Fisherman's II urban outfall during a storm event

Truckee Meadows Stormwater Monitoring Annual Report
Fiscal Year 2020

Prepared for: CITY OF RENO

In Cooperation with:

City of Sparks

Nevada DOT

Washoe County, Nevada

Western Regional Water Commission

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The Truckee Meadows Stormwater Permit Coordinating Committee

(NPDES MS4 Discharge Permit No. NVS000001)

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EXECUTIVE SUMMARY

The Truckee River through the Truckee Meadows has impaired water quality related to high water temperature, excessive nutrients, and increased total dissolved solids (TDS). Water quality is of particular concern because the Truckee River and its tributaries have a number of beneficial uses including aquatic habitat, recreation, and domestic and irrigation water. To attain nutrient-related water quality objectives in the Truckee River, the Nevada Division of Environmental Protection (NDEP) has developed a Total Maximum Daily Load (TMDL) for total-nitrogen (Total-N), total-phosphorus (Total-P), and TDS.

In 1990, the NDEP issued a Municipal Separate Storm Sewer System (MS4) permit to the Truckee Meadows Region, which includes the City of Reno, City of Sparks, and Washoe County. The permit requires the continued administration, implementation, and enforcement of a Stormwater Management Program (SWMP) to mitigate pollution from stormwater runoff within the Truckee Meadows permit area including receiving waters of the Truckee River and its tributaries. A stormwater monitoring program to collect stormwater and baseflow samples across Truckee River tributaries and some urban outfalls has been part of the SWMP since 2003 and is administered under the 2018 Sample and Analysis Plan (SAP) created by Balance Hydrologics (Trustman and Hastings, 2018).

This annual stormwater monitoring report is required under the MS4 permit to report stormwater quality measured in the previous fiscal year. The report supports the permit holder in continuing to develop a robust data set of stormwater quality to facilitate identification of water quality or environmental degradation problems in the Truckee Meadows and to document changes in water quality over time in response to land management, sediment control strategies, and other improvement measures, as required by the SWMP.

Balance Hydrologics evaluated water quality in stormwater and baseflow at 15 monitoring stations as part of the Truckee Meadows Regional Storm Water Quality Management Program in FY2020. Grab samples were collected, and instantaneous loads were quantified for 7 stations, while automated samplers and near-continuous streamflow gages at 4 urban outfalls and 4 tributary stations were used to calculate constituent load to the Truckee River during storm events and a 24-hour baseflow period.

Total annual precipitation in the Truckee Meadows in FY2020, as measured at the Reno-Tahoe International Airport (RNO), was 4.11 inches, well below the long-term annual average of 7.40 inches. Most of this precipitation fell in November and December with some late winter/early spring storms in March and April. January and February, typically the wettest months of the year, were unseasonably dry in 2020. There were some summer convective storms observed in May and June, but they were extremely isolated and limited in precipitation.

As a result of the below-average precipitation and limited rainfall-runoff events, Balance staff were only successful in collecting 13 out of a scheduled 30 samples (2 storm event samples at 4 stations and 1 storm event sample at an additional 5 stations during 5 separate storm events). As in past years, Balance also collected baseflow water quality samples at 11 tributary monitoring stations during summer baseflow (August 5-6, 2019) and winter baseflow (February 12-13, 2020).

Across all storms sampled at all sampled stations, most but not all Total-N concentrations in stormwater runoff exceeded established water quality standards (WQS). Most but not all Total-N concentrations in tributary baseflow exceeded WQS across all locations sampled and where WQS are established. Highest concentrations in stormwater runoff were measured from urban outfalls. Whereas, the highest concentrations in baseflow were measured from North Truckee Drain, a major tributary to the Truckee River.

Across all storms sampled at all sampled stations, Total-P concentrations ranged between 0.03 mg/L and 4.2 mg/L. Highest Total-P concentrations in stormwater runoff were measured from the Arlington Street urban outfall. Total-P concentrations in baseflow ranged between 0.07 mg/L to as high as 0.43 mg/L. While single value WQS do not exist for Total-P, these values are typical in both stormwater and baseflow in the Truckee Meadows and can affect water quality by acting as a limiting agent in biological activity.

TDS concentrations measured in stormwater runoff exceeded WQS in 13 of 31 samples collected (includes composite samples). TDS concentrations in baseflow exceeded WQS in samples from both North Truckee Drain stations, Chalk Creek and Alum Creek, all other stations sampled were below WQS. In some cases, TDS concentrations in baseflow exceeded concentrations in stormwater runoff which may suggest water quality impairment originates from irrigation returns, illicit discharges, or other sources that occur during non-precipitation runoff.

