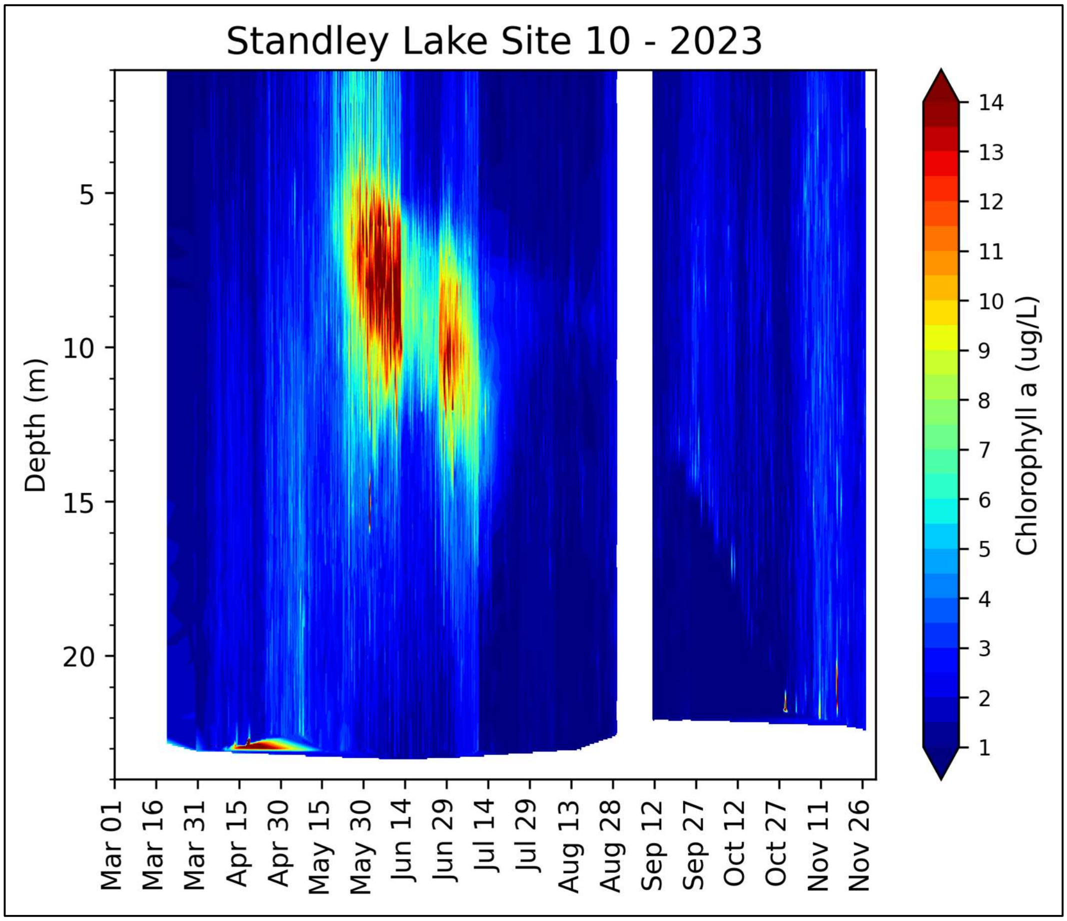

Figure 44. Contour Plot of Chlorophyll *a* Concentrations in Standley Lake, 2023

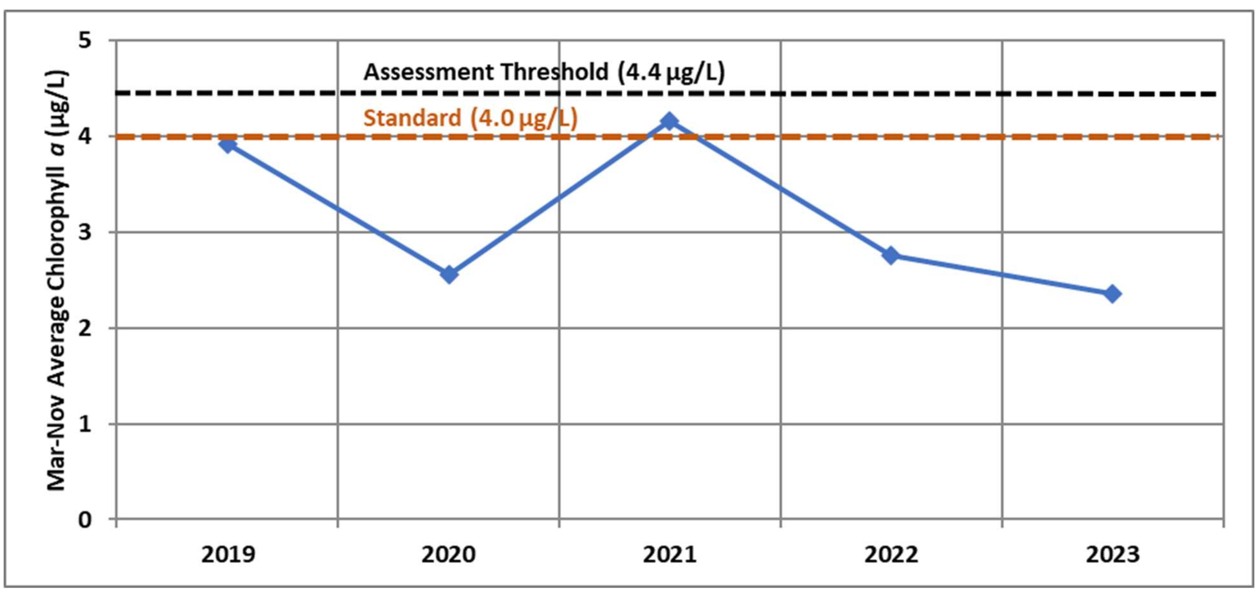

Figure 45. March-November Average Chlorophyll *a* Concentrations, 2018-2023

SECCHI DEPTH

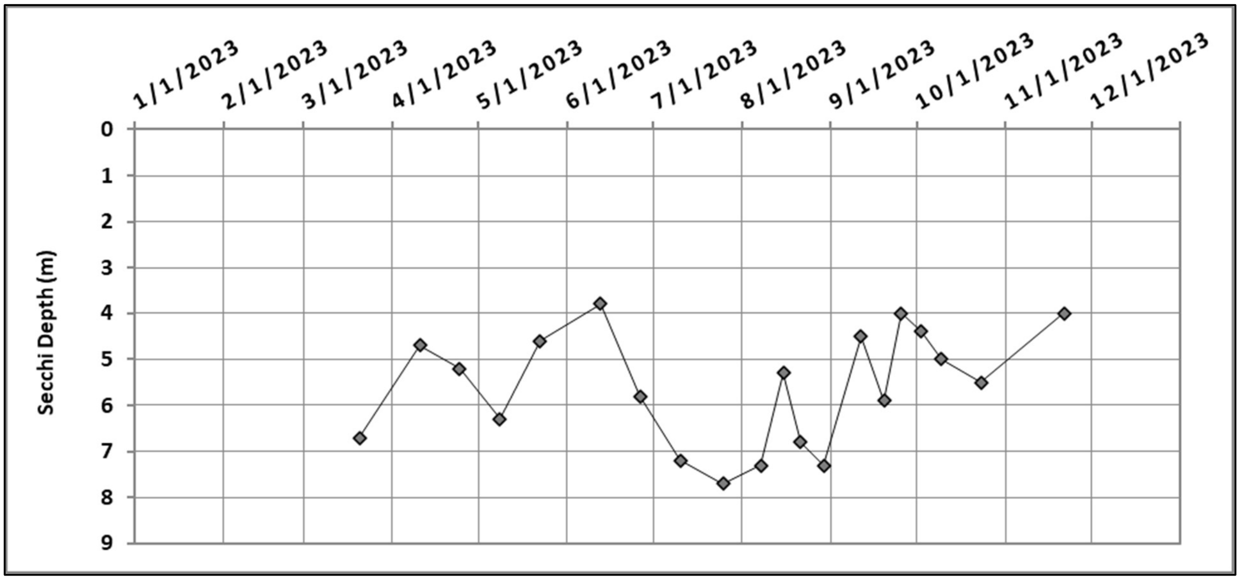

Figure 46. Clarity as Measured by Secchi Depth in Standley Lake, 2023

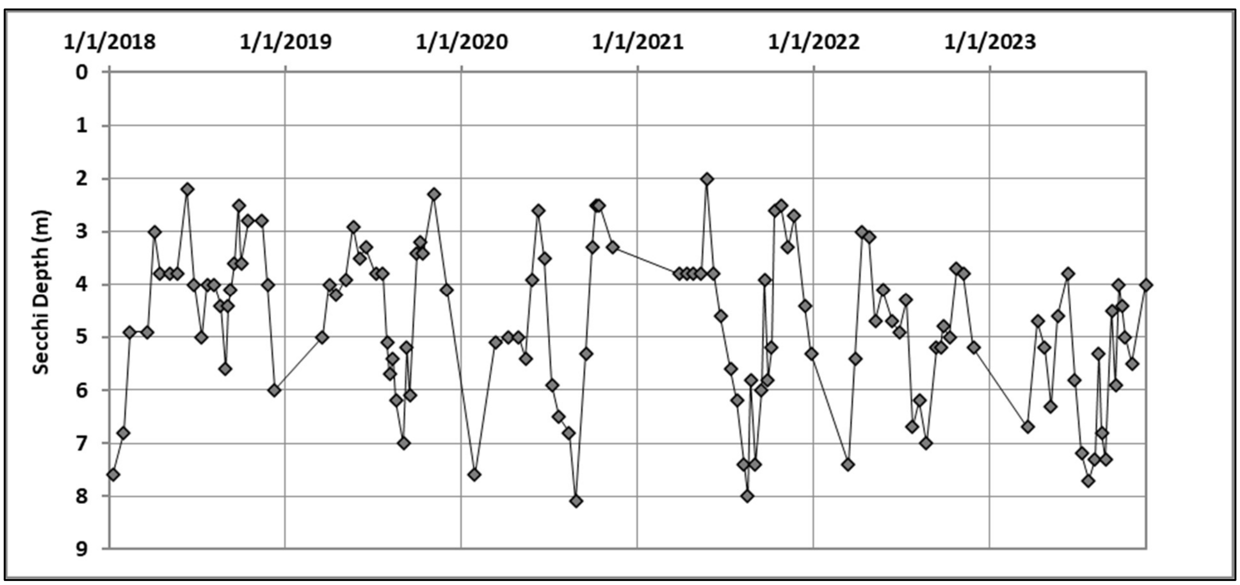

Figure 47. Clarity as Measured by Secchi Depth in Standley Lake, 2018-2023

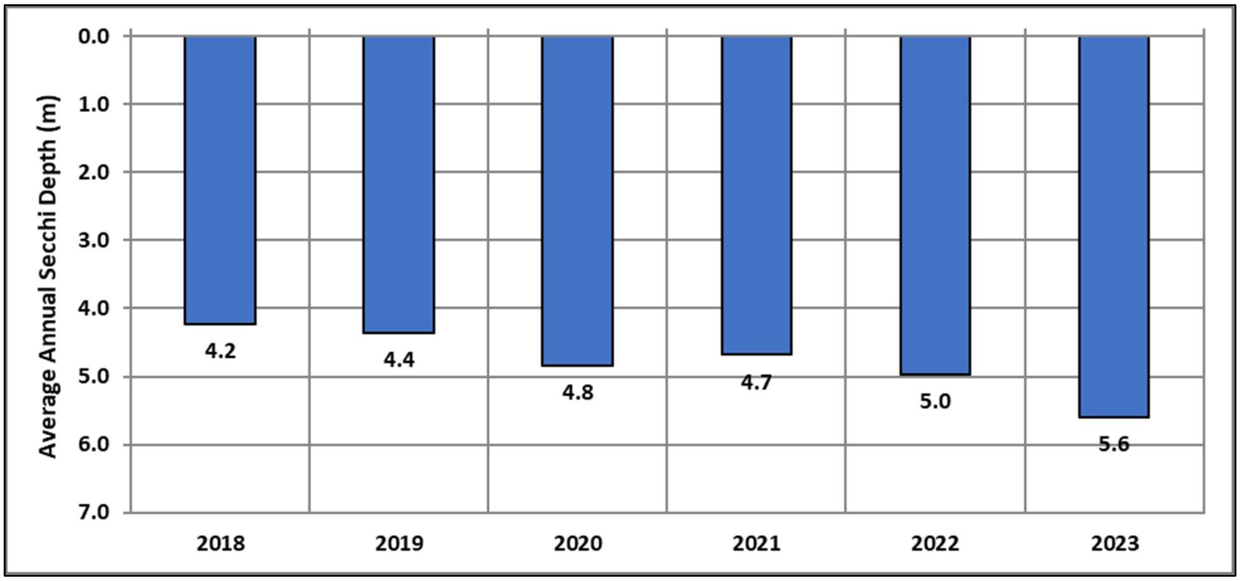

Figure 48. Average Annual Secchi Depth in Standley Lake, 2018-2023

ACRONYMS

AF - Acre Feet

CC26 - Clear Creek Sampling Station: Clear Creek at Lawson Gage

CCAS26 - Clear Creek Autosampler Station: Clear Creek at Lawson Gage

CC59 - Clear Creek Autosampler Station: Clear Creek 2 Miles West of Highway 58/US6 in Golden. Storm water-Only Location Operated by City of Golden

CCAS59 - Clear Creek Autosampler Station: Clear Creek 2 Miles West of Highway 58/US6 in Golden