Limited water samples were collected and analyzed for *E.coli* in FY2020 due to holding time constraints at the time of sampling and the limited number of runoff events. Stormwater runoff samples were successfully collected and analyzed from Alum Creek and concentrations were above WQS. However, in FY2020, Balance was authorized to augment sampling and collected additional baseflow bacteria water samples at upstream and downstream locations from 10 tributaries the Truckee River and Steamboat Creek across the Truckee Meadows in June 2020 under baseflow conditions. Results suggest an increase in *E.coli* from upstream locations to downstream locations at most locations with several locations exceeding WQS.

Physical parameters, including turbidity, and chemical parameters, including dissolved oxygen and pH, measured from both stormwater runoff and baseflow also suggest conditions that exceed established WQS. All measurements of Dissolved oxygen were within an acceptable range or met WQS with the exception of measurements at North Truckee Drain at Big Fish Drive that were below WQS in summer baseflow conditions.

Stormwater and baseflow loads were quantified at all tributary stations with near-continuous streamflow and automated samplers—which allowed for multiple samples to be collected over a storm event hydrograph. Stormwater load measured in FY2020 were relatively low due to the below average level of precipitation and runoff during sampled storms.

Summer and winter baseflow daily load in Steamboat Creek and North Truckee Drain were roughly the same and all loads were well below TMDLs established for three constituents (Total-N, Total-P, and TDS) in the Truckee River at Lockwood. The exception was Total-P, where summer baseflow load was twice as much as the winter baseflow load, but still below the TMDL for the Truckee River.

1 INTRODUCTION AND PROJECT PURPOSE

1.1 Introduction

The Truckee Meadows Storm Water Permit Coordinating Committee (SWPCC) is composed of representatives of the City of Reno, City of Sparks and Washoe County and is responsible for the development, administration, and implementation of the Stormwater Management Program (SWMP) for the Truckee Meadows (**Figure 1-1**). This is part of a National Pollution Discharge Elimination System (NPDES) MS4 Permit to monitor and implement source controls to reduce and prevent harmful pollutants from being washed by stormwater runoff into local water bodies. The SWPCC is required by its MS4 permit to conduct a stormwater monitoring program following a Sampling and Analysis Plan (SAP) that describes the sampling program and approach. Under the SWMP, sampling has been conducted since 2003 at a number of established monitoring stations across the Truckee Meadows with results reported to the Nevada Department of Environmental Protection (NDEP). In fiscal year[1] 2020 (FY2020), Balance Hydrologics (Balance) was contracted to continue implementing the stormwater monitoring program under the guidance of the SWPCC and in accordance with the 2018 SAP (Trustman and Hastings, 2018) and addendum to the 2018 SAP dated September 19, 2019.

1.2 Project Purpose

The primary goal of the stormwater monitoring program is to develop a better understanding of how stormwater runoff affects receiving waters within the MS4 permit area over time through monitoring, research and investigation (Stantec, 2012). With accurate, and representative monitoring data, program effectiveness can be assessed and new or revised stormwater Best Management Practices (BMPs) can be identified. In support of this overall program goal, four monitoring objectives have been identified:

1. Characterize stormwater runoff quality in tributaries and urban stormwater outfalls to the Truckee River;
2. Collect the data necessary to improve our understanding of stormwater effects on listed constituents in impaired receiving waters;

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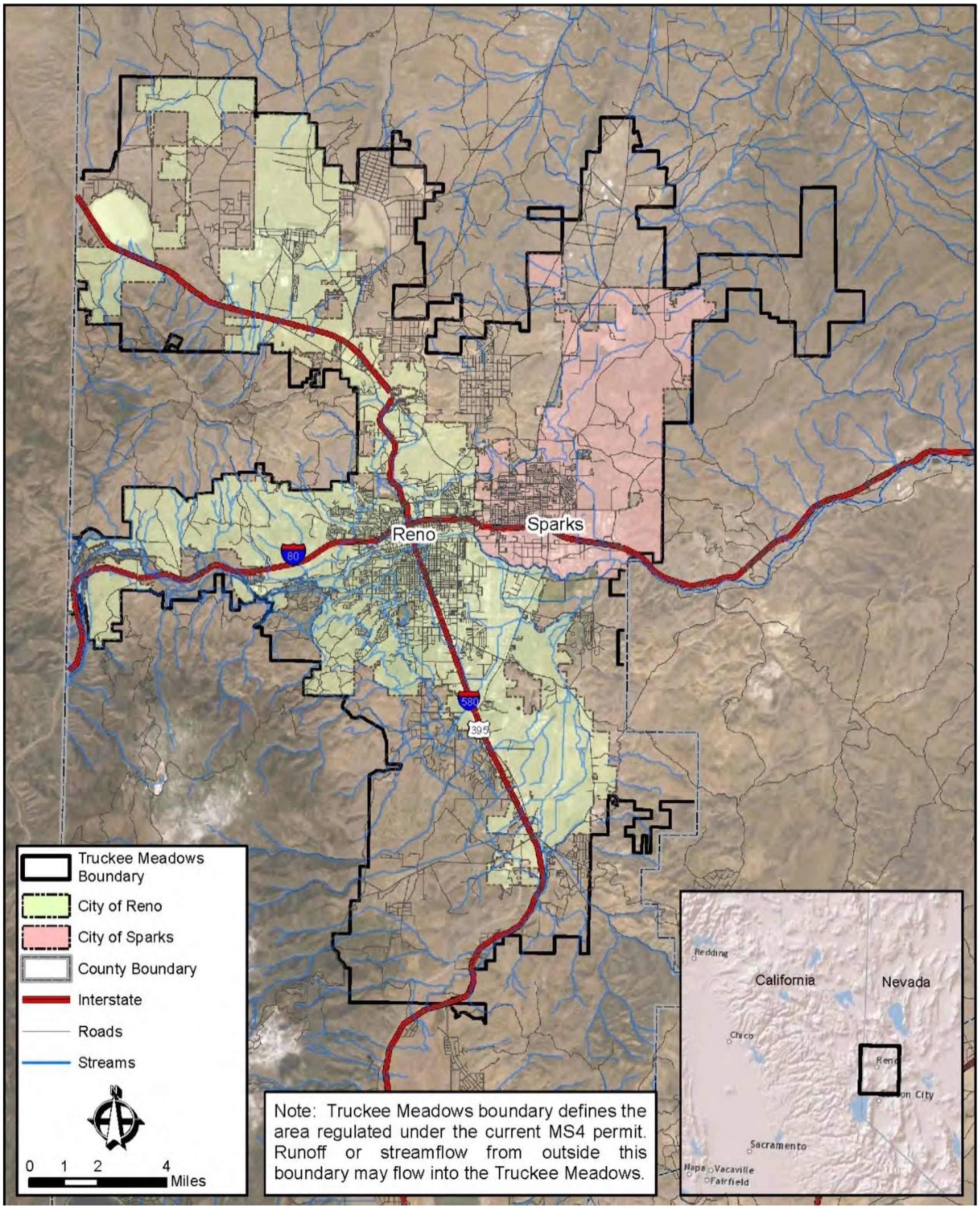
[1] Fiscal year corresponds to the City of Reno's 12-month fiscal period beginning July 1, for a given year through June 30 of the following named year.

3. Measure the baseflow water quality in selected tributaries with varying land-use types within the study area; and

4. Conduct special studies and investigations as needs arise and funding is available to better understand stormwater issues in the area.



Note: Truckee Meadows boundary defines the area regulated under the current MS4 permit. Runoff or streamflow from outside this boundary may flow into the Truckee Meadows.

Figure 1-1 **Location Map of Truckee Meadows, including City of Reno, City of Sparks and parts of Washoe County, Nevada**

1.3 Regulatory Background

The discharge of municipal stormwater runoff within the Truckee Meadows is regulated under a single discharge permit, a Municipal Separate Storm Sewer System (MS4) permit. The permit is jointly issued to the City of Reno, City of Sparks, and Washoe County and allows the co-permittees to discharge municipal stormwater runoff into the receiving waters of the Truckee River and tributaries. The permit also requires stormwater monitoring, defined as regular observation and sampling that is representative of the volume and nature of the monitored discharge (NDEP, 2010).

In addition to the NPDES Stormwater Permit Program, Section 303(d) of the Clean Water Act also established a program to manage water pollution in water bodies that are not meeting federal water quality standards. Section 303(d) requires that states establish a list of impaired water bodies and assess the sources of that pollution.