CC60 - Clear Creek Sampling Station: Clear Creek at Church Ditch Headgate

CFS - Cubic Feet per Second

FHL - Farmers' Highline Canal

Church - Church Ditch

Croke - Croke Canal

DO - Dissolved Oxygen

DP - Dissolved Phosphorus

KDPL - Kinnear Ditch Pipeline

TN - Total Nitrogen

TP - Total Phosphorus

TSS - Total Suspended Solids

USGS - United States Geological Survey

SUPPLEMENTAL INFORMATION – 4

CLEAR CREEK, CANAL, AND STANDLEY LAKE WATER QUALITY MONITORING DATA - 2023

Clear Creek Grabs

Method				SM2550B	SM4500H+B	SM2510B	ASTMD888-09C	ASTMD7315	SM2540D	SM5310C	SM4500NH3H	SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	EPA300	EPA300	EPA300	EPA200.8
DL				1.0	1.0	10	1.0	1	1	0.5	0.01	0.01	0.03	0.0025	0.0025	0.1	5	10	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				1	1	0	1	1	0	1	2	2	2	4	4	1	0	0	5
Reporting Units				°C	s.u.	µS/cm	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Oxygen, Dissolved	Turbidity	Solids, Total Suspended	Carbon, Total Organic	Nitrogen, Ammonia (Salicylate)	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Bromide	Chloride	Sulfate	Antimony, Total
02/08/23	10:00	G	CC 26	1.9	8.1	404	9.9	0.6	1	0.8	0.02	0.37	0.43						
02/08/23	10:40	G	CC 50	3.5	7.9	886	10.3	0.7	< 1	1.5	0.02	0.53	0.66						
02/08/23	11:05	G	CC 60	1.1	8.0	457	11.2	1.8	< 1	0.9	0.01	0.42	0.47						
04/12/23	9:40	G	CC 26	5.3	7.4	527	9.8	1.2	11	1.1	0.02	0.35	0.46						
04/12/23	10:10	G	CC 40	6.9	7.9	430	9.8	1.0	5	1.3	0.02	0.33	0.44						
04/12/23	10:30	G	CC 50	8.3	7.7	600	9.4	< 1	10	2.4	0.02	0.19	0.38						
04/12/23	11:15	G	CC 60	10.6	8.1	508	9.5	1.0	6	1.5	0.02	0.28	0.42						
06/14/23	9:55	G	CC 05	5.5	7.0	174	9.3	0.8	3	3.0	0.01	0.10	0.31	< 0.0025	0.0066				
06/14/23	10:20	G	CC 10	6.6	7.3	91	8.8	3.5	1		< 0.01	0.12	0.28	< 0.0025	0.0120				
06/14/23	10:40	G	CC 15	5.5	7.6	149	9.3	0.3	1		0.02	0.14	0.28	< 0.0025	0.0083				
06/14/23	10:17	G	CC 20	7.0	7.4	141	9.4	1.0	2	2.7	0.01	0.13	0.27	< 0.0025	0.0093				
06/14/23	10:40	G	CC 25	7.3	7.6	147	9.2	2.4	1		0.01	0.17	0.32	< 0.0025	0.0083				
06/14/23	10:55	G	CC 26	7.3	7.5	147	9.2	1.8	2	2.9	0.01	0.15	0.34	< 0.0025	0.0083				
06/14/23	11:11	G	CC 30	7.7	7.8	56	9.5	5.3	5		< 0.01	0.09	0.30	< 0.0025	0.0198				
06/14/23	11:10	G	CC 34	7.2	7.7	59	9.1	1.5	2		0.01	0.13	0.35	< 0.0025	0.0128				
06/14/23	11:25	G	CC 35	8.1	7.6	136	9.2	2.8	3	3.5	0.01	0.14	0.35	< 0.0025	0.0125				
06/14/23	12:35	G	CC 40	9.9	7.6	137	9.3	1.9	5	3.0	0.01	0.13	0.29	< 0.0025	0.0138				
06/14/23	9:39	G	CC 44	6.1	7.6	74	9.7	3.8	8		0.01	0.04	0.22	0.0063	0.0198				
06/14/23	9:07	G	CC 50	7.2	7.3	175	9.8	10.1	13	4.4	0.01	0.19	0.33	< 0.0025	0.0268				
06/14/23	12:00	G	CC 52	14.1	8.0	430	8.1	21.6	34	6.4	0.02	0.16	0.60	0.0241	0.0716				
06/14/23	12:15	G	CC 53	13.2	8.1	511	8.1	5.7	2	5.5	0.01	0.35	0.62	< 0.0025	0.0198				
06/14/23	8:40	G	CC 60	7.6	7.5	156	10.2	5.0	1	3.3	0.01	0.14	0.30	< 0.0025	0.0188				
06/14/23	14:15	QC	UCC DUP								0.01	0.16	0.30		0.0081				
06/14/23	14:15	QC	UCC SPIKE								0.04	0.40	0.57		0.0546				
10/11/23	10:10	G	CC 05	3.0	8.1	248	9.5	0.1	1	1.2	< 0.01	0.23	0.33	0.0026	0.0041	< 0.1	29	21	< 0.001
10/11/23	10:40	G	CC 10	6.4	7.9	135	8.9	0.2	213		0.02	0.16	0.25	< 0.0025	0.0046	< 0.1	< 5	23	< 0.001
10/11/23	10:45	G	CC 15	5.7	7.7	778	8.5	0.1	5		0.21	0.56	0.84	< 0.0025	0.0030	< 0.1	< 5	331	< 0.001
10/11/23	11:10	G	CC 20	7.1	7.8	391	8.8	0.2	4	1.1	0.02	0.23	0.37	< 0.0025	0.0034	< 0.1	13	133	< 0.001
10/11/23	10:57	G	CC 25	7.9	7.7	225	8.7	0.5	4		< 0.01	0.13	0.24	< 0.0025	0.0032	< 0.1	21	24	< 0.001
10/11/23	11:10	G	CC 26	7.1	7.7	304	9.2	0.2	1	1.1	< 0.01	0.18	0.32	0.0026	0.0041	< 0.1	19	67	< 0.001
10/11/23	10:20	G	CC 30	7.4	7.8	43	9.1	0.1	3		< 0.01	0.05	0.24	0.0042	0.0092	< 0.1	< 5	< 10	< 0.001
10/11/23	11:52	G	CC 34	7.1	7.6	234	9.5	0.2	< 1		0.02	0.10	0.24	0.0026	0.0068	< 0.1	16	48	< 0.001
10/11/23	11:38	G	CC 35	5.0	7.9	74	9.6	0.2	1	1.9	< 0.01	0.11	0.24	0.0042	0.0056	< 0.1	< 5	< 10	< 0.001
10/11/23	10:00	G	CC 40	7.4	7.8	267	9.1	0.1	1	1.3	< 0.01	0.14	0.28	0.0031	0.0065	< 0.1	17	57	< 0.001
10/11/23	11:45	G	CC 44	6.3	8.1	163	8.8	0.1	< 1		< 0.01	< 0.01	0.12	< 0.0025	0.0072	< 0.1	23	10	< 0.001
10/11/23	12:10	G	CC 50	10.9	7.8	941	8.4	0.2	< 1	2.2	0.02	0.16	0.37	0.0028	0.0065	0.1	104	257	< 0.001
10/11/23	12:19	G	CC 53	8.6	7.6	1423	8.6	0.8	2	2.2	0.02	0.48	0.67	0.0037	0.0056	< 0.1	327	20	< 0.001
10/11/23	12:40	G	CC 60	9.5	8.2	317	9.1	0.1	1	1.3	< 0.01	0.12	0.26	0.4030	0.4600	< 0.1	31	63	< 0.001
10/11/23	0:00	QC	UCC DUP								0.02	0.23	0.39		0.0037				
10/11/23	0:00	QC	UCC SPIKE								0.02	0.23	0.38		0.0705				
12/13/23	9:51	G	CC 26	3.6	8.5	379	9.7		1	1.0	0.02	0.35	0.45	0.0057	0.0058				
12/13/23	10:35	G	CC 50	2.8	8.0	1076	10.2			2.0	0.03	0.40	0.60	0.0038	0.0088				
12/13/23	11:06	G	CC 60		8.0	484	11.4		2	1.1	0.02	0.38	0.49	< 0.0025	0.0070				

Clear Creek Grabs

Method				EPA200.8	EPA200.8	EPA200.8	EPA200.8	EPA200.8	EPA200.8	EPA200.8	EPA200.8	EPA200.8	EPA200.8
DL				0.001	0.01	0.001	0.001	0.01	0.001	0.005	0.002	0.001	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Copper, Total	Lead, Total	Nickel, Total	Selenium, Total	Thallium, Total	Uranium, Total
02/08/23	10:00	G	CC 26										
02/08/23	10:40	G	CC 50										
02/08/23	11:05	G	CC 60										
04/12/23	9:40	G	CC 26										
04/12/23	10:10	G	CC 40										
04/12/23	10:30	G	CC 50										
04/12/23	11:15	G	CC 60										
06/14/23	9:55	G	CC 05										
06/14/23	10:20	G	CC 10										
06/14/23	10:40	G	CC 15										
06/14/23	10:17	G	CC 20										
06/14/23	10:40	G	CC 25										
06/14/23	10:55	G	CC 26										
06/14/23	11:11	G	CC 30										
06/14/23	11:10	G	CC 34										
06/14/23	11:25	G	CC 35										
06/14/23	12:35	G	CC 40										
06/14/23	9:39	G	CC 44										
06/14/23	9:07	G	CC 50										
06/14/23	12:00	G	CC 52										
06/14/23	12:15	G	CC 53										
06/14/23	8:40	G	CC 60										
06/14/23	14:15	QC	UCC DUP										
06/14/23	14:15	QC	UCC SPIKE										
10/11/23	10:10	G	CC 05	< 0.001	0.0535	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00251
10/11/23	10:40	G	CC 10	< 0.001	0.0382	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00100
10/11/23	10:45	G	CC 15	< 0.001	0.0144	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00196
10/11/23	11:10	G	CC 20	< 0.001	0.0308	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00124
10/11/23	10:57	G	CC 25	< 0.001	0.0584	< 0.001	< 0.001	< 0.01	0.00205	< 0.005	< 0.002	< 0.001	0.00146
10/11/23	11:10	G	CC 26	< 0.001	0.0478	< 0.001	< 0.001	< 0.01	0.00105	< 0.005	< 0.002	< 0.001	0.00141
10/11/23	10:20	G	CC 30	< 0.001	0.0129	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	< 0.001
10/11/23	11:52	G	CC 34	< 0.001	0.0363	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00118
10/11/23	11:38	G	CC 35	< 0.001	0.0226	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	< 0.001
10/11/23	10:00	G	CC 40	< 0.001	0.0381	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00102
10/11/23	11:45	G	CC 44	< 0.001	0.0405	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	< 0.001
10/11/23	12:10	G	CC 50	< 0.001	0.0488	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	< 0.001
10/11/23	12:19	G	CC 53	< 0.001	0.1800	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00556
10/11/23	12:40	G	CC 60	< 0.001	0.0425	< 0.001	< 0.001	< 0.01	< 0.001	< 0.005	< 0.002	< 0.001	0.00117
10/11/23	0:00	QC	UCC DUP										
10/11/23	0:00	QC	UCC SPIKE										
12/13/23	9:51	G	CC 26										
12/13/23	10:35	G	CC 50										
12/13/23	11:06	G	CC 60										

Ambient Autosamplers

Method				SM2550B	SM4500H+B	SM2510B	ASTMD7315	SM2540D	SM5310C	SM4500NH3H	SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	EPA300	EPA300	EPA300	EPA200.8	EPA200.8
DL				1.0	1.0	10	1	1	0.5	0.01	0.01	0.03	0.0025	0.0025	0.1	5	10	0.001	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				1	1	0	1	0	1	2	2	2	4	4	1	0	0	5	5
Reporting Units				°C	s.u.	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Turbidity	Solids, Total Suspended	Carbon, Total Organic	Nitrogen, Ammonia (Salicylate)	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Bromide	Chloride	Sulfate	Arsenic, Dissolved	Arsenic, Total
04/24/23	17:00	C	CC AS 26	6.4	7.7	260	1.6	2	1.4	0.02	0.32	0.45	< 0.0025	0.0173		85.5		< 0.001	< 0.001
04/25/23	5:25	C	CC AS 49	9.4	7.5	487	2.6	3.5	1.9	0.01	0.26	0.45	< 0.0025	0.0152		71		< 0.001	< 0.001
04/25/23	5:25	C	CC AS 50	9.5	7.6	639	2.6	5	2.2	0.02	0.51	0.71	< 0.0025	0.0096		103.0000		< 0.001	< 0.001
04/25/23	20:05	C	CC AS 59	7.2	7.9	509	5.1	4	2.1	0.03	0.25	0.47	< 0.0025	0.0084				< 0.001	< 0.001
04/25/23	0:30	C	CC AS T2					11.5								80.2			
04/26/23	11:05	C	CC AS T11	9.9	7.9	510	8.3	12.5	2.3	0.02	0.21	0.48	< 0.0025	0.0271		79.3		< 0.001	< 0.001
04/26/23	0:30	C	CC AS T2	8.8	7.9	508	9.2		2.5	0.05	0.26	0.52	< 0.0025	0.0262				< 0.001	< 0.001
05/30/23	6:30	C	CC AS 26	13.7	7.8	168	4.4	12	4.0	0.01	0.14	0.40	< 0.0025	0.0146		22.5		< 0.001	< 0.001
05/30/23	10:35	C	CC AS 49	14.8	7.6	161	7.5	20	4.4	0.02	0.13	0.45	< 0.0025	0.0269		18.9		< 0.001	< 0.001
05/30/23	10:35	C	CC AS 50	15.0	7.4	170	10.0	13	4.4	< 0.01	0.08	0.31	< 0.0025	0.0280		21		< 0.001	< 0.001
05/30/23	19:25	C	CC AS 59	21.1	7.7	171	12.8	19	4.6	< 0.01	0.13	0.44	< 0.0025	0.0262		21.1		< 0.001	< 0.001
05/30/23	20:51	C	CC AS T2	22.8	7.7	183	9.5	18	4.7	< 0.01	0.11	0.50	< 0.0025	0.0289		22.8		< 0.001	< 0.001
05/31/23	6:38	C	CC AS T11	20.3	7.7	197	13.8	25	4.0	0.01	0.11	0.42	< 0.0025	0.0262		24.6			
05/31/23	6:48	C	CC AS T11															< 0.001	< 0.001
06/19/23	1:00	C	CC AS 26	15.7	7.7	145	2.8			0.01	0.15	0.29						< 0.001	< 0.001
06/19/23	2:00	C	CC AS 26					3	2.8				< 0.0025	0.0080		12.7			
06/19/23	5:50	C	CC AS 49															< 0.001	< 0.001
06/19/23	5:52	C	CC AS 49	18.4	7.6	140	4.0	1	3.2	< 0.01	0.14	0.33	< 0.0025	0.0110		12.6			
06/19/23	5:50	C	CC AS 50															< 0.001	< 0.001
06/19/23	5:52	C	CC AS 50	20.0	7.5	201	9.0	< 1	4.9	< 0.01	0.13	0.37	< 0.0025	0.0223		25.8			
06/19/23	14:14	C	CC AS 59	22.3	7.6	159	5.8	5	3.5	< 0.01	0.14	0.33	< 0.0025	0.0083		25.3			
06/19/23	14:15	C	CC AS 59															< 0.001	< 0.001
06/19/23	15:35	C	CC AS T2	25.0	7.7	178	5.0	2	4.0	< 0.01	0.11	0.28	< 0.0025	0.0117		20.2		< 0.001	< 0.001
06/20/23	13:35	C	CC AS T11	21.5	7.7	188	8.4	2	3.4	0.01	0.08	0.30	< 0.0025	0.0212		20.8		< 0.001	< 0.001
07/17/23	12:05	G	CC 50										< 0.0025	0.0092					
07/17/23	6:30	C	CC AS 26	17.8	8.0	146	2.0	4	1.7	0.02	0.13	0.28	< 0.0025	0.0093		10		< 0.001	< 0.001
07/17/23	10:50	C	CC AS 49	20.3	7.9	145	3.4	3	1.9	< 0.01	0.13	0.31	< 0.0025	0.0139		10		< 0.001	< 0.001
07/17/23	12:05	G	CC AS 50	19.6	7.8	360	3.1	2	2.9	< 0.01	0.18	0.43				40		< 0.001	< 0.001
07/17/23	15:55	C	CC AS 59	27.9	7.9	168	1.9	< 1	2.2	< 0.01	0.12	0.29	< 0.0025	0.0104		14		< 0.001	< 0.001
07/18/23	11:30	G	CC AS T11	19.9	7.8	177	15.0			< 0.01	0.10	0.32						< 0.001	< 0.001
07/18/23	11:00	G	CC AS T2	18.3	7.9	175	2.3			< 0.01	0.11	0.30						< 0.001	< 0.001
07/18/23	11:00	G	Trib 02					2	1.7				0.0225	< 0.0025		14			
07/18/23	11:30	G	Trib 11					11	1.7				0.0085	< 0.0025		15			
08/28/23	12:40	G	CC 26					3	1.6				< 0.0025	0.0110	< 0.1	18	47		
08/28/23	13:15	G	CC 49					17	1.7				0.0037	0.1390	< 0.1	19	45		
08/28/23	13:40	G	CC 50					71	2.9				0.0041	0.0675	0.1	63	110		
08/28/23	14:30	G	CC 59					47	1.7				0.0047	0.0498	< 0.1	29	59		
08/28/23	12:40	G	CC AS 26	17.0	8.0	236	4.3			< 0.01	0.19	0.30						< 0.001	< 0.001
08/28/23	13:15	G	CC AS 49	19.2	8.0	515	67.3			< 0.01	0.17	0.32						< 0.001	0.0013
08/28/23	13:40	G	CC AS 50	17.1	8.0	235	11.6			< 0.01	0.32	0.64						< 0.001	0.0013
08/28/23	14:30	G	CC AS 59	18.2	7.9	285	62.3			< 0.01	0.22	0.41						< 0.001	0.005
08/28/23	20:00	C	CC AS T11	11.3	7.7	280	12.5	30	2.6	< 0.01	0.21	0.44	0.0037	0.0282	< 0.1	27.2	51.9	< 0.001	< 0.001
08/28/23	14:00	C	CC AS T2	14.1	7.8	275	8.7	14	4.6	< 0.01	0.16	0.41	0.0818	0.1130	< 0.1	26.1	52	< 0.001	< 0.001
09/18/23	11:20	G	CC 26					1	1.14				< 0.0025	0.0082	< 0.1	19.5	56.7		
09/18/23	12:45	G	CC 49					1	1.41				0.0034	0.0114	< 0.1	18	48.7		
09/18/23	12:25	G	CC 50					2	2.46				< 0.0025	0.0149	0.12	89.7	201.2		
09/18/23	13:20	G	CC 59					2	1.52				< 0.0025	0.0101	< 0.1	27.8	58.3		
09/18/23	11:20	G	CC AS 26	11.7	8	265	1.4			< 0.01	0.22	0.31						< 0.001	< 0.001
09/18/23	12:45	G	CC AS 49	17.5	7.9	243	1.8			< 0.01	0.17	0.32						< 0.001	< 0.001
09/18/23	12:25	G	CC AS 50	20.2	7.8	799	3.7			< 0.01	0.37	0.61						< 0.001	< 0.001
09/18/23	13:20	G	CC AS 59	17	7.9	283	2.1			< 0.01	0.19	0.33						< 0.001	< 0.001