Every two years, NDEP is required to prepare and submit an updated 303(d) list to the U.S. Environmental Protection Agency (USEPA). The 2018 SAP used for the monitoring program in this report is based on the 303(d) list from the Nevada 2014 Water Quality Integrated Report published in 2016. Impairment differs between listed water bodies, but constituents of concern include nutrients, bacteria, metals, and general chemical parameters such as pH and physical parameters such as temperature (**Table 1-1**).

Table 1-1 **2014 Impaired Waters and Listed Constituents** 303(d) List, Truckee Meadows, Nevada (adapted from NDEP, 2016)

Impaired Waters and Listed Constituents, 2014 303(d) List, Truckee Meadows

Monitoring	Water Name	Reach Impaired	Impairment	Impaired Beneficial Use
FY2018	Truckee River	From NV-CA state line to E. McCarran	Water Temperature	AQL
Yes	Alum Creek	Entire reach	pH	PWL, RWC
			Total-P	AQL, RWC
			Ortho-P	AQL, RWC
			Water Temperature	AQL
			TDS	MDS
			TSS	AQL
Yes	Chalk Creek	Entire reach	Nitrate	AQL, RWC
			Total-P	AQL, RWC
			Ortho-P	AQL, RWC
			Selenium	AQL
			Sulfates	MDS
			Temperature	AQL
			TDS	MDS
			TSS	AQL
No	Sparks Marina	Entire reservoir	Total-N	AQL, RWC
			Total-P	AQL, RWC
			TDS	MDS
No	Tracy Pond	Entire area	pH	AQL, PWL, RWC
No	Dry Creek	Headwaters to Boynton Slough	E-coli	RWC
No	Evans Creek	HWY 395 to Dry Creek	E-coli	RWC
No	Franktown Creek	From irrigation diversion to Washoe Lake	Iron	AQL
No	Galena Creek	(see NDEP, 2014)	pH	AQL, PWL, RWC
No	Hunter Creek	From Hunter Lake to its confluence with the Truckee River	pH	AQL
Yes	Steamboat Creek	Little Washoe Lake to USGS 10349300	E-coli	RWC
		USGS 10349300 to Truckee River	Arsenic	AQL, IRR, WLS
			Boron	IRR, WLS
			E-coli	RWC
			Iron	AQL
Yes	Thomas Creek	Below Steamboat Ditch	Arsenic	AQL, IRR, WLS
			Boron	IRR, WLS
No	Washoe Lakes	Entire lakes	Mercury in fish tissue	FC
Yes (N. Fork Only)	Whites Creek	Middle Fork	E-coli	RWC
			Iron	AQL
		North and South Forks and Whites Creek	Total-P	AQL, RWC
		North Fork	Total-P	AQL, RWC
			E-coli	RWC

Notes:

Monitoring indicated with "yes" include at least one station of the listed waters monitored by Balance Hydrologics, Inc. as part of this prog