Ambient Autosamplers

Method				SM2550B	SM4500H+B	SM2510B	ASTMD7315	SM2540D	SM5310C	SM4500NH3H	SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	EPA300	EPA300	EPA300	EPA200.8	EPA200.8
DL				1.0	1.0	10	1	1	0.5	0.01	0.01	0.03	0.0025	0.0025	0.1	5	10	0.001	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				1	1	0	1	0	1	2	2	2	4	4	1	0	0	5	5
Reporting Units				°C	s.u.	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Turbidity	Solids, Total Suspended	Carbon, Total Organic	Nitrogen, Ammonia (Salicylate)	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Bromide	Chloride	Sulfate	Arsenic, Dissolved	Arsenic, Total
09/18/23	14:00	C	CC AS T2	23.4	7.9	309	5.2	4	1.96	< 0.01	0.14	0.3	< 0.0025	0.0149	< 0.1	29.7	59	< 0.001	< 0.001
09/19/23	9:30	C	CC AS T11	20.7	7.7	330	5.8	11	1.62	< 0.01	0.13	0.28	< 0.0025	0.0214	< 0.1	31.3	60.2	< 0.001	< 0.001
10/16/23	11:40	G	CC 26					< 1	1.63				< 0.0025	0.0044	< 0.1	21.8	77.4		
10/16/23	12:20	G	CC 49					< 1	1.15				0.0025	0.0057	< 0.1	40.4	67.4		
10/16/23	12:40	G	CC 50					1	2.19				< 0.0025	0.0085	0.14	98.8	254.2		
10/16/23	13:20	G	CC 59					< 1	1.34				< 0.0025	0.0265	< 0.1	32.8	75.9		
10/16/23	11:40	G	CC AS 26	8.2	8.2	320	1.2			0.02	0.23	0.32						< 0.001	< 0.001
10/16/23	12:20	G	CC AS 49	8.6	8.3	285	1.3			0.02	0.16	0.26						< 0.001	< 0.001
10/16/23	12:40	G	CC AS 50	11.7	8.2	914	1			0.02	1.12	1.36						< 0.001	< 0.001
10/16/23	13:20	G	CC AS 59	11.6	8.2	333	1.2			< 0.01	0.2	0.34						< 0.001	< 0.001
10/16/23	12:00	C	CC AS T2	19.7	8.1	338	1.9	< 1	1.64	< 0.01	0.16	0.3	0.003	0.0057	< 0.1	32.2	70.6	< 0.001	< 0.001
10/17/23	12:00	C	CC AS T11	17	8	345	2.4	3	1.41	< 0.01	0.15	0.29	0.0038	0.0106	< 0.1	33.2	71.3	< 0.001	< 0.001

Ambient Autosamplers

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.01	0.0003	0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001	0.002	0.002
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Barium, Dissolved	Barium, Total	Beryllium, Dissolved	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Chromium, Dissolved	Chromium, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total	Manganese, Dissolved	Manganese, Total
04/24/23	17:00	C	CC AS 26	0.074	0.075	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0015	0.0021	0.014	0.16	< 0.0005	0.0015	0.071	0.1
04/25/23	5:25	C	CC AS 49	0.062	0.061	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0041	0.006	0.01	0.15	< 0.0005	0.00089	0.092	0.11
04/25/23	5:25	C	CC AS 50	0.0320	0.0340	< 0.0003	< 0.001	0.0009	0.0010	< 0.0009	< 0.0009	0.0072	0.0110	0.0110	0.2200	< 0.0005	0.0016	0.0700	0.0980
04/25/23	20:05	C	CC AS 59	0.062	0.063	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0037	0.0052	< 0.01	0.1	< 0.0005	0.00086	0.03	0.059
04/25/23	0:30	C	CC AS T2																
04/26/23	11:05	C	CC AS T11	0.059	0.062	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0037	0.0061	< 0.01	0.38	< 0.0005	0.0019	0.022	0.06
04/26/23	0:30	C	CC AS T2	0.059	0.065	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0035	0.0063	< 0.01	0.36	< 0.0005	0.0016	0.029	0.064
05/30/23	6:30	C	CC AS 26	0.028	0.032	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.001	0.0029	0.0046	0.052	0.59	< 0.0005	0.0045	0.044	0.18
05/30/23	10:35	C	CC AS 49	0.025	0.034	< 0.0003	< 0.001	< 0.0005	0.00058	< 0.0009	0.0013	0.0057	0.012	0.049	1	< 0.0005	0.0071	0.048	0.24
05/30/23	10:35	C	CC AS 50	0.02	0.028	< 0.0003	< 0.001	0.0012	0.0014	< 0.0009	0.0016	0.016	0.031	0.043	1.1	< 0.0005	0.0059	0.17	0.26
05/30/23	19:25	C	CC AS 59	0.026	0.036	< 0.0003	< 0.001	< 0.0005	0.00069	< 0.0009	0.0018	0.006	0.016	0.042	1.3	< 0.0005	0.0092	0.031	0.27
05/30/23	20:51	C	CC AS T2	0.027	0.035	< 0.0003	< 0.001	< 0.0005	0.00061	< 0.0009	0.0015	0.0053	0.014	0.038	1	< 0.0005	0.0073	0.035	0.24
05/31/23	6:38	C	CC AS T11																
05/31/23	6:48	C	CC AS T11	0.027	0.034	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.0013	0.0051	0.012	0.032	0.92	< 0.0005	0.0055	0.01	0.11
06/19/23	1:00	C	CC AS 26	0.025	0.029	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.002	0.0028	0.042	0.21	< 0.0005	0.0022	0.034	0.078
06/19/23	2:00	C	CC AS 26																
06/19/23	5:50	C	CC AS 49	0.023	0.028	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0044	0.0081	0.039	0.37	< 0.0005	0.0027	0.052	0.11
06/19/23	5:52	C	CC AS 49																
06/19/23	5:50	C	CC AS 50	0.026	0.034	< 0.0003	< 0.001	0.00097	0.0015	< 0.0009	0.0017	0.016	0.029	0.053	0.97	< 0.0005	0.0062	0.15	0.22
06/19/23	5:52	C	CC AS 50																
06/19/23	14:14	C	CC AS 59																
06/19/23	14:15	C	CC AS 59	0.025	0.031	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.001	0.005	0.0088	0.036	0.42	< 0.0005	0.0029	0.039	0.11
06/19/23	15:35	C	CC AS T2	0.027	0.033	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.00099	0.0044	0.0077	0.029	0.35	< 0.0005	0.0024	0.043	0.11
06/20/23	13:35	C	CC AS T11	0.027	0.033	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.00094	0.0042	0.0072	0.027	0.33	< 0.0005	0.0023	0.02	0.064
07/17/23	12:05	G	CC 50																
07/17/23	6:30	C	CC AS 26	0.0260	0.0280	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0011	0.0017	0.033	0.16	< 0.0005	0.002	0.02	0.067
07/17/23	10:50	C	CC AS 49	0.0240	0.0270	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0022	0.004	0.027	0.27	< 0.0005	0.0021	0.028	0.098
07/17/23	12:05	G	CC AS 50	0.0270	0.0280	< 0.0003	< 0.001	0.0011	0.0012	< 0.0009	< 0.0009	0.015	0.024	0.088	0.27	< 0.0005	0.0017	0.2	0.21
07/17/23	15:55	C	CC AS 59	0.0270	0.0300	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0023	0.0044	0.021	0.27	< 0.0005	0.0018	0.02	0.072
07/18/23	11:30	G	CC AS T11	0.0280	0.0370	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0022	0.0086	0.02	0.89	< 0.0005	0.0051	0.011	0.11
07/18/23	11:00	G	CC AS T2	0.0270	0.0290	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0023	0.0037	0.023	0.17	< 0.0005	0.0013	0.026	0.057
07/18/23	11:00	G	Trib 02																
07/18/23	11:30	G	Trib 11																
08/28/23	12:40	G	CC 26																
08/28/23	13:15	G	CC 49																
08/28/23	13:40	G	CC 50																
08/28/23	14:30	G	CC 59																
08/28/23	12:40	G	CC AS 26	0.0410	0.0440	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.001	0.0018	0.036	0.27	< 0.0005	0.0037	0.024	0.061
08/28/23	13:15	G	CC AS 49	0.035	0.045	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.0016	0.0037	0.011	0.026	1.3	< 0.0005	0.02	0.093	0.16
08/28/23	13:40	G	CC AS 50	0.039	0.067	< 0.0003	< 0.001	0.0013	0.0022	< 0.0009	0.0059	0.0095	0.046	< 0.01	5.4	< 0.0005	0.029	0.22	0.36
08/28/23	14:30	G	CC AS 59	0.036	0.065	< 0.0003	< 0.001	< 0.0005	0.00078	< 0.0009	0.0044	0.0032	0.024	0.011	4.5	< 0.0005	0.079	0.064	0.22
08/28/23	20:00	C	CC AS T11	0.043	0.053	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.0011	0.0038	0.011	< 0.01	1.4	< 0.0005	0.0063	< 0.002	0.099
08/28/23	14:00	C	CC AS T2	0.04	0.047	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.00095	0.0028	0.0073	0.24	0.84	< 0.0005	0.0054	0.0052	0.11
09/18/23	11:20	G	CC 26																
09/18/23	12:45	G	CC 49																
09/18/23	12:25	G	CC 50																
09/18/23	13:20	G	CC 59																
09/18/23	11:20	G	CC AS 26	0.045	0.047	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	< 0.001	0.0015	0.039	0.19	< 0.0005	0.0017	0.041	0.06
09/18/23	12:45	G	CC AS 49	0.037	0.038	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0034	0.0044	0.029	0.21	< 0.0005	0.0015	0.054	0.073
09/18/23	12:25	G	CC AS 50	0.041	0.043	< 0.0003	< 0.001	0.0014	0.0015	< 0.0009	< 0.0009	0.0076	0.014	< 0.01	0.34	< 0.0005	0.0026	0.14	0.16
09/18/23	13:20	G	CC AS 59	0.041	0.043	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0026	0.0044	0.018	0.25	< 0.0005	0.0019	0.023	0.052

Ambient Autosamplers

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.01	0.0003	0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001	0.002	0.002
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	**Sample Time**	**Sample Type**	**Location ID**	**Barium, Dissolved**	**Barium, Total**	**Beryllium, Dissolved**	**Beryllium, Total**	**Cadmium, Dissolved**	**Cadmium, Total**	**Chromium, Dissolved**	**Chromium, Total**	**Copper, Dissolved**	**Copper, Total**	**Iron, Dissolved**	**Iron, Total**	**Lead, Dissolved**	**Lead, Total**	**Manganese, Dissolved**	**Manganese, Total**
09/18/23	14:00	C	CC AS T2	0.044	0.047	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0024	0.0053	0.015	0.38	< 0.0005	0.0056	0.019	0.067
09/19/23	9:30	C	CC AS T11	0.045	0.047	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0029	0.0047	0.016	0.38	< 0.0005	0.0035	0.0031	0.045
10/16/23	11:40	G	CC 26																
10/16/23	12:20	G	CC 49																
10/16/23	12:40	G	CC 50																
10/16/23	13:20	G	CC 59																
10/16/23	11:40	G	CC AS 26	0.046	0.047	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	< 0.001	0.0013	0.027	0.14	< 0.0005	0.0013	0.055	0.065
10/16/23	12:20	G	CC AS 49	0.038	0.038	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0027	0.0039	0.021	0.098	< 0.0005	0.00068	0.071	0.079
10/16/23	12:40	G	CC AS 50	0.044	0.043	< 0.0003	< 0.001	0.00098	0.0011	< 0.0009	< 0.0009	0.0051	0.0071	< 0.01	0.082	< 0.0005	0.00089	0.11	0.11
10/16/23	13:20	G	CC AS 59	0.043	0.042	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0023	0.0036	0.012	0.1	< 0.0005	0.00072	0.031	0.043
10/16/23	12:00	C	CC AS T2	0.043	0.043	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0021	0.0034	0.01	0.11	< 0.0005	0.001	0.027	0.045
10/17/23	12:00	C	CC AS T11	0.046	0.048	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0017	0.0038	0.012	0.25	< 0.0005	0.002	0.015	0.04

Ambient Autosamplers

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.002	0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Molybdenum, Dissolved	Molybdenum, Total	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
04/24/23	17:00	C	CC AS 26	0.0053	0.0052	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.27	0.26	< 0.002	< 0.002	0.075	0.092
04/25/23	5:25	C	CC AS 49	0.0036	0.0034	0.0013	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.26	0.26	< 0.002	< 0.002	0.096	0.11
04/25/23	5:25	C	CC AS 50	< 0.002	< 0.002	0.0028	0.0031	< 0.002	< 0.002	< 0.0005	< 0.0005	0.3200	0.3200	< 0.002	< 0.002	0.2000	0.2300
04/25/23	20:05	C	CC AS 59	0.003	0.0029	0.0013	0.0013	< 0.002	< 0.002	< 0.0005	< 0.0005	0.28	0.26	< 0.002	< 0.002	0.076	0.096
04/25/23	0:30	C	CC AS T2														
04/26/23	11:05	C	CC AS T11	0.0031	0.0029	0.0011	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.28	0.27	< 0.002	< 0.002	0.037	0.062
04/26/23	0:30	C	CC AS T2	0.0029	0.0029	0.0012	0.0016	< 0.002	< 0.002	< 0.0005	< 0.0005	0.26	0.27	< 0.002	< 0.002	0.066	0.098
05/30/23	6:30	C	CC AS 26	0.0024	0.0031	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.097	0.094	< 0.002	< 0.002	0.056	0.1
05/30/23	10:35	C	CC AS 49	0.002	0.0024	< 0.001	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.094	0.093	< 0.002	< 0.002	0.061	0.14
05/30/23	10:35	C	CC AS 50	< 0.002	< 0.002	0.0024	0.0037	< 0.002	< 0.002	< 0.0005	< 0.0005	0.098	0.098	< 0.002	< 0.002	0.2	0.27
05/30/23	19:25	C	CC AS 59	0.002	0.0024	< 0.001	0.0017	< 0.002	< 0.002	< 0.0005	< 0.0005	0.096	0.095	< 0.002	< 0.002	0.062	0.18
05/30/23	20:51	C	CC AS T2	< 0.002	0.0023	< 0.001	0.0016	< 0.002	< 0.002	< 0.0005	< 0.0005	0.1	0.099	< 0.002	< 0.002	0.054	0.15
05/31/23	6:38	C	CC AS T11														
05/31/23	6:48	C	CC AS T11	0.0021	0.0023	< 0.001	0.0013	< 0.002	< 0.002	< 0.0005	< 0.0005	0.11	0.11	< 0.002	< 0.002	0.032	0.1
06/19/23	1:00	C	CC AS 26	< 0.002	0.0022	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.087	0.095	< 0.002	< 0.002	0.048	0.071
06/19/23	2:00	C	CC AS 26														
06/19/23	5:50	C	CC AS 49	< 0.002	< 0.002	< 0.001	0.0011	< 0.002	< 0.002	< 0.0005	< 0.0005	0.085	0.091	< 0.002	< 0.002	0.057	0.091
06/19/23	5:52	C	CC AS 49														
06/19/23	5:50	C	CC AS 50	< 0.002	< 0.002	0.0028	0.0039	< 0.002	< 0.002	< 0.0005	< 0.0005	0.11	0.11	< 0.002	< 0.002	0.19	0.27
06/19/23	5:52	C	CC AS 50														
06/19/23	14:14	C	CC AS 59														
06/19/23	14:15	C	CC AS 59	< 0.002	< 0.002	< 0.001	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.09	0.099	< 0.002	< 0.002	0.055	0.095
06/19/23	15:35	C	CC AS T2	< 0.002	< 0.002	< 0.001	0.0012	< 0.002	< 0.002	< 0.0005	< 0.0005	0.098	0.11	< 0.002	< 0.002	0.049	0.088
06/20/23	13:35	C	CC AS T11	0.002	0.002	< 0.001	0.0011	< 0.002	< 0.002	< 0.0005	< 0.0005	0.11	0.12	< 0.002	< 0.002	0.025	0.053
07/17/23	12:05	G	CC 50														
07/17/23	6:30	C	CC AS 26	0.0022	0.0023	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.099	0.097	< 0.002	< 0.002	0.032	0.05200
07/17/23	10:50	C	CC AS 49	< 0.002	< 0.002	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.095	0.094	< 0.002	< 0.002	0.041	0.07200
07/17/23	12:05	G	CC AS 50	< 0.002	< 0.002	0.0024	0.0033	< 0.002	< 0.002	< 0.0005	< 0.0005	0.18	0.18	< 0.002	< 0.002	0.21	0.24000
07/17/23	15:55	C	CC AS 59	< 0.002	< 0.002	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.1	0.1	< 0.002	< 0.002	0.034	0.06100
07/18/23	11:30	G	CC AS T11	< 0.002	< 0.002	< 0.001	0.0013	< 0.002	< 0.002	< 0.0005	< 0.0005	0.11	0.11	< 0.002	< 0.002	0.02	0.08500
07/18/23	11:00	G	CC AS T2	< 0.002	< 0.002	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.11	0.11	< 0.002	< 0.002	0.042	0.06100
07/18/23	11:00	G	Trib 02														
07/18/23	11:30	G	Trib 11														
08/28/23	12:40	G	CC 26														
08/28/23	13:15	G	CC 49														
08/28/23	13:40	G	CC 50														
08/28/23	14:30	G	CC 59														
08/28/23	12:40	G	CC AS 26	0.0031	0.0034	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.15	0.16	< 0.002	< 0.002	0.044	0.07100
08/28/23	13:15	G	CC AS 49	0.0026	0.0027	< 0.001	0.0022	< 0.002	< 0.002	< 0.0005	< 0.0005	0.14	0.15	< 0.002	< 0.002	0.045	0.11
08/28/23	13:40	G	CC AS 50	< 0.002	< 0.002	0.0039	0.0098	< 0.002	< 0.002	< 0.0005	< 0.0005	0.26	0.26	< 0.002	0.0082	0.1	0.42
08/28/23	14:30	G	CC AS 59	0.0024	0.0027	0.0012	0.0042	< 0.002	< 0.002	< 0.0005	0.00057	0.16	0.16	< 0.002	0.006	0.033	0.16
08/28/23	20:00	C	CC AS T11	0.0028	0.0028	< 0.001	0.0018	< 0.002	< 0.002	< 0.0005	< 0.0005	0.17	0.17	< 0.002	0.0029	0.014	0.069
08/28/23	14:00	C	CC AS T2	0.0026	0.0027	< 0.001	0.0017	< 0.002	< 0.002	< 0.0005	< 0.0005	0.16	0.16	< 0.002	< 0.002	0.037	0.091
09/18/23	11:20	G	CC 26														
09/18/23	12:45	G	CC 49														
09/18/23	12:25	G	CC 50														
09/18/23	13:20	G	CC 59														
09/18/23	11:20	G	CC AS 26	0.0036	0.0037	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.17	0.17	< 0.002	< 0.002	0.041	0.058
09/18/23	12:45	G	CC AS 49	0.0023	0.0022	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.15	0.15	< 0.002	< 0.002	0.055	0.07
09/18/23	12:25	G	CC AS 50	< 0.002	< 0.002	0.004	0.0046	< 0.002	< 0.002	< 0.0005	< 0.0005	0.38	0.38	< 0.002	< 0.002	0.25	0.3
09/18/23	13:20	G	CC AS 59	0.0023	0.0023	< 0.001	0.0011	< 0.002	< 0.002	< 0.0005	< 0.0005	0.17	0.17	< 0.002	< 0.002	0.048	0.069