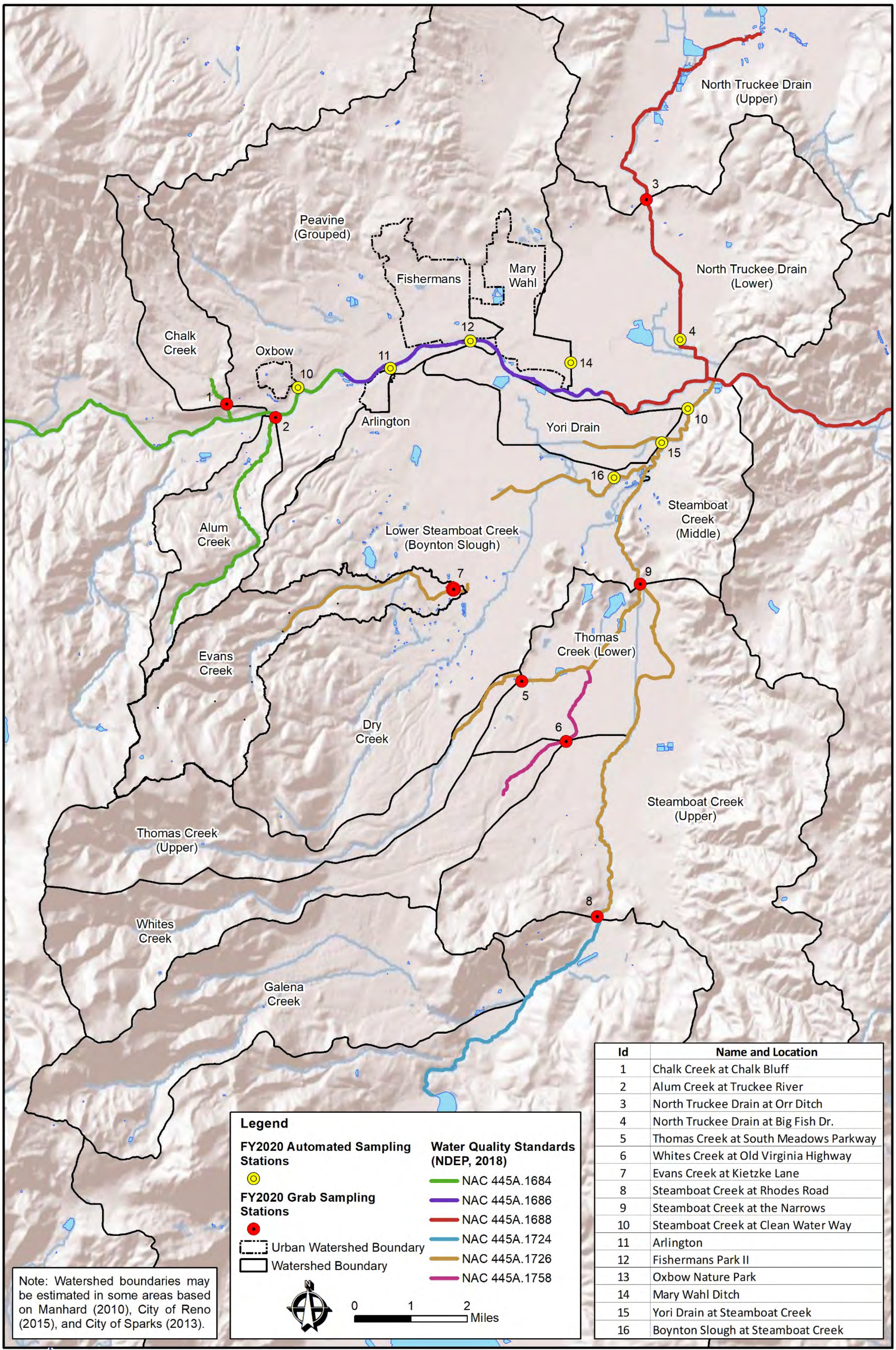
AQL = aquatic life, FC = fish consumption, IRR = irrigation, MDS = municipal domestic supply, PWL = propagation of wildlife,

RNC = recreation not involving contact with water, RWC = recreation involving contact with water, WLS = watering of livestock.

Ortho-P = Orthophosphate, Total-N = Total Nitrogen, Total-P = Total Phosphorus, TDS = Total Dissolved Solids, TSS = Total Suspended Solids.

Nevada's water quality standards, as contained in the Nevada Administrative Code (NAC) 445A.11704 – 445A.2234, define the water quality goals for a segment or length of a stream or river by designating beneficial uses of the water and setting criteria necessary to protect the beneficial uses and/or maintain high water quality. Beneficial uses include, but are not limited to, irrigation, recreation, aquatic life, and drinking water supply. In many cases, listed waters have different beneficial uses and different numeric criteria. Some listed waters have two or more segments with each segment having different beneficial uses and numeric criteria.

For the purposes of this stormwater monitoring program, specific water-quality numeric criteria were identified for each tributary or segment monitored in accordance with current NAC and their control points. The Tributary Rule (NAC 445A.1239) states that all water quality standards (WQS) established for Designated Waters shall apply to all tributaries that are non-designated waters. **Figure 1-2** shows watershed boundaries for tributaries monitored under this program, stations monitored in FY2020, and tributary or stream segments that have specific beneficial uses and numeric criteria used to compare water quality results measured in this program. Monitored Designated waters and non-designated waters, tributary to the Truckee River , are outlined in **Table 1-2** as they relate to their respective NACs and the Tributary Rule. Finally, we present water quality parameters, beneficial uses, and water quality standards for each of the six NAC listed streams or river segments in **Appendix E**. We note that some numeric criteria include single value (S.V.) measures and/or annual averages (A-Avg.). Samples collected as part of this program are considered single value measures and are compared to S.V. standards when they exist. If S.V. standards do not exist for a given parameter, results will be compared to A-Avg., but should be interpreted with caution.