Ambient Autosamplers

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.002	0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Molybdenum, Dissolved	Molybdenum, Total	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
09/18/23	14:00	C	CC AS T2	0.0025	0.0024	< 0.001	0.0012	< 0.002	< 0.002	< 0.0005	< 0.0005	0.19	0.18	< 0.002	< 0.002	0.039	0.07
09/19/23	9:30	C	CC AS T11	0.0026	0.0025	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.19	0.19	< 0.002	< 0.002	0.014	0.038
10/16/23	11:40	G	CC 26														
10/16/23	12:20	G	CC 49														
10/16/23	12:40	G	CC 50														
10/16/23	13:20	G	CC 59														
10/16/23	11:40	G	CC AS 26	0.0044	0.0044	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.19	0.19	< 0.002	< 0.002	0.045	0.056
10/16/23	12:20	G	CC AS 49	0.0027	0.0027	< 0.001	0.0011	< 0.002	< 0.002	< 0.0005	< 0.0005	0.17	0.17	< 0.002	< 0.002	0.08	0.089
10/16/23	12:40	G	CC AS 50	< 0.002	< 0.002	0.0036	0.0041	< 0.002	< 0.002	< 0.0005	< 0.0005	0.47	0.48	< 0.002	< 0.002	0.25	0.26
10/16/23	13:20	G	CC AS 59	0.0024	0.0025	< 0.001	0.0011	< 0.002	< 0.002	< 0.0005	< 0.0005	0.19	0.19	< 0.002	< 0.002	0.068	0.08
10/16/23	12:00	C	CC AS T2	0.0025	0.0025	< 0.001	0.0011	< 0.002	< 0.002	< 0.0005	< 0.0005	0.19	0.19	< 0.002	< 0.002	0.062	0.078
10/17/23	12:00	C	CC AS T11	0.0024	0.0025	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.2	0.2	< 0.002	< 0.002	0.028	0.046

Event Autosamplers

Method				SM2550B	SM4500H+B	SM2510B	ASTMD7315	SM2540D	SM5310C	SM4500NH3H	SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	EPA300	EPA300	EPA300	EPA200.8	EPA200.8
DL				1.0	1.0	10	1	1	0.5	0.01	0.01	0.03	0.0025	0.0025	0.1	5	10	0.001	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				1	1	0	1	0	1	2	2	2	4	4	1	0	0	5	5
Reporting Units				°C	s.u.	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Turbidity	Solids, Total Suspended	Carbon, Total Organic	Nitrogen, Ammonia (Salicylate)	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Bromide	Chloride	Sulfate	Arsenic, Dissolved	Arsenic, Total
04/03/23	16:00	CE	CC AS T2	16.2	7.8	520	1.8			< 0.01	0.40	0.52						< 0.001	< 0.001
04/03/23	16:00	CE	Trib 02					< 1	1.7					0.0098		63.6			
04/04/23	0:00	CE	CC AS T11	8.6	7.9	535	13.1			< 0.01	0.36	0.53						< 0.001	< 0.001
04/04/23	0:00	CE	Trib 11					26	1.8				< 0.0025	0.0317		66.2			
05/18/23	11:35	G	CC AS T27	13.4	7.4	347	26.0			0.45	0.23	< 0.03						< 0.001	< 0.001
05/18/23	11:35	G	Trib 27					54	4.9							60.7			
07/20/23	16:15	C	CC AS T11	18.7	7.6	200	99.4	139	2.1	0.02	0.14	0.44	0.0832	0.0088		21		< 0.001	0.0061
08/01/23	12:00	C	CC AS T11	19.0	7.5	208	302.2		4.1	0.09	0.51	2.50	0.0055	0.3100		18.3	28	< 0.001	0.0085
08/28/23	12:00	C	CC AS T2	15.7	7.7	285	224.0	215	2.4	< 0.01	0.23	0.73	0.0093	0.0920	< 0.1	31.3	54.4	< 0.001	0.036
08/29/23	10:00	C	CC AS T11	12.9	7.6	300	301.0	300	2.3	0.02	0.25	0.82	0.0108	0.1340	< 0.1	32.3	62.7	< 0.001	0.06
10/10/23	14:20	G	Trib 22d	19.2	7.8	873	88.8	184	13.6	0.11	0.94	2.10	0.0036	0.3510	0.17	156.8	75.6	< 0.001	0.003
11/01/23	9:45	G	Trib 03	6.1	7.8	453	9.5	44	1.7	0.03	0.27	0.58	0.0033	0.0475	0.1	49.6	89.8	< 0.001	0.0015
11/02/23	9:20	G	LDC Bypass	7.1	7.8	772	278.0	1300	6.3	0.03	0.06	2.12	0.0072	0.3740	0.17	66.1	95.4	< 0.001	0.018
11/03/23	11:35	G	Trib 04	11.5	7.0	477	22.6	82	3.2	< 0.01	0.20	0.60	0.0065	0.0840	0.11	53.1	89.9	< 0.001	0.0025

Event Autosamplers

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.01	0.0003	0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001	0.002	0.002
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Barium, Dissolved	Barium, Total	Beryllium, Dissolved	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Chromium, Dissolved	Chromium, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total	Manganese, Dissolved	Manganese, Total
04/03/23	16:00	CE	CC AS T2	0.061	0.061	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0033	0.0052	< 0.01	0.098	< 0.0005	0.00077	0.025	0.05
04/03/23	16:00	CE	Trib 02																
04/04/23	0:00	CE	CC AS T11	0.0590	0.0670	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0029	0.0074	< 0.01	0.9400	< 0.0005	0.0035	0.0140	0.1100
04/04/23	0:00	CE	Trib 11																
05/18/23	11:35	G	CC AS T27	0.043	0.056	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	0.0023	0.0059	0.014	0.069	1.8	< 0.0005	0.0093	0.038	0.11
05/18/23	11:35	G	Trib 27																
07/20/23	16:15	C	CC AS T11	0.031	0.1	< 0.0003	0.00037	< 0.0005	0.0014	0.0014	0.0092	0.004	0.071	0.03	9.5	< 0.0005	0.13	0.0047	0.42
08/01/23	12:00	C	CC AS T11	0.035	0.23	< 0.0003	0.0014	< 0.0005	0.0014	< 0.0009	0.035	0.0027	0.054	0.036	25	< 0.0005	0.04	< 0.002	0.76
08/28/23	12:00	C	CC AS T2	0.037	0.15	< 0.0003	0.0003	< 0.0005	0.0015	< 0.0009	0.015	0.0033	0.095	0.013	19	< 0.0005	0.55	0.016	0.51
08/29/23	10:00	C	CC AS T11	0.037	0.21	< 0.0003	0.00044	< 0.0005	0.0016	< 0.0009	0.02	0.0033	0.15	< 0.01	26	< 0.0005	0.99	0.015	0.54
10/10/23	14:20	G	Trib 22d	0.077	0.16	< 0.0003	0.00032	< 0.0005	< 0.001	< 0.0009	0.0048	0.0019	0.0099	0.048	7.6	< 0.0005	0.01	0.19	1.3
11/01/23	9:45	G	Trib 03	0.064	0.084	< 0.0003	< 0.001	< 0.0005	0.002	< 0.0009	0.0028	0.0017	0.028	0.03	2.2	< 0.0005	0.02	0.42	0.95
11/02/23	9:20	G	LDC Bypass	0.11	0.38	< 0.0003	0.0016	< 0.0005	0.01	< 0.0009	0.028	< 0.001	0.25	< 0.01	31	< 0.0005	0.27	0.052	1.3
11/03/23	11:35	G	Trib 04	0.062	0.092	< 0.0003	< 0.001	< 0.0005	0.001	< 0.0009	0.0032	0.0016	0.027	0.029	3.1	< 0.0005	0.025	0.11	0.27

Event Autosamplers

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.7r4.4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 901.1	EPA 901.1	EPA 901.1	EPA 901.1
DL				0.002	0.002	0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005	variable	variable	variable	variable
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L	pCi/L
Sample Date	Sample Time	Sample Type	Location ID	Molybdenum, Dissolved	Molybdenum, Total	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total	Gross Alpha	Gross Alpha, Uncertainty	Gross Beta	Gross Beta, Uncertainty
04/03/23	16:00	CE	CC AS T2	0.0031	0.0033	0.0013	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.28	0.28	< 0.002	< 0.002	0.076	0.094				
04/03/23	16:00	CE	Trib 02																		
04/04/23	0:00	CE	CC AS T11	0.0033	0.0034	0.0015	0.0023	< 0.002	< 0.002	< 0.0005	< 0.0005	0.3100	0.3000	< 0.002	0.0020	0.0560	0.1000				
04/04/23	0:00	CE	Trib 11																		
05/18/23	11:35	G	CC AS T27	0.0021	0.0025	0.0016	0.0031	< 0.002	< 0.002	< 0.0005	< 0.0005	0.18	0.18	< 0.002	0.0039	0.084	0.16	2	2.4	4.5	2.6
05/18/23	11:35	G	Trib 27																		
07/20/23	16:15	C	CC AS T11	0.0021	0.0025	< 0.001	0.0082	< 0.002	< 0.002	< 0.0005	0.0012	0.12	0.13	< 0.002	0.011	0.024	0.33	8.4	3.5	10.2	3
08/01/23	12:00	C	CC AS T11	0.0028	0.0029	< 0.001	0.025	< 0.002	< 0.002	< 0.0005	< 0.0005	0.13	0.16	< 0.002	0.038	0.0082	0.3	29.1	8.6	30.6	5.2
08/28/23	12:00	C	CC AS T2	0.0024	0.0047	< 0.001	0.01	< 0.002	< 0.002	< 0.0005	0.0056	0.16	0.17	< 0.002	0.02	0.024	0.37	21.7	6.3	15.5	3.3
08/29/23	10:00	C	CC AS T11	0.0024	0.0058	< 0.001	0.013	< 0.002	< 0.002	< 0.0005	0.01	0.16	0.19	< 0.002	0.026	0.019	0.49	25.8	8.5	21.6	4.8
10/10/23	14:20	G	Trib 22d	< 0.002	< 0.002	0.0017	0.0065	< 0.002	< 0.002	< 0.0005	< 0.0005	0.59	0.58	< 0.002	0.013	< 0.005	0.058				
11/01/23	9:45	G	Trib 03	0.003	0.0033	0.0017	0.0049	< 0.002	< 0.002	< 0.0005	< 0.0005	0.25	0.25	< 0.002	0.004	0.096	0.36				
11/02/23	9:20	G	LDC Bypass	0.0049	0.0041	0.0028	0.028	< 0.002	< 0.002	< 0.0005	0.004	0.66	0.69	< 0.002	0.047	< 0.005	1.8				
11/03/23	11:35	G	Trib 04	0.0028	0.0028	0.0018	0.0042	< 0.002	< 0.002	< 0.0005	< 0.0005	0.28	0.28	< 0.002	0.0054	0.031	0.24				