Note: Watershed boundaries may be estimated in some areas based on Manhard (2010), City of Reno (2015), and City of Sparks (2013).

Id	Name and Location
1	Chalk Creek at Chalk Bluff
2	Alum Creek at Truckee River
3	North Truckee Drain at Orr Ditch
4	North Truckee Drain at Big Fish Dr.
5	Thomas Creek at South Meadows Parkway
6	Whites Creek at Old Virginia Highway
7	Evans Creek at Kietzke Lane
8	Steamboat Creek at Rhodes Road
9	Steamboat Creek at the Narrows
10	Steamboat Creek at Clean Water Way
11	Arlington
12	Fishermans Park II
13	Oxbow Nature Park
14	Mary Wahl Ditch
15	Yori Drain at Steamboat Creek
16	Boynton Slough at Steamboat Creek

Balance Hydrologics, Inc.

Basemap Source: ESRI ArcGIS Online and data partners

Y:\GIS\Projects\213136 City of Reno\mxd\213136 Figure 1_2 FY2020 Watershed and Water Quality Map_v2.mxd

Figure 1-2 Monitoring Station Map showing 303(d) Designated Waters with Water Quality Standards and Non-Designated Waters with Tributary Rule applied, Truckee Meadows Stormwater Program, FY2020

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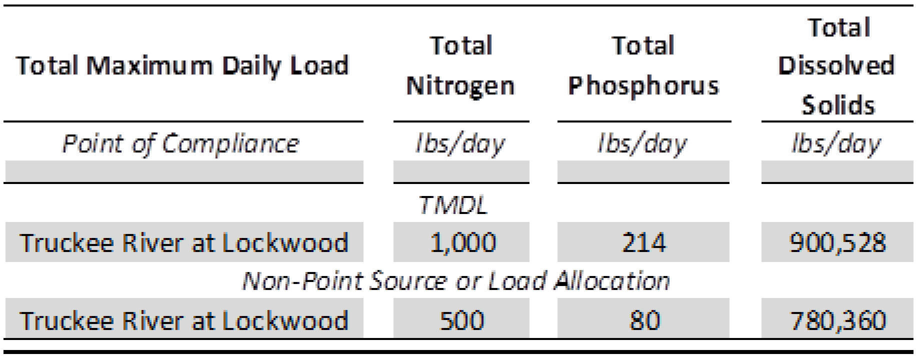
Table 1-2 Designated Waters under Nevada Administrative Code and Monitoring Stations where Water Quality Standards were applied using the Tributary Rule, Truckee Meadows Stormwater Program, FY2020

Nevada Administrative Code	Description of Water Quality Control	Monitored Waters That Apply	Monitoring Station	Monitoring Station Code
NAC 445a. 1684	*Truckee River from California/Nevada State Line to Idlewild*			
		Chalk Creek	Chalk Bluff	CC@CB
		Alum Creek	at Truckee River	AC@TR
		Urban Outfall	Oxbow Nature Park	C-24
NAC 445a. 1686	*Truckee River from Idlewild to E. McCarran Boulevard Bridge*			
		Urban Outfall	Arlington	H-19
		Urban Outfall	Fisherman's Park II	D-16
		Urban Outfall	Mary Wahl Drain	SDOE 008936
NAC 445a. 1688	*Truckee River from E. McCarran Boulevard Bridge to Lockwood*			
		North Truckee Drain	at Orr Ditch	NTD@ORR
		North Truckee Drain	at Big Fish Drive	NTD@BFD
NAC 445a. 1724	*Steamboat Creek at gaging station (Rhodes Road upstream to Washoe Lake)*			
		Steamboat Creek	at Rhodes Road	SBC@RR
NAC 445a. 1726	*Steamboat Creek from USGS gage 10349300 to confluence with Truckee River*			
		Steamboat Creek	at the Narrows	SBC@NAR
		Steamboat Creek	at Clean Water Way	SBC@CWW
		Yori Drain	at Steamboat Creek	YD@SBC
		Boynton Slough	at Steamboat Creek	BS@SBC
		Evans Creek	at Kietzke Lane	EC@KL
		Thomas Creek	at South Meadow Parkway	TC@SMP
NAC 445a. 1758	*Whites Creek below Steamboat Ditch*			
		N.F. Whites Creek	at Old Virginia Highway	WC@OVH