Tribs

Method				SM2550B	SM4500H+B	SM2510B	ASTMD888-09C	ASTMD7315	SM2540D	SM5310C	SM 9223 B	SM4500NH3H	SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	SM2340C	EPA300	EPA300
DL				1.0	1.0	10	1.0	1	1	0.5	1	0.01	0.01	0.03	0.0025	0.0025	10	0.1	5
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				1	1	0	1	1	0	1	0	2	2	2	4	4	0	1	0
Reporting Units				°C	s.u.	µS/cm	mg/L	NTU	mg/L	mg/L	cfu/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as CaCO3	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Oxygen, Dissolved	Turbidity	Solids, Total Suspended	Carbon, Total Organic	E. coli	Nitrogen, Ammonia (Salicylate)	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Hardness	Bromide	Chloride
01/04/23	9:15	G	Trib 01						< 1	1.0	3.0	0.02	0.44	0.58					58.14
01/04/23	10:25	G	Trib 01																
01/04/23	9:30	G	Trib 02						< 1	1.1	6.0	0.03	0.47	0.64					61.8600
01/04/23	10:25	G	Trib 02																
01/04/23	9:50	G	Trib 03						2	1.1	53.0								60.11
01/04/23	10:25	G	Trib 03																
01/04/23	10:25	G	Trib 04						19	1.5	70.0	0.02	0.41	0.63					65.54
01/04/23	8:25	G	Trib 24						< 1	2.0	5.0	0.03	0.07	0.27					47.26
01/04/23	10:25	G	Trib 24																
02/01/23	9:05	G	Trib 01						< 1	1.0	< 1	0.01	0.50	0.52					50.6
02/01/23	9:20	G	Trib 02						1	1.0	33.0	0.02	0.49	0.58					51.5
02/01/23	9:35	G	Trib 03						2	2.4	135.0	0.02	0.49	0.59					59.2
02/01/23	10:15	G	Trib 04						< 1	1.4	6.0	0.04	0.45	0.69					66.3
02/01/23	8:35	G	Trib 24						< 1	1.9	< 1	0.02	0.10	0.19					43.4
03/01/23	9:20	G	Trib 01						< 1	1.0	< 1	0.02	0.49	0.59			220.0000		57.91
03/01/23	9:20	G	Trib 02																
03/01/23	9:30	G	Trib 02						< 1	1.1	1.0	0.03	0.51	0.68			196.0000		59.98
03/01/23	9:20	G	Trib 03																
03/01/23	9:45	G	Trib 03						2	1.1	51.0	0.02	0.50	0.69			200.0000		64.94
03/01/23	9:20	G	Trib 04																
03/01/23	10:20	G	Trib 04						9	1.4	10.0	0.02	0.43	0.67			204.0000		66.7
03/01/23	8:40	G	Trib 24						1	1.9	3.0	0.02	0.10	0.27			160.0000		43.37
03/01/23	9:20	G	Trib 24																
04/05/23	9:40	G	Trib 01	3.3	7.8	636	11.4	2.4	< 1	1.3	9.0	< 0.01	0.35	0.47	< 0.0025	0.0092			92.1
04/05/23	9:55	G	Trib 02	7.0	7.9	622	10.6	1.4	3	1.3	5.0	< 0.01	0.37	0.46	< 0.0025	0.0108			94
04/05/23	10:40	G	Trib 11	6.4	7.9	556	20.4	5.5	12	1.6	5.0	< 0.01	0.34	0.48	< 0.0025	0.0173			71
04/05/23	8:45	G	Trib 24	12.4	7.8	379	9.5	1.7	1	1.8	< 1	0.01	0.07	0.22	< 0.0025	0.0101			44
05/03/23	9:15	G	Trib 01	13.7	7.6	496	9.4	3.9	20	2.3	5.0	< 0.01	0.26	0.58	< 0.0025	0.0374			80
05/03/23	9:35	G	Trib 02	14.4	7.8	483	9.4	6.4	20	2.5	8.0	< 0.01	0.26	0.58	< 0.0025	0.0356			79
05/03/23	1:00	G	Trib 03	16.7	7.9	502	8.8	6.9	9	2.4	25.0	< 0.01	0.23	0.45	< 0.0025	0.0257			81
05/03/23	9:55	G	Trib 03																
05/03/23	10:35	G	Trib 11	16.3	8.0	502	8.8	3.1	7	2.1	18.0	< 0.01	0.15	0.35	< 0.0025	0.0134			79
05/03/23	8:25	G	Trib 24	14.4	7.8	380	8.8	1.5	2	2.0	2.0	< 0.01	0.05	0.21	< 0.0025	0.0074			43
05/18/23	11:35	G	Trib 27												< 0.0025	0.0438			
06/07/23	9:10	G	Trib 01	14.0	7.6	172	9.3	6.3	15	3.8	19.0	< 0.01	0.12	0.36	< 0.0025	0.0222	76.0000		19
06/07/23	9:30	G	Trib 02	12.3	7.6	175.4	9.6	5.1	15	3.8	16.0	0.01	0.12	0.37	< 0.0025	0.0201	86.0000		20
06/07/23	9:50	G	Trib 03	13.6	13.6	168.5	9.3	7.0	19	4.0	29.0	0.01	0.12	0.38	0.264	0.2880	56.0000		19
06/07/23	10:30	G	Trib 11	17.5	7.8	201.3	8.9	5.2	10	3.9	93.0	0.02	0.09	0.37	< 0.0025	0.0225	92.0000		21
06/07/23	8:05	G	Trib 24	15.1	7.6	370.5	6.6	1.4	4	1.8	< 1	0.01	0.10	0.31	< 0.0025	0.0198	154.0000		42.7
07/05/23	9:55	G	Trib 01	13.2	7.8	157.5	8.9	8.7	34	2.3	37.0	< 0.01	0.16	0.37	< 0.0025	0.0147			16
07/05/23	10:20	G	Trib 02	13.0	7.9	154	9	11.0	29	2.2	33.0	< 0.01	0.16	0.35	< 0.0025	0.0165			13.9
07/05/23	10:35	G	Trib 03	13.4	7.9	157	9	9.9	14	2.2	61.0	< 0.01	0.15	0.34	0.005	0.0239			14.2
07/05/23	11:20	G	Trib 11	14.7	7.9	169.9	8.3	8.6	46	2.6	435.0	< 0.01	0.16	0.36	< 0.0025	0.0303			15.5
07/05/23	8:50	G	Trib 24	15.9	7.4	395.2	5.2	2.4	20	1.8	< 1	0.02	0.14	0.3	< 0.0025	0.014			43
07/05/23	9:30	G	Trib 01	17.6	7.7	189.2	8.2	10.2		2.52	205	< 0.01	0.14	0.38	0.0048	0.0244		< 0.1	15.4
07/05/23	9:45	G	Trib 02																
07/05/23	10:00	G	Trib 02	18	7.6	186.4	8.3	10.5		2.5	147	< 0.01	0.15	0.4	0.0041	0.0272			15.8
07/05/23	10:20	G	Trib 03	18.8	7.6	189.9	8.2	14.8		2.52	248	< 0.01	0.15	0.39	0.0046	0.0428		< 0.1	16.3
07/05/23	11:25	G	Trib 11	21.2	7.5	200.5	7.8	8.4		2.14	190	< 0.01	0.17	0.44	0.0065	0.0395		< 0.1	17.3
07/05/23	8:30	G	Trib 24	16.9	7.2	380.6	3.9	3.6		1.83	< 1	< 0.01	0.22	0.41	0.0034	0.0125		< 0.1	42.7
07/05/23	8:50	G	Trib 24																

Tribs

Method				SM2550B	SM4500H+B	SM2510B	ASTMD888-09C	ASTMD7315	SM2540D	SM5310C	SM 9223 B	SM4500NH3H	SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	SM2340C	EPA300	EPA300
DL				1.0	1.0	10	1.0	1	1	0.5	1	0.01	0.01	0.03	0.0025	0.0025	10	0.1	5
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				1	1	0	1	1	0	1	0	2	2	2	4	4	0	1	0
Reporting Units				°C	s.u.	µS/cm	mg/L	NTU	mg/L	mg/L	cfu/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as CaCO3	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Oxygen, Dissolved	Turbidity	Solids, Total Suspended	Carbon, Total Organic	E. coli	Nitrogen, Ammonia (Salicylate)	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Hardness	Bromide	Chloride
07/05/23	11:05	G	Trib 27	20	7.5	191	7.7	7.5		2.13	138	< 0.01	0.12	0.33	0.0065	0.0315		< 0.1	15.5
08/03/23	10:00	G	Trib 02															< 0.1	
09/06/23	9:20	G	Trib 01	16.5	7.5	290	8.6	1.2	4	1.73	25	0.02	0.21	0.36	0.0034	0.0105	120	< 0.1	27.2
09/06/23	9:40	G	Trib 02	18.7	7.6	293	8.1	1.7	4	1.55	20	0.02	0.21	0.39	0.0025	0.0089	124	< 0.1	26.2
09/06/23	11:00	G	Trib 11	21.5	7.8	307	8	4.9	13	1.65	77	< 0.01	0.14	0.27	0.0359	0.0583	128	< 0.1	27.8
09/06/23	8:30	G	Trib 24	18.8	7.3	351	3.7	3.6	4	1.98	20	0.02	0.1	0.27	0.0037	0.0149	136	< 0.1	40.9
09/06/23	10:35	G	Trib 27	19.3	7.7	292	8.2	4.3	6	2.13	461	< 0.01	0.09	0.26	0.0037	0.0186	120	< 0.1	25.3
10/04/23	10:00	G	Trib 01	2.5	8	324	9.5	1.2	4	1.62	3	< 0.01	0.11	0.21	< 0.0025	0.0039		< 0.1	29
10/04/23	10:15	G	Trib 02	15.9	8	317	8.7	< 1	5	1.39	6	0.02	0.12	0.23	< 0.0025	0.0059		< 0.1	30.1
10/04/23	10:25	G	Trib 03	14.7	7.9	360	8.4	1.4	2	1.83	88	0.02	0.12	0.26	< 0.0025	0.0081		< 0.1	36.9
10/04/23	11:05	G	Trib 11	15.4	8	293	8.6	2.4	8	1.63	61	< 0.01	0.08	0.21	< 0.0025	0.0145		< 0.1	28.5
10/04/23	8:25	G	Trib 24	17.5	7.2	361	4	2.4	5	2.06	66	0.02	0.07	0.24	0.008	0.0197		< 0.1	41.3
11/01/23	9:10	G	Trib 01	4.3	7.82	421	11.7	1	4	1.37	2	< 0.01	0.26	0.38	0.0027	0.0073		0.1	45.6
11/01/23	9:30	G	Trib 02	6.1	7.8	431	11	1	7	1.29	88	0.02	0.27	0.4	< 0.0025	0.0064		< 0.1	45.4
11/01/23	10:40	G	Trib 11	6.5	7.8	513	10.2	2.3	7	1.79	83	< 0.01	0.28	0.46	< 0.0025	0.0111		0.11	65
11/01/23	10:20	G	Trib 22d	8.1	7.7	105.9	9.9	1.7	3	2.68	22	< 0.01	0.05	0.23	0.0038	0.0119		< 0.1	7.2
11/01/23	8:30	G	Trib 24	16	7.7	347.3	7.4	1.9	3	2.01	44	0.02	0.04	0.19	0.0038	0.0117		< 0.1	37.9
12/06/23	9:05	G	Trib 01	2.4	7.8	460.8	11.8	1	< 1	1.12	< 1	< 0.01	0.38	0.49	0.004	0.0059	148		47.8
12/06/23	9:20	G	Trib 02	3.9	7.8	466.3	11.6	< 1	< 1	1.16	1	< 0.01	0.41	0.57	0.0028	0.0058	152		50.1
12/06/23	9:35	G	Trib 03	5.4	8	463.9	11	1.2	< 1	1.24	5	< 0.01	0.4	0.55	0.0032	0.0087	152		49.3
12/06/23	10:10	G	Trib 04	5.2	7.9	470.4	10.7	2.7	3	1.43		< 0.01	0.36	0.51	0.0035	0.0133			50.8
12/06/23	8:20	G	Trib 24	13.5	7.9	355.2	9.1	1.4	< 1	2.02	19	0.02	0.04	0.39	0.0035	0.0105	112		38.9

Tribs

Method				EPA300	EPA200.8	EPA200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8
DL				10	0.001	0.001	0.002	0.01	0.0003	0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Sulfate	Arsenic, Dissolved	Arsenic, Total	Barium, Dissolved	Barium, Total	Beryllium, Dissolved	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Chromium, Dissolved	Chromium, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total
01/04/23	9:15	G	Trib 01																	
01/04/23	10:25	G	Trib 01														< 0.01	0.038		
01/04/23	9:30	G	Trib 02																	
01/04/23	10:25	G	Trib 02														< 0.01	0.046		
01/04/23	9:50	G	Trib 03																	
01/04/23	10:25	G	Trib 03														0.01	0.076		
01/04/23	10:25	G	Trib 04														< 0.01	0.57		
01/04/23	8:25	G	Trib 24																	
01/04/23	10:25	G	Trib 24														< 0.01	0.086		
02/01/23	9:05	G	Trib 01														< 0.01	0.032		
02/01/23	9:20	G	Trib 02														< 0.01	0.052		
02/01/23	9:35	G	Trib 03														< 0.01	0.088		
02/01/23	10:15	G	Trib 04														< 0.01	0.16		
02/01/23	8:35	G	Trib 24														< 0.01	0.028		
03/01/23	9:20	G	Trib 01	< 10	< 0.001	< 0.001	0.052	0.057	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.003	0.0042	< 0.01	0.035	< 0.0005	< 0.001
03/01/23	9:20	G	Trib 02		< 0.001	< 0.001	0.054	0.06	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0024	0.0046	0.01	0.11	< 0.0005	0.00081
03/01/23	9:30	G	Trib 02	99																
03/01/23	9:20	G	Trib 03		< 0.001	< 0.001	0.054	0.059	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0022	0.0047	0.012	0.13	< 0.0005	0.0011
03/01/23	9:45	G	Trib 03	100																
03/01/23	9:20	G	Trib 04		< 0.001	< 0.001	0.055	0.064	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0017	0.0052	0.016	0.29	< 0.0005	0.0036
03/01/23	10:20	G	Trib 04	97																
03/01/23	8:40	G	Trib 24	58																
03/01/23	9:20	G	Trib 24		< 0.001	< 0.001	0.043	0.048	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0024	0.0029	< 0.01	0.026	< 0.0005	< 0.001
04/05/23	9:40	G	Trib 01														0.01	0.063		
04/05/23	9:55	G	Trib 02														< 0.01	0.11		
04/05/23	10:40	G	Trib 11														< 0.01	0.37		
04/05/23	8:45	G	Trib 24														< 0.01	0.044		
05/03/23	9:15	G	Trib 01	65													0.01	0.83		
05/03/23	9:35	G	Trib 02	65													0.11	0.87		
05/03/23	1:00	G	Trib 03	67																
05/03/23	9:55	G	Trib 03														0.01	0.31		
05/03/23	10:35	G	Trib 11	71													< 0.01	0.2		
05/03/23	8:25	G	Trib 24	58													< 0.01	0.059		
05/18/23	11:35	G	Trib 27																	
06/07/23	9:10	G	Trib 01	22	< 0.001	< 0.001	0.0250	0.0310	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0056	0.011	0.042	0.85	< 0.0005	0.006
06/07/23	9:30	G	Trib 02	22	< 0.001	< 0.001	0.0270	0.0330	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0052	0.011	0.043	0.86	< 0.0005	0.0059
06/07/23	9:50	G	Trib 03	21	< 0.001	< 0.001	0.0270	0.0320	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0058	0.011	0.042	0.82	< 0.0005	0.0058
06/07/23	10:30	G	Trib 11	24	< 0.001	< 0.001	0.0280	0.0300	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.005	0.0075	0.035	0.35	< 0.0005	0.002
06/07/23	8:05	G	Trib 24	57	< 0.001	< 0.001	0.05	0.05	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0054	0.0068	< 0.01	0.055	< 0.0005	< 0.001
07/05/23	9:55	G	Trib 01														0.21	0.8		
07/05/23	10:20	G	Trib 02														0.027	0.84		
07/05/23	10:35	G	Trib 03														0.023	1		
07/05/23	11:20	G	Trib 11														0.021	0.89		
07/05/23	8:50	G	Trib 24														0.01	0.1		
07/05/23	9:30	G	Trib 01	29.5													0.065	1.1		
07/05/23	9:45	G	Trib 02														0.029	1		
07/05/23	10:00	G	Trib 02	29.7																
07/05/23	10:20	G	Trib 03	30.4													0.036	1.3		
07/05/23	11:25	G	Trib 11	31.6													0.02	1.5		
07/05/23	8:30	G	Trib 24	55.6																
07/05/23	8:50	G	Trib 24														< 0.01	0.16		

Tribs

Method				EPA300	EPA200.8	EPA200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8
DL				10	0.001	0.001	0.002	0.01	0.0003	0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	**Sample Time**	**Sample Type**	**Location ID**	**Sulfate**	**Arsenic, Dissolved**	**Arsenic, Total**	**Barium, Dissolved**	**Barium, Total**	**Beryllium, Dissolved**	**Beryllium, Total**	**Cadmium, Dissolved**	**Cadmium, Total**	**Chromium, Dissolved**	**Chromium, Total**	**Copper, Dissolved**	**Copper, Total**	**Iron, Dissolved**	**Iron, Total**	**Lead, Dissolved**	**Lead, Total**
07/05/23	11:05	G	Trib 27	31.6													0.031	0.64		
08/03/23	10:00	G	Trib 02																	
09/06/23	9:20	G	Trib 01	58.1	< 0.001	< 0.001	0.04	0.043	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0025	0.0038	0.02	1	< 0.0005	0.0016
09/06/23	9:40	G	Trib 02	58.8	< 0.001	< 0.001	0.039	0.043	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0026	0.0039	0.018	0.17	< 0.0005	0.0014
09/06/23	11:00	G	Trib 11	60.6	< 0.001	< 0.001	0.041	0.048	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0018	0.0052	0.017	0.57	< 0.0005	0.0062
09/06/23	8:30	G	Trib 24	54.5	< 0.001	< 0.001	0.048	0.053	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.002	0.0034	< 0.01	0.19	< 0.0005	0.00071
09/06/23	10:35	G	Trib 27	58.3	< 0.001	< 0.001	0.041	0.045	< 0.0003	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0019	0.0028	0.038	0.24	< 0.0005	0.002
10/04/23	10:00	G	Trib 01	65.7													0.017	0.092		
10/04/23	10:15	G	Trib 02	66.1													0.021	0.094		
10/04/23	10:25	G	Trib 03	64.9													0.018	0.1		
10/04/23	11:05	G	Trib 11	54.6													0.014	0.22		
10/04/23	8:25	G	Trib 24	53.1													< 0.01	0.11		
11/01/23	9:10	G	Trib 01	86													0.011	0.096		
11/01/23	9:30	G	Trib 02	87.8													0.011	0.098		
11/01/23	10:40	G	Trib 11	93.8													0.013	0.19		
11/01/23	10:20	G	Trib 22d	< 10													0.027	0.11		
11/01/23	8:30	G	Trib 24	50.3													< 0.01	0.064		
12/06/23	9:05	G	Trib 01	91.5													< 0.01	0.084		
12/06/23	9:20	G	Trib 02	90.3													< 0.01	0.081		
12/06/23	9:35	G	Trib 03	92.5													< 0.01	0.12		
12/06/23	10:10	G	Trib 04	90.4													< 0.01	0.19		
12/06/23	8:20	G	Trib 24	53.5													< 0.01	0.067		