Note: Detailed water quality standards located in **Appendix E**

For water bodies listed as impaired, states must assess the amount of pollution that a water body can receive without violating water quality standards. That amount of pollution is termed a Total Maximum Daily Load (TMDL). Load are then allocated among the different sources, including point sources (or waste load allocation) as well as non-point source natural or background sources (or load allocation) (Stantec, 2011). In 1994, TMDLs for the Truckee River were established for three different constituents: total nitrogen (Total-N), total phosphorus (Total-P), and total dissolved solids (TDS) (**Table 1-3**). The control point for these constituents is the Truckee River at Lockwood. Monitoring of waters in the Truckee River at Lockwood is not a component of this monitoring program, but sampling and analysis is carried out by the Truckee Meadows Water Reclamation Facility (TMWRF) under a separate NPDES permit, and results are available on the Truckee River Information Gateway (TRIG; http://truckeeriverinfo.org/). However, the MS4 permit does state that the permit holder must evaluate stormwater that contributes to the 303(d) list or TMDL (Section II A. I). Three constituents with TMDLs and other constituents of concern are measured under this stormwater monitoring program at urban outfalls and tributaries to the Truckee River to better understand the quality of waters entering the Truckee River (receiving waters) from Truckee Meadows.

Table 1-3 Total Maximum Daily Load (TMDLs), Truckee River at Lockwood



Total Maximum Daily Load	Total Nitrogen	Total Phosphorus	Total Dissolved Solids
Point of Compliance	*lbs/day*	*lbs/day*	*lbs/day*
	TMDL		
Truckee River at Lockwood	1,000	214	900,528
	Non-Point Source or Load Allocation		
Truckee River at Lockwood	500	80	780,360

2 SAMPLING AND ANALYSIS PLAN (2018) AND ADDENDUMS

Every year, a revised Sampling and Analysis Plan (SAP) is submitted to the NDEP and outlines the sampling program and approach, including locations of sampling, the stormwater sampling activities to be conducted, and lists of constituents for laboratory analysis. During implementation of the SAP, field realities often necessitate minor modifications to the SAP before a revised SAP can be completed. These revisions are documented in the annual stormwater monitoring report and/or as addenda to the SAP. In FY2020, Balance issued a single addendum to the 2018 SAP (Hastings and Trustman, 2019) with minor equipment and station monitoring changes.

2.1 Sampling and Analysis Plan

In FY2020, Balance conducted the monitoring program based on the 2018 SAP, dated October 2018 (Trustman and others, 2018). The SAP identifies two different sampling activities: (1) scheduled, non-rain event, tributary baseflow sampling; and (2) unscheduled stormwater runoff sampling. The 2018 SAP identifies 15 monitoring stations, including 11 tributary monitoring stations on 8 tributaries that require both baseflow sampling and unscheduled stormwater runoff sampling, and 4 urban outfall monitoring stations that require only unscheduled, stormwater runoff sampling.

All four urban outfalls and four selected tributaries utilize near-continuous streamflow gages and automated samplers to collect multiple samples across a given storm runoff event to characterize constituent loading to the Truckee River. Balance also continued to operate additional streamflow gaging stations on two tributaries to the Truckee River (Alum Creek, and Thomas Creek), while Truckee Meadows Water Authority (TMWA) operates and maintains a streamflow gaging station on Whites Creek. The Chalk Creek gaging station was discontinued due to continuous disruptions from beaver activity and replaced with a monitoring station on South Evans Creek. Instantaneous flow measurements were still collected along with samples at Chalk Creek. Streamflow data helps quantify storm event runoff volumes and is required to calculate instantaneous or total storm loading rates at these stations.

2.2 Baseflow Sampling and Analysis from Two Main Tributaries

Steamboat Creek and North Truckee Drain have been identified as key sources of excess nutrients to the Truckee River (Shump, 1985, Romeis, 1999, Hastings and Shaw, 2015, and Hastings and Trustman, 2019). Balance conducted a multi-year special study to evaluate baseflow nutrient loading from these two tributaries since 2016. In FY2020 baseflow sampling has been incorporated into the stormwater monitoring program. Balance continued to operate four automated samplers, two co-located at USGS streamflow gaging stations and monitoring stations under this program (Steamboat Creek at Clean Water Way (SBC@CWW) and North Truckee Drain at Big Fish Drive (NTD@BFD)) and two located on tributaries that discharge into Steamboat Creek (Boynton Slough at Steamboat Creek (BS@SBC) and Yori Drain at Steamboat Creek (YD@SBC)). Data collected at these stations allow for calculation of 24-hour nutrient loading and fulfill the ambient monitoring requirements of this program.

2.3 Constituents of Concern

The 2018 SAP identifies the following constituents and physical and chemical parameters of concern:

- Total nitrogen (Total-N),
- Nitrate as nitrogen (NO_3),
- Total Kjeldahl nitrogen (TKN),
- Total phosphorus (Total-P),
- Ortho-phosphate (Ortho-P),
- Total dissolved solids (TDS),
- Total suspended solids (TSS),
- Total Escherichia coli bacteria (*E.coli*), and
- Standard physical and chemical parameters including: water temperature, turbidity, pH, dissolved oxygen (DO), and specific conductance (SC).

Below, we define and briefly discuss the importance of these constituents/parameters as they relate to stormwater in the Truckee Meadows.

2.3.1 NITROGEN AND PHOSPHORUS

Nitrogen and phosphorus are typical water pollution constituents of concern in urban stormwater. The major sources of these nutrients in urban stormwater are urban landscape runoff, atmospheric deposition, animal waste, improperly functioning septic systems, and/or undertreated wastewater returned to the river (Terrene Institute, 1996).

The degree to which nitrogen and phosphorus are present in a river can affect the trophic status and amount of algal biomass produced. Excess nutrients tend to increase primary biological productivity, which in turn cause algal blooms. A secondary impact is the residual negative effects of decomposing algae, which depletes dissolved oxygen concentrations necessary to support other aquatic life (USEPA, 1999).

There are several forms of nitrogen found in stormwater runoff. Total-N includes four forms including NO_3, NO_2, NH_3, and ammonium (NH_4). NO_3 and NO_2 are the inorganic fractions of nitrogen. NO_2 is uncommon in stormwater because it can quickly transform to NO_3 by bacteria. NO_3 is stable over a considerable range of conditions and is readily transported in water. NO_3 is highly toxic to humans and fish at high concentrations and long exposure. NH_3 is more volatile and is quickly converted to NO_2 and NO_3 through oxidation, but usually is the most readily toxic to aquatic life. NH_3 typically reacts or dissolves in water to also form NH_4 at neutral pH levels (i.e., near 7). NH_4 is strongly adsorbed on mineral surfaces or soil particles and can therefore be easily transported by sediment in the water (Hem, 1985).

TKN is a measure of the total concentration of organic nitrogen and ammonia. Sources of nitrogen in surface waters include both residential and agricultural fertilizers, septic tanks, leaking sewer lines, and leach fields. Unsanitary disposal of human and pet excrement are also common sources in urban areas and are frequently observed in the Truckee Meadows urban areas.

Total-P is a measure of both organic and inorganic forms of phosphorus. Ortho-P is commonly present in stormwater and the fraction of Total-P that is most immediately biologically available to aquatic life (Hem, 1985). Sources of phosphorus in surface waters include the natural weathering and erosion of local bedrock, especially areas underlain by igneous rocks (e.g., granodiorite, volcanic rocks). Erosion can exacerbate the concentrations of phosphorus in stormwater. Other sources may include sewage and household detergents, runoff from fertilized lawns and cropland, runoff from animal manure storage areas or drained wetlands, decomposition of organic matter, and commercial cleaning products.

Identification of the source(s) of phosphorus (Total-P and Ortho-P) in tributaries is complicated by multiple possible sources and hydrological, geochemical, and biological processes affecting phosphorus fate and transport (Denver and others, 2010). Romeis (1999) identified multiple possible sources of excess phosphorus to Steamboat Creek that included: Livestock, fertilizers, irrigation return flows, leaking septic systems and/or bank erosion. Concentrations of phosphorus (as phosphate) have been measured in geothermal wells in the Truckee Meadows region (Great Basin Groundwater Geochemical Database, 2016), while Shump (1985) and Skalbeck and others (2002) have established that some tributaries, including Steamboat Creek, are gaining streams and receive groundwater from both non-thermal and thermal waters. The link between these possible sources and transport is, however, poorly understood, and additional investigations into the source(s) of elevated phosphorus (Total-P and Ortho-P) concentrations are warranted.

2.3.2 SUSPENDED AND DISSOLVED SOLIDS

TSS is a measure of both organic and inorganic solids suspended in the water column, whereas TDS is a measure of all inorganic and organic substances dissolved in the water column (Hem, 1985). Both TSS and TDS have been reported to increase in waters that receive urban stormwater. Their concentrations