Tribs

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.002	0.002	0.002	0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Manganese, Dissolved	Manganese, Total	Molybdenum, Dissolved	Molybdenum, Total	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
01/04/23	9:15	G	Trib 01																
01/04/23	10:25	G	Trib 01	0.022	0.029													0.12	0.13
01/04/23	9:30	G	Trib 02																
01/04/23	10:25	G	Trib 02	0.022	0.03													0.12	0.13
01/04/23	9:50	G	Trib 03																
01/04/23	10:25	G	Trib 03	0.027	0.039													0.11	0.12
01/04/23	10:25	G	Trib 04	0.065	0.096													0.079	0.13
01/04/23	8:25	G	Trib 24																
01/04/23	10:25	G	Trib 24	0.0069	0.0089													0.018	0.019
02/01/23	9:05	G	Trib 01	0.02	0.024													0.13	0.14
02/01/23	9:20	G	Trib 02	0.024	0.029													0.13	0.13
02/01/23	9:35	G	Trib 03	0.027	0.036													0.12	0.13
02/01/23	10:15	G	Trib 04	0.048	0.054													0.077	0.086
02/01/23	8:35	G	Trib 24	0.0083	0.013													0.025	0.026
03/01/23	9:20	G	Trib 01	0.032	0.039	0.0023	0.0026	0.0015	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.27	0.27	< 0.002	< 0.002	0.11	0.13
03/01/23	9:20	G	Trib 02	0.044	0.057	0.0024	0.0027	0.0015	0.0015	< 0.002	< 0.002	< 0.0005	< 0.0005	0.28	0.29	< 0.002	< 0.002	0.1	0.13
03/01/23	9:30	G	Trib 02																
03/01/23	9:20	G	Trib 03	0.045	0.06	0.0024	0.0026	0.0014	0.0015	< 0.002	< 0.002	< 0.0005	< 0.0005	0.29	0.29	< 0.002	< 0.002	0.084	0.11
03/01/23	9:45	G	Trib 03																
03/01/23	9:20	G	Trib 04	0.065	0.086	0.0025	0.0026	0.0013	0.0017	< 0.002	< 0.002	< 0.0005	< 0.0005	0.29	0.3	< 0.002	< 0.002	0.067	0.099
03/01/23	10:20	G	Trib 04																
03/01/23	8:40	G	Trib 24																
03/01/23	9:20	G	Trib 24	0.011	0.017	0.0025	0.0028	0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.2	0.21	< 0.002	< 0.002	0.018	0.021
04/05/23	9:40	G	Trib 01	0.041	0.063													0.12	0.13
04/05/23	9:55	G	Trib 02	0.04	0.064													0.11	0.13000
04/05/23	10:40	G	Trib 11	0.024	0.051													0.06	0.08100
04/05/23	8:45	G	Trib 24	0.0023	0.0059													0.055	0.06300
05/03/23	9:15	G	Trib 01	0.054	0.25													0.081	0.23000
05/03/23	9:35	G	Trib 02	0.05	0.3													0.078	0.25000
05/03/23	1:00	G	Trib 03																
05/03/23	9:55	G	Trib 03	0.048	0.12													0.073	0.12000
05/03/23	10:35	G	Trib 11	0.028	0.052													0.035	0.05200
05/03/23	8:25	G	Trib 24	< 0.002	0.017													0.015	0.01800
05/18/23	11:35	G	Trib 27																
06/07/23	9:10	G	Trib 01	0.046	0.17	< 0.002	< 0.002	< 0.001	0.0015	< 0.002	< 0.002	< 0.0005	< 0.0005	0.094	0.092	< 0.002	< 0.002	0.073	0.13000
06/07/23	9:30	G	Trib 02	0.047	0.17	< 0.002	< 0.002	< 0.001	0.0015	< 0.002	< 0.002	< 0.0005	< 0.0005	0.098	0.097	< 0.002	< 0.002	0.068	0.13000
06/07/23	9:50	G	Trib 03	0.048	0.17	< 0.002	< 0.002	< 0.001	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.1	0.094	< 0.002	< 0.002	0.074	0.13000
06/07/23	10:30	G	Trib 11	0.024	0.052	< 0.002	0.002	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.11	0.11	< 0.002	< 0.002	0.034	0.05700
06/07/23	8:05	G	Trib 24	0.0027	0.018	0.0025	0.0027	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.22	0.21	< 0.002	< 0.002	0.05	0.052
07/05/23	9:55	G	Trib 01	0.088	0.093													0.077	0.082
07/05/23	10:20	G	Trib 02	0.04	0.091													0.049	0.081
07/05/23	10:35	G	Trib 03	0.041	0.11													0.048	0.087
07/05/23	11:20	G	Trib 11	0.0092	0.092													0.025	0.073
07/05/23	8:50	G	Trib 24	0.002	0.051													0.026	0.033
07/05/23	9:30	G	Trib 01	0.025	0.12													0.041	0.1
07/05/23	9:45	G	Trib 02	0.024	0.11													0.038	0.098
07/05/23	10:00	G	Trib 02																
07/05/23	10:20	G	Trib 03	0.027	0.13													0.036	0.11
07/05/23	11:25	G	Trib 11	0.0085	0.16													0.021	0.11
07/05/23	8:30	G	Trib 24																
07/05/23	8:50	G	Trib 24	0.003	0.16													0.058	0.073

Tribs

Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.002	0.002	0.002	0.002	0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Manganese, Dissolved	Manganese, Total	Molybdenum, Dissolved	Molybdenum, Total	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
07/05/23	11:05	G	Trib 27	0.015	0.062													0.017	0.045
08/03/23	10:00	G	Trib 02																
09/06/23	9:20	G	Trib 01	0.02	0.049	0.0025	0.0026	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.17	0.17	< 0.002	< 0.002	0.054	0.072
09/06/23	9:40	G	Trib 02	0.019	0.046	0.0025	0.0027	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.17	0.18	< 0.002	< 0.002	0.047	0.064
09/06/23	11:00	G	Trib 11	0.019	0.069	0.0028	0.0028	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.18	0.19	< 0.002	< 0.002	0.012	0.042
09/06/23	8:30	G	Trib 24	< 0.002	0.15	0.0024	0.0027	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.21	0.21	< 0.002	< 0.002	0.0089	0.018
09/06/23	10:35	G	Trib 27	0.0069	0.023	0.0026	0.0026	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.18	0.18	< 0.002	< 0.002	0.013	0.023
10/04/23	10:00	G	Trib 01	0.023	0.035													0.069	0.083
10/04/23	10:15	G	Trib 02	0.022	0.034													0.061	0.072
10/04/23	10:25	G	Trib 03	0.064	0.079													0.049	0.057
10/04/23	11:05	G	Trib 11	0.013	0.038													0.02	0.036
10/04/23	8:25	G	Trib 24	< 0.002	0.12													0.01	0.017
11/01/23	9:10	G	Trib 01	0.054	0.079													0.13	0.14
11/01/23	9:30	G	Trib 02	0.053	0.075													0.12	0.14
11/01/23	10:40	G	Trib 11	0.032	0.047													0.066	0.082
11/01/23	10:20	G	Trib 22d	0.0039	0.013													< 0.005	< 0.005
11/01/23	8:30	G	Trib 24	< 0.002	0.054													0.0057	0.01
12/06/23	9:05	G	Trib 01	0.037	0.056													0.12	0.14
12/06/23	9:20	G	Trib 02	0.037	0.052													0.12	0.13
12/06/23	9:35	G	Trib 03	0.033	0.059													0.11	0.13
12/06/23	10:10	G	Trib 04	0.013	0.024													0.08	0.095
12/06/23	8:20	G	Trib 24	< 0.002	0.025													0.006	0.01

Tribs

Method				EPA 901.1	EPA 901.1	EPA 901.1	EPA 901.1
DL				variable	variable	variable	variable
Max Sig figs				2	2	2	2
Max decimals				1	1	1	1
Reporting Units				pCi/L	pCi/L	pCi/L	pCi/L
Sample Date	Sample Time	Sample Type	Location ID	Gross Alpha	Gross Alpha, Uncertainty	Gross Beta	Gross Beta, Uncertainty
01/04/23	9:15	G	Trib 01				
01/04/23	10:25	G	Trib 01				
01/04/23	9:30	G	Trib 02				
01/04/23	10:25	G	Trib 02				
01/04/23	9:50	G	Trib 03				
01/04/23	10:25	G	Trib 03				
01/04/23	10:25	G	Trib 04				
01/04/23	8:25	G	Trib 24				
01/04/23	10:25	G	Trib 24				
02/01/23	9:05	G	Trib 01				
02/01/23	9:20	G	Trib 02				
02/01/23	9:35	G	Trib 03				
02/01/23	10:15	G	Trib 04				
02/01/23	8:35	G	Trib 24				
03/01/23	9:20	G	Trib 01	2.4	2	2.8	2.3
03/01/23	9:20	G	Trib 02				
03/01/23	9:30	G	Trib 02	2.3	2.2	3.8	2.5
03/01/23	9:20	G	Trib 03				
03/01/23	9:45	G	Trib 03	0.9	1.7	2.9	2.6
03/01/23	9:20	G	Trib 04				
03/01/23	10:20	G	Trib 04	2.8	2.3	4.2	2.7
03/01/23	8:40	G	Trib 24	2	1.8	2.9	2.2
03/01/23	9:20	G	Trib 24				
04/05/23	9:40	G	Trib 01				
04/05/23	9:55	G	Trib 02				
04/05/23	10:40	G	Trib 11				
04/05/23	8:45	G	Trib 24				
05/03/23	9:15	G	Trib 01				
05/03/23	9:35	G	Trib 02				
05/03/23	1:00	G	Trib 03				
05/03/23	9:55	G	Trib 03				
05/03/23	10:35	G	Trib 11				
05/03/23	8:25	G	Trib 24				
05/18/23	11:35	G	Trib 27				
06/07/23	9:10	G	Trib 01	3.1	1.9	3.3	2.3
06/07/23	9:30	G	Trib 02	3.8	2.1	3.3	2.3
06/07/23	9:50	G	Trib 03	2.8	1.9	3.3	2.2
06/07/23	10:30	G	Trib 11	1.2	1.5	3.0	2.4
06/07/23	8:05	G	Trib 24	1.8	2.8	5.9	4.7
07/05/23	9:55	G	Trib 01				
07/05/23	10:20	G	Trib 02				
07/05/23	10:35	G	Trib 03				
07/05/23	11:20	G	Trib 11				
07/05/23	8:50	G	Trib 24				
07/05/23	9:30	G	Trib 01				
07/05/23	9:45	G	Trib 02				
07/05/23	10:00	G	Trib 02				
07/05/23	10:20	G	Trib 03				
07/05/23	11:25	G	Trib 11				
07/05/23	8:30	G	Trib 24				
07/05/23	8:50	G	Trib 24				

Tribs

Method				EPA 901.1	EPA 901.1	EPA 901.1	EPA 901.1
DL				variable	variable	variable	variable
Max Sig figs				2	2	2	2
Max decimals				1	1	1	1
Reporting Units				pCi/L	pCi/L	pCi/L	pCi/L
Sample Date	Sample Time	Sample Type	Location ID	Gross Alpha	Gross Alpha, Uncertainty	Gross Beta	Gross Beta, Uncertainty
07/05/23	11:05	G	Trib 27				
08/03/23	10:00	G	Trib 02				
09/06/23	9:20	G	Trib 01	3.1	2.4	3.1	2.3
09/06/23	9:40	G	Trib 02	2.6	2.4	4.8	2.7
09/06/23	11:00	G	Trib 11	2.6	2.3	3.9	2.5
09/06/23	8:30	G	Trib 24	0.1	2	5.2	2.6
09/06/23	10:35	G	Trib 27	2.2	2.2	3.4	2.6
10/04/23	10:00	G	Trib 01				
10/04/23	10:15	G	Trib 02				
10/04/23	10:25	G	Trib 03				
10/04/23	11:05	G	Trib 11				
10/04/23	8:25	G	Trib 24				
11/01/23	9:10	G	Trib 01				
11/01/23	9:30	G	Trib 02				
11/01/23	10:40	G	Trib 11				
11/01/23	10:20	G	Trib 22d				
11/01/23	8:30	G	Trib 24				
12/06/23	9:05	G	Trib 01	4.4	3	5.1	2.6
12/06/23	9:20	G	Trib 02	2.9	2.6	5.8	2.9
12/06/23	9:35	G	Trib 03	5	3.2	6.3	2.8
12/06/23	10:10	G	Trib 04	8.2	3.9	5.9	2.8
12/06/23	8:20	G	Trib 24	4.9	2.8	5.8	2.7

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Method				**SM2550B**	**SM4500H+B**	**SM2510B**	**ASTMD888-09C**	**SM2580A**	**ASTMD7315**	**YSI optical probe**	**SM 10200-H**	**SM 10900**	**Secchi Disk**	**SM2540D**	**SM5310C**	**SM5910B**	**SM 9223 B**	**SM4500NH3H**
DL				**1.0**	**1.0**	**10**	**1.0**	**1.0**	**1**	**1**	**1**	**1**	**0.1**	**1**	**0.5**	**0.001**	**1**	**0.01**
Max Sig figs				**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**4**	**3**	**3**	**3**	**3**	**3**	**3**
Max decimals				**1**	**1**	**0**	**1**	**0**	**1**	**1**	**1**	**0**	**2**	**0**	**1**	**3**	**0**	**2**
Reporting Units				**°C**	**s.u.**	**µS/cm**	**mg/L**	**mV**	**NTU**	**µg/L**	**µg/L**	**ct/mL**	**m**	**mg/L**	**mg/L**	**10 cm^{-1}**	**cfu/100 mL**	**mg/L**
Sample Date	**Sample Time**	**Sample Type**	**Location ID**	**Temp**	**pH**	**Conductivity, Specific**	**Oxygen, Dissolved**	**ORP, Oxidation Reduction Potential**	**Turbidity**	**Chlorophyll a, Field**	**Chlorophyll a, Lab (Methanol)**	**Algae Count**	**Secchi Depth**	**Solids, Total Suspended**	**Carbon, Total Organic**	**UV254**	**E. coli**	**Nitrogen, Ammonia (Salicylate)**
03/20/23	11:30	**G**	**SL 10-00**	4.6	7.9	354	10.9	260	1.7	0.4			6.7					
03/20/23	11:30	**G**	**SL 10-03**	4.5	7.8	354	10.9	258	1.7	0.4				2	1.9			0.04
03/20/23	11:45	**G**	**SL 10-70**	4.4	7.8	357	10.7	227	2.2	1.6				3	2.0	0.3		0.05
03/20/23	11:15	**C**	**SL 10-PZ**	4.2	7.8	356	10.8	233	1.8	1.4	1.0	53.0		2	1.9	0.3		0.04
04/10/23		**G**	**SL 10-00**	8.5	7.9	366	10.2	297	2.0	0.7			4.7				< 1	
04/10/23	12:30	**G**	**SL 10-03**	7.7	7.9	364	10.3	297	1.7	0.8				1	1.9			0.02
04/10/23	12:45	**G**	**SL 10-70**	5.4	7.5	362	9.8	322	4.0	2.1				3	1.9	0.3	43.0	0.03
04/10/23	12:15	**C**	**SL 10-PZ**	6.1	7.8	361	10.3	307	2.0	1.6	1.2	56.0		3	1.9	0.3		0.03
04/24/23		**G**	**SL 10-00**	8.0	7.9	364	9.9	242	1.7	0.9			5.2					
04/24/23	10:40	**G**	**SL 10-03**	8.1	7.9	364	9.8	242	1.8	1.0				2				0.03
04/24/23	10:45	**G**	**SL 10-70**															
04/24/23	11:00	**G**	**SL 10-70**	8.1	7.6	370	8.7	246	6.1	2.8						0.3		0.03
04/24/23	10:45	**C**	**SL 10-PZ**	7.9	7.9	365	9.8	341	1.9	1.9	2.1	94.0				0.3		0.03
04/24/23	11:00	**C**	**SL 10-PZ**															
05/08/23		**G**	**SL 10-00**	14.4	8.2	375	9.4	257	0.9	0.1			6.3				< 1	
05/08/23	11:45	**G**	**SL 10-03**	13.8	8.2	378	9.3	261	1.0	0.2				< 1				0.02
05/08/23	11:45	**G**	**SL 10-70**													0.2		
05/08/23	12:00	**G**	**SL 10-70**	8.1	7.4	368	7.7	318	4.5	0.8				< 1	2.0		2.0	0.05
05/08/23	11:30	**C**	**SL 10-PZ**	10.9	8.3	369	10.1	277	1.3	0.4	3.1	85.0		< 1	2.0	0.3		0.03
05/22/23		**G**	**SL 10-00**	15.5	8.5	375	9.3	221	1.2	1.4			4.6					
05/22/23	11:20	**G**	**SL 10-03**	15.3	8.5	375	9.4	220	1.3	2.1				5				0.01
05/22/23	11:30	**G**	**SL 10-70**	8.4	7.2	371	7.3	253	3.2	3.6				5		0.2		0.08
05/22/23	11:15	**C**	**SL 10-PZ**	14.5	8.5	373	9.5	220	2.1	4.8	4.3	217.0				0.3		0.03
06/12/23	10:15	**G**	**SL 10-00**	18.8	8.7	365	8.2	168	1.2	0.9			3.8				< 1	
06/12/23	10:30	**G**	**SL 10-03**			364	8.2	168	1.4	1.3				2	2.6			< 0.01
06/12/23	10:45	**G**	**SL 10-70**	8.8	7.3	369	5.3	182	5.1	1.2				< 1	1.8	0.2	< 1	0.17
06/12/23	10:00	**C**	**SL 10-PZ**	12.4	8.3	281	9.7	171	1.8	6.8	5.6	263.0		2	2.9	0.4		< 0.01
06/26/23		**G**	**SL 10-00**	21.9	8.4	340	7.9	268		0.4			5.8					
06/26/23	11:25	**G**	**SL 10-03**	21.5	8.4	339	7.9	268		0.6								0.02
06/26/23	11:30	**G**	**SL 10-70**	9.0	7.2	375	3.7	306		2.6						0.3		0.17
06/26/23	11:15	**C**	**SL 10-PZ**								5.0	189.0				0.4		0.01
07/10/23		**G**	**SL 10-00**	22.3	8.3	352	7.5	309		0.6			7.2				< 1	
07/10/23	11:15	**G**	**SL 10-03**	22.3	8.3	352	7.5	304		0.9				31	2.6			0.02
07/10/23	11:20	**G**	**SL 10-70**	9.4	6.9	373	3.1	497		0.9				12	1.9	0.3	< 1	0.11
07/10/23	11:05	**C**	**SL 10-PZ**								4.1	132.0		13	2.6	0.3		0.02
07/25/23		**G**	**SL 10-00**	24.2	8.4	344.4	6.97	270.6		0.5			7.7					
07/25/23	11:55	**G**	**SL 10-03**	24.1	8.4	344.5	6.97	272.4		0.7								< 0.01
07/25/23	11:45	**G**	**SL 10-70**	9.6	6.9	375.8	0.94	350.6		0.9						0.3		0.06
07/25/23	11:30	**C**	**SL 10-PZ**								2.3	63.0				0.3		0.02
08/07/23		**G**	**SL 10-00**	22.9	8.3	333.9	7.31	247.2		0.5			7.3				< 1	
08/07/23	10:15	**G**	**SL 10-03**	22.8	8.3	333.8	7.32	249.7		0.7				1	2.3			< 0.01
08/07/23	11:15	**G**	**SL 10-03**															
08/07/23	10:45	**G**	**SL 10-70**	9.9	6.9	376.4	0.04	336.5		0.2				4	1.8	0.3	3.0	< 0.01
08/07/23	11:20	**G**	**SL 10-70**															
08/07/23	10:30	**C**	**SL 10-PZ**								0.97	39		< 1	2.29	0.322		0.02
08/07/23	11:05	**C**	**SL 10-PZ**															
08/15/23		**G**	**SL 10-00**										5.3					
08/15/23	11:00	**G**	**SL 10-70**															0.02
08/15/23	10:30	**C**	**SL 10-PZ**															0.03
08/21/23		**G**	**SL 10-00**	23.3	8.27	333.8	7.3	233.1		0.65			6.8					
08/21/23	10:55	**G**	**SL 10-03**															

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Method				SM2550B	SM4500H+B	SM2510B	ASTMD888-09C	SM2580A	ASTMD7315	YSI optical probe	SM 10200-H	SM 10900	Secchi Disk	SM2540D	SM5310C	SM5910B	SM 9223 B	SM4500NH3H
DL				1.0	1.0	10	1.0	1.0	1	1	1	1	0.1	1	0.5	0.001	1	0.01
Max Sig figs				3	3	3	3	3	3	3	3	4	3	3	3	3	3	3
Max decimals				1	1	0	1	0	1	1	1	0	2	0	1	3	0	2
Reporting Units				°C	s.u.	µS/cm	mg/L	mV	NTU	µg/L	µg/L	ct/mL	m	mg/L	mg/L	$10\ cm^{-1}$	cfu/100 mL	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Temp	pH	Conductivity, Specific	Oxygen, Dissolved	ORP, Oxidation Reduction Potential	Turbidity	Chlorophyll a, Field	Chlorophyll a, Lab (Methanol)	Algae Count	Secchi Depth	Solids, Total Suspended	Carbon, Total Organic	UV254	E. coli	Nitrogen, Ammonia (Salicylate)
08/21/23	11:55	G	SL 10-03	23.2	8.27	333.7	7.31	234.2		0.62								< 0.01
08/21/23	10:45	G	SL 10-70															
08/21/23	11:45	G	SL 10-70	10.2	6.85	379.3	0.02	284.8		0.55						0.27		0.04
08/21/23	10:30	C	SL 10-PZ															
08/21/23	11:30	C	SL 10-PZ								1.16	26				0.317		0.02
08/29/23		G	SL 10-00										7.3					
08/29/23	10:30	G	SL 10-70															0.08
08/29/23	10:45	C	SL 10-PZ															0.02
09/11/23		G	SL 10-00	21.4	8.04	335	7	291		0.6			4.5				< 1	
09/11/23	10:15	G	SL 10-03	21.4	8.04	335	7	290		0.6				2	1.94			0.02
09/11/23	10:30	G	SL 10-70	10.3	6.99	388	0.03	263		0.8				6	1.86	0.288	9	0.18
09/11/23	10:00	C	SL 10-PZ								1.5	15		3	2.03	0.289		< 0.01
09/19/23		G	SL 10-00										5.9					
09/19/23	11:00	G	SL 10-70															0.27
09/19/23	10:00	C	SL 10-PZ															
09/19/23	10:45	C	SL 10-PZ															0.01
09/25/23		G	SL 10-00	19.2	7.91	337	7.07	278		0.8			4					
09/25/23		G	SL 10-03															
09/25/23	11:00	G	SL 10-03	19	7.92	337	7.06	281		1.2								< 0.01
09/25/23	11:15	G	SL 10-70	10.5	6.84	390	0.03	111		0.4						0.3		0.19
09/25/23	10:45	C	SL 10-PZ								1.94	37				0.286		< 0.01
10/02/23		G	SL 10-00										4.4					
10/02/23	10:45	G	SL 10-70															0.19
10/02/23	10:30	C	SL 10-PZ															< 0.01
10/06/23	11:15	G	SL 10-70															
10/06/23	10:45	C	SL 10-PZ															
10/09/23		G	SL 10-00	17.5	7.87	339	7.4	298		0.5			5				1	
10/09/23		G	SL 10-03	17.3	7.88	339	7.4	299		0.8								< 0.01
10/09/23	10:15	G	SL 10-03											2	1.99			
10/09/23	0:00	G	SL 10-70	10.6	6.89	390	0.15	286		0.15						0.366	79	0.38
10/09/23	10:45	G	SL 10-70											5	2.25			
10/09/23	10:55	G	SL 10-70															
10/09/23		C	SL 10-PZ								1.35	26				0.277		0.01
10/09/23	10:30	C	SL 10-PZ											2	2.06			
10/09/23	10:40	C	SL 10-PZ															
10/23/23	0:00	G	SL 10-00	15.3	7.88	340	7.64	264		0.57			5.5					
10/23/23	10:10	G	SL 10-03		7.88	340	7.7	266		0.8								0.12
10/23/23	10:15	G	SL 10-03	15.2														
10/23/23	10:45	G	SL 10-70	10.9	6.79	389	0.46	132		0.5						0.36		0.38
10/23/23	10:30	C	SL 10-PZ								1.61	19				0.286		0.15
11/21/23		G	SL 10-00										4					
11/21/23		C	SL 10-PZ								2.13							

STANDLEY LAKE

Method				SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	SM2340C	EPA300	EPA300	EPA300	EPA 200.8	EPA 200.8	EPA 200.7r4.4	EPA200.8	EPA200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.01	0.03	0.0025	0.0025	10	0.1	5	10	0.002	0.002	0.1	0.001	0.001	0.002	0.01	0.0003
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				2	2	4	4	0	1	0	0	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Hardness	Bromide	Chloride	Sulfate	Silica, Dissolved	Silica, Total	Silicon, Dissolved	Arsenic, Dissolved	Arsenic, Total	Barium, Dissolved	Barium, Total	Beryllium, Dissolved
03/20/23	11:30	G	SL 10-00																
03/20/23	11:30	G	SL 10-03	0.04	0.24			160											
03/20/23	11:45	G	SL 10-70	0.04	0.29			154.0000						2.3000	< 0.001	< 0.001	0.0490	0.0490	< 0.0003
03/20/23	11:15	C	SL 10-PZ	0.04	0.27			164						2.3	< 0.001	< 0.001	0.049	0.05	< 0.0003
04/10/23		G	SL 10-00																
04/10/23	12:30	G	SL 10-03	0.04	0.22	< 0.0025	0.0075			43.2									
04/10/23	12:45	G	SL 10-70	0.04	0.26	< 0.0025	0.011			42.9				2.2					
04/10/23	12:15	C	SL 10-PZ	0.04	0.23	< 0.0025	0.0092			43				2.2					
04/24/23		G	SL 10-00																
04/24/23	10:40	G	SL 10-03	0.22	0.22	< 0.0025	0.0073												
04/24/23	10:45	G	SL 10-70			< 0.0025	0.0089												
04/24/23	11:00	G	SL 10-70	0.03	0.25									2					
04/24/23	10:45	C	SL 10-PZ	0.03	0.28									1.9					
04/24/23	11:00	C	SL 10-PZ			< 0.0025	0.0078												
05/08/23		G	SL 10-00																
05/08/23	11:45	G	SL 10-03	0.03	0.18	< 0.0025	0.0060			47.6									
05/08/23	11:45	G	SL 10-70																
05/08/23	12:00	G	SL 10-70	0.04	0.44	< 0.0025	0.0095			43.6				2.1					
05/08/23	11:30	C	SL 10-PZ	0.02	0.23	< 0.0025	0.0069			44.5				1.6					
05/22/23		G	SL 10-00																
05/22/23	11:20	G	SL 10-03	0.02	0.24	< 0.0025	0.0069			48									
05/22/23	11:30	G	SL 10-70	0.04	0.26	0.005	0.0081							2.2					
05/22/23	11:15	C	SL 10-PZ	0.02	0.29	< 0.0025	0.0092							0.98					
06/12/23	10:15	G	SL 10-00																
06/12/23	10:30	G	SL 10-03	< 0.01	0.19	< 0.0025	0.0083	117.0000		44									
06/12/23	10:45	G	SL 10-70	0.04	0.34	< 0.0025	0.0103	126.0000		42		3			< 0.001	< 0.001	0.0550	0.0590	< 0.0003
06/12/23	10:00	C	SL 10-PZ	< 0.01	0.21	< 0.0025	0.0106	116.0000		44		0			< 0.001	< 0.001	0.0510	0.0530	< 0.0003
06/26/23		G	SL 10-00																
06/26/23	11:25	G	SL 10-03	< 0.01	0.21	< 0.0025	0.0065												
06/26/23	11:30	G	SL 10-70	0.06	0.39	< 0.0025	0.0147					3							
06/26/23	11:15	C	SL 10-PZ	< 0.01	0.20	< 0.0025	0.0122					0							
07/10/23		G	SL 10-00																
07/10/23	11:15	G	SL 10-03	< 0.01	0.21	< 0.0025	0.0066			42									
07/10/23	11:20	G	SL 10-70	0.11	0.41	< 0.0025	0.0133			43		3							
07/10/23	11:05	C	SL 10-PZ	< 0.01	0.24	< 0.0025	0.0118			42		1							
07/25/23		G	SL 10-00																
07/25/23	11:55	G	SL 10-03	< 0.01	0.26	< 0.0025	0.0055												
07/25/23	11:45	G	SL 10-70	0.17	0.40	< 0.0025	0.0106					3							
07/25/23	11:30	C	SL 10-PZ	< 0.01	0.31	0.005	0.0111					0.83							
08/07/23		G	SL 10-00																
08/07/23	10:15	G	SL 10-03	< 0.01	0.20				< 0.1	39.2	49.3								
08/07/23	11:15	G	SL 10-03			< 0.0025	0.0058												
08/07/23	10:45	G	SL 10-70	0.25	0.43				< 0.1	42.8	56.2	3.4							
08/07/23	11:20	G	SL 10-70			< 0.0025	0.0125												
08/07/23	10:30	C	SL 10-PZ	< 0.01	0.24				< 0.1	39.3	49.7	1.1							
08/07/23	11:05	C	SL 10-PZ			< 0.0025	0.0111												
08/15/23		G	SL 10-00																
08/15/23	11:00	G	SL 10-70	0.24	0.41	< 0.0025	0.0123												
08/15/23	10:30	C	SL 10-PZ	< 0.01	0.21	< 0.0025	0.0058												
08/21/23		G	SL 10-00																
08/21/23	10:55	G	SL 10-03			< 0.0025	0.058												

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Method				SM4500NO3I	SM4500NO3	SM4500PE	SM4500PE	SM2340C	EPA300	EPA300	EPA300	EPA 200.8	EPA 200.8	EPA 200.7r4.4	EPA200.8	EPA200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.01	0.03	0.0025	0.0025	10	0.1	5	10	0.002	0.002	0.1	0.001	0.001	0.002	0.01	0.0003
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				2	2	4	4	0	1	0	0	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Nitrogen	Phosphorus, Dissolved (DRP)	Phosphorus, Total	Hardness	Bromide	Chloride	Sulfate	Silica, Dissolved	Silica, Total	Silicon, Dissolved	Arsenic, Dissolved	Arsenic, Total	Barium, Dissolved	Barium, Total	Beryllium, Dissolved
08/21/23	11:55	G	SL 10-03	< 0.01	0.16														
08/21/23	10:45	G	SL 10-70			< 0.0025	0.0149												
08/21/23	11:45	G	SL 10-70	0.19	0.38							3.5							
08/21/23	10:30	C	SL 10-PZ			0.005	0.0084												
08/21/23	11:30	C	SL 10-PZ	< 0.01	0.19							1.5							
08/29/23		G	SL 10-00																
08/29/23	10:30	G	SL 10-70	0.15	0.38	< 0.0025	0.0142												
08/29/23	10:45	C	SL 10-PZ	0.02	0.21	< 0.0025	0.0094												
09/11/23		G	SL 10-00																
09/11/23	10:15	G	SL 10-03	< 0.01	0.18	< 0.0025	0.0073	120	< 0.1	37.6	50.2								
09/11/23	10:30	G	SL 10-70	0.07	0.4	< 0.0025	0.0188	152	< 0.1	43	53.8	4.5	4.8		< 0.001	< 0.001	0.053	0.054	< 0.0003
09/11/23	10:00	C	SL 10-PZ	< 0.01	0.17	< 0.0025	0.0084	128	< 0.1	37.8	49.2	2.1	2.3		< 0.001	< 0.001	0.048	0.051	< 0.0003
09/19/23		G	SL 10-00																
09/19/23	11:00	G	SL 10-70	0.02	0.52	0.0153	0.0332												
09/19/23	10:00	C	SL 10-PZ									2.1	2.3			< 0.001		0.051	
09/19/23	10:45	C	SL 10-PZ	0.01	0.17	< 0.0025	0.0082												
09/25/23		G	SL 10-00																
09/25/23		G	SL 10-03			< 0.0025	0.0085												
09/25/23	11:00	G	SL 10-03	< 0.01	0.16														
09/25/23	11:15	G	SL 10-70	0.05	0.43	0.171	0.0306					4.3							
09/25/23	10:45	C	SL 10-PZ	< 0.01	0.17	< 0.0025	0.0056					2.4							
10/02/23		G	SL 10-00																
10/02/23	10:45	G	SL 10-70	0.05	0.43	0.0302	0.103												
10/02/23	10:30	C	SL 10-PZ	< 0.01	0.17	0.0076	0.103												
10/06/23	11:15	G	SL 10-70									4.3							
10/06/23	10:45	C	SL 10-PZ									2.4							
10/09/23		G	SL 10-00																
10/09/23		G	SL 10-03	< 0.01	0.15	< 0.0025	0.0081												
10/09/23	10:15	G	SL 10-03						< 0.1	38.8	50.8								
10/09/23	0:00	G	SL 10-70	< 0.01	0.6	0.0563	0.128												
10/09/23	10:45	G	SL 10-70						< 0.1	43.2	51.3								
10/09/23	10:55	G	SL 10-70									5.1							
10/09/23		C	SL 10-PZ	< 0.01	0.26	< 0.0025	0.0138												
10/09/23	10:30	C	SL 10-PZ						< 0.1	38.5	50.5								
10/09/23	10:40	C	SL 10-PZ									2.5							
10/23/23	0:00	G	SL 10-00																
10/23/23	10:10	G	SL 10-03	< 0.01	0.19														
10/23/23	10:15	G	SL 10-03			0.0031	0.0063												
10/23/23	10:45	G	SL 10-70	< 0.01	0.59	0.0331	0.0592					5.5			0.0019	0.0021	0.055	0.057	< 0.0003
10/23/23	10:30	C	SL 10-PZ	0.01	0.18	0.0025	0.0073					2.8			< 0.001	< 0.001	0.052	0.053	< 0.0003
11/21/23		G	SL 10-00																
11/21/23		C	SL 10-PZ																

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Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001	0.002	0.002	0.0001	0.002	0.002
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Chromium, Dissolved	Chromium, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total	Manganese, Dissolved	Manganese, Total	Mercury, Total	Molybdenum, Dissolved	Molybdenum, Total
03/20/23	11:30	G	SL 10-00																
03/20/23	11:30	G	SL 10-03																
03/20/23	11:45	G	SL 10-70	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0012	0.0014	< 0.01	0.0600	< 0.0005	< 0.001	0.0220	0.0270	< 0.0001	0.0026	0.0026
03/20/23	11:15	C	SL 10-PZ	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0013	0.0013	< 0.01	0.036	< 0.0005	< 0.001	0.022	0.025	< 0.0001	0.0026	0.0027
04/10/23		G	SL 10-00																
04/10/23	12:30	G	SL 10-03																
04/10/23	12:45	G	SL 10-70																
04/10/23	12:15	C	SL 10-PZ																
04/24/23		G	SL 10-00																
04/24/23	10:40	G	SL 10-03																
04/24/23	10:45	G	SL 10-70																
04/24/23	11:00	G	SL 10-70																
04/24/23	10:45	C	SL 10-PZ																
04/24/23	11:00	C	SL 10-PZ																
05/08/23		G	SL 10-00																
05/08/23	11:45	G	SL 10-03																
05/08/23	11:45	G	SL 10-70																
05/08/23	12:00	G	SL 10-70																
05/08/23	11:30	C	SL 10-PZ																
05/22/23		G	SL 10-00																
05/22/23	11:20	G	SL 10-03																
05/22/23	11:30	G	SL 10-70																
05/22/23	11:15	C	SL 10-PZ																
06/12/23	10:15	G	SL 10-00																
06/12/23	10:30	G	SL 10-03																
06/12/23	10:45	G	SL 10-70	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	< 0.001	< 0.01	< 0.01	0.12	< 0.0005	< 0.001	0.16	0.21	< 0.0001	0.0027	0.003
06/12/23	10:00	C	SL 10-PZ	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0016	0.0015	< 0.01	0.059	< 0.0005	< 0.001	< 0.002	0.0091	< 0.0001	0.0028	0.0029
06/26/23		G	SL 10-00																
06/26/23	11:25	G	SL 10-03																
06/26/23	11:30	G	SL 10-70																
06/26/23	11:15	C	SL 10-PZ																
07/10/23		G	SL 10-00																
07/10/23	11:15	G	SL 10-03																
07/10/23	11:20	G	SL 10-70																
07/10/23	11:05	C	SL 10-PZ																
07/25/23		G	SL 10-00																
07/25/23	11:55	G	SL 10-03																
07/25/23	11:45	G	SL 10-70																
07/25/23	11:30	C	SL 10-PZ																
08/07/23		G	SL 10-00																
08/07/23	10:15	G	SL 10-03																
08/07/23	11:15	G	SL 10-03																
08/07/23	10:45	G	SL 10-70																
08/07/23	11:20	G	SL 10-70																
08/07/23	10:30	C	SL 10-PZ																
08/07/23	11:05	C	SL 10-PZ																
08/15/23		G	SL 10-00																
08/15/23	11:00	G	SL 10-70								0.01	0.2			0.002	0.3			
08/15/23	10:30	C	SL 10-PZ																
08/21/23		G	SL 10-00																
08/21/23	10:55	G	SL 10-03																

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Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8
DL				0.001	0.0005	0.001	0.0009	0.0009	0.001	0.01	0.01	0.01	0.0005	0.001	0.002	0.002	0.0001	0.002	0.002
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Date	Sample Time	Sample Type	Location ID	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Chromium, Dissolved	Chromium, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total	Manganese, Dissolved	Manganese, Total	Mercury, Total	Molybdenum, Dissolved	Molybdenum, Total
08/21/23	11:55	G	SL 10-03																
08/21/23	10:45	G	SL 10-70																
08/21/23	11:45	G	SL 10-70																
08/21/23	10:30	C	SL 10-PZ																
08/21/23	11:30	C	SL 10-PZ																
08/29/23		G	SL 10-00																
08/29/23	10:30	G	SL 10-70								0.01	0.21			0.5	0.61			
08/29/23	10:45	C	SL 10-PZ																
09/11/23		G	SL 10-00																
09/11/23	10:15	G	SL 10-03																
09/11/23	10:30	G	SL 10-70	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	< 0.001	0.0011	< 0.01	0.13	< 0.0005	< 0.001	1.4	1.4	< 0.0001	0.0044	0.0046
09/11/23	10:00	C	SL 10-PZ	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	< 0.001	0.0014	< 0.01	0.057	< 0.0005	< 0.001	< 0.002	0.0089	< 0.0001	0.0027	0.0029
09/19/23		G	SL 10-00																
09/19/23	11:00	G	SL 10-70								< 0.01	0.13			1.9	1.9			
09/19/23	10:00	C	SL 10-PZ								< 0.01	0.057							
09/19/23	10:45	C	SL 10-PZ																
09/25/23		G	SL 10-00																
09/25/23		G	SL 10-03																
09/25/23	11:00	G	SL 10-03																
09/25/23	11:15	G	SL 10-70																
09/25/23	10:45	C	SL 10-PZ																
10/02/23		G	SL 10-00																
10/02/23	10:45	G	SL 10-70								0.26	0.48			1.8	1.8			
10/02/23	10:30	C	SL 10-PZ																
10/06/23	11:15	G	SL 10-70																
10/06/23	10:45	C	SL 10-PZ																
10/09/23		G	SL 10-00																
10/09/23		G	SL 10-03																
10/09/23	10:15	G	SL 10-03																
10/09/23	0:00	G	SL 10-70																
10/09/23	10:45	G	SL 10-70																
10/09/23	10:55	G	SL 10-70																
10/09/23		C	SL 10-PZ																
10/09/23	10:30	C	SL 10-PZ																
10/09/23	10:40	C	SL 10-PZ																
10/23/23	0:00	G	SL 10-00																
10/23/23	10:10	G	SL 10-03																
10/23/23	10:15	G	SL 10-03																
10/23/23	10:45	G	SL 10-70	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	< 0.001	< 0.01	0.033	0.17	< 0.0005	< 0.001	2.3	2.3	< 0.0001	0.0045	0.0046
10/23/23	10:30	C	SL 10-PZ	< 0.001	< 0.0005	< 0.001	< 0.0009	< 0.0009	0.0012	0.0011	< 0.01	0.048	< 0.0005	< 0.001	< 0.002	0.0089	< 0.0001	0.0029	0.0028
11/21/23		G	SL 10-00																
11/21/23		C	SL 10-PZ																

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Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 901.1	EPA 901.1	EPA 901.1	EPA 901.1
DL				0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005	variable	variable	variable	variable
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L	pCi/L
Sample Date	Sample Time	Sample Type	Location ID	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total	Gross Alpha	Gross Alpha, Uncertainty	Gross Beta	Gross Beta, Uncertainty
03/20/23	11:30	G	SL 10-00													1.4	1.8	3.6	2.4
03/20/23	11:30	G	SL 10-03																
03/20/23	11:45	G	SL 10-70	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.2100	0.2000	< 0.002	< 0.002	0.0150	0.0170	5.3	2.6	5.4	2.5
03/20/23	11:15	C	SL 10-PZ	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.2	0.2	< 0.002	< 0.002	0.014	0.016	3.2	2.3	4.9	2.5
04/10/23		G	SL 10-00																
04/10/23	12:30	G	SL 10-03																
04/10/23	12:45	G	SL 10-70																
04/10/23	12:15	C	SL 10-PZ																
04/24/23		G	SL 10-00																
04/24/23	10:40	G	SL 10-03																
04/24/23	10:45	G	SL 10-70																
04/24/23	11:00	G	SL 10-70																
04/24/23	10:45	C	SL 10-PZ																
04/24/23	11:00	C	SL 10-PZ																
05/08/23		G	SL 10-00																
05/08/23	11:45	G	SL 10-03																
05/08/23	11:45	G	SL 10-70																
05/08/23	12:00	G	SL 10-70																
05/08/23	11:30	C	SL 10-PZ																
05/22/23		G	SL 10-00																
05/22/23	11:20	G	SL 10-03																
05/22/23	11:30	G	SL 10-70																
05/22/23	11:15	C	SL 10-PZ																
06/12/23	10:15	G	SL 10-00													3	2.4	3.2	2.4
06/12/23	10:30	G	SL 10-03																
06/12/23	10:45	G	SL 10-70	< 0.001	0.0013	< 0.002	< 0.002	< 0.0005	< 0.0005	0.22	0.24	< 0.002	< 0.002	0.012	0.01600	3.1	2.4	2.7	2.4
06/12/23	10:00	C	SL 10-PZ	< 0.001	0.001	< 0.002	< 0.002	< 0.0005	< 0.0005	0.21	0.23	< 0.002	< 0.002	< 0.005	0.00550	0.8	1.7	3.8	2.5
06/26/23		G	SL 10-00																
06/26/23	11:25	G	SL 10-03																
06/26/23	11:30	G	SL 10-70																
06/26/23	11:15	C	SL 10-PZ																
07/10/23		G	SL 10-00																
07/10/23	11:15	G	SL 10-03																
07/10/23	11:20	G	SL 10-70																
07/10/23	11:05	C	SL 10-PZ																
07/25/23		G	SL 10-00																
07/25/23	11:55	G	SL 10-03																
07/25/23	11:45	G	SL 10-70																
07/25/23	11:30	C	SL 10-PZ																
08/07/23		G	SL 10-00																
08/07/23	10:15	G	SL 10-03																
08/07/23	11:15	G	SL 10-03																
08/07/23	10:45	G	SL 10-70																
08/07/23	11:20	G	SL 10-70																
08/07/23	10:30	C	SL 10-PZ																
08/07/23	11:05	C	SL 10-PZ																
08/15/23		G	SL 10-00																
08/15/23	11:00	G	SL 10-70											0.013	0.017				
08/15/23	10:30	C	SL 10-PZ																
08/21/23		G	SL 10-00																
08/21/23	10:55	G	SL 10-03																

STANDLEY LAKE

Sample Date	Sample Time	Sample Type	Location ID	Nickel, Dissolved	Nickel, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Strontium, Dissolved	Strontium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total	Gross Alpha	Gross Alpha, Uncertainty	Gross Beta	Gross Beta, Uncertainty
Method				EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	PA 200.7 Rev 4	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 901.1	EPA 901.1	EPA 901.1	EPA 901.1
DL				0.001	0.005	0.002	0.002	0.0005	0.0005	0.002	0.002	0.002	0.002	0.005	0.005	variable	variable	variable	variable
Max Sig figs				3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
Max decimals				5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1
Reporting Units				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L	pCi/L
08/21/23	11:55	G	SL 10-03																
08/21/23	10:45	G	SL 10-70																
08/21/23	11:45	G	SL 10-70																
08/21/23	10:30	C	SL 10-PZ																
08/21/23	11:30	C	SL 10-PZ																
08/29/23		G	SL 10-00																
08/29/23	10:30	G	SL 10-70											0.01	0.013				
08/29/23	10:45	C	SL 10-PZ																
09/11/23		G	SL 10-00													2.6	2.3	3.8	2.7
09/11/23	10:15	G	SL 10-03																
09/11/23	10:30	G	SL 10-70	0.0014	0.0014	< 0.002	< 0.002	< 0.0005	< 0.0005	0.23	0.22	< 0.002	< 0.002	0.01	0.012	3.7	2.9	4.1	2.7
09/11/23	10:00	C	SL 10-PZ	< 0.001	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.2	0.2	< 0.002	< 0.002	< 0.005	< 0.005	3.8	2.6	6.9	3
09/19/23		G	SL 10-00																
09/19/23	11:00	G	SL 10-70											0.0082	0.011				
09/19/23	10:00	C	SL 10-PZ																
09/19/23	10:45	C	SL 10-PZ																
09/25/23		G	SL 10-00																
09/25/23		G	SL 10-03																
09/25/23	11:00	G	SL 10-03																
09/25/23	11:15	G	SL 10-70																
09/25/23	10:45	C	SL 10-PZ																
10/02/23		G	SL 10-00																
10/02/23	10:45	G	SL 10-70											0.0072	0.0099				
10/02/23	10:30	C	SL 10-PZ																
10/06/23	11:15	G	SL 10-70																
10/06/23	10:45	C	SL 10-PZ																
10/09/23		G	SL 10-00																
10/09/23		G	SL 10-03																
10/09/23	10:15	G	SL 10-03																
10/09/23	0:00	G	SL 10-70																
10/09/23	10:45	G	SL 10-70																
10/09/23	10:55	G	SL 10-70																
10/09/23		C	SL 10-PZ																
10/09/23	10:30	C	SL 10-PZ																
10/09/23	10:40	C	SL 10-PZ																
10/23/23	0:00	G	SL 10-00																
10/23/23	10:10	G	SL 10-03																
10/23/23	10:15	G	SL 10-03																
10/23/23	10:45	G	SL 10-70	0.0016	0.0015	< 0.002	< 0.002	< 0.0005	< 0.0005	0.22	0.22	< 0.002	< 0.002	< 0.005	0.0081				
10/23/23	10:30	C	SL 10-PZ	0.0011	< 0.005	< 0.002	< 0.002	< 0.0005	< 0.0005	0.2	0.2	< 0.002	< 0.002	< 0.005	< 0.005				
11/21/23		G	SL 10-00																
11/21/23		C	SL 10-PZ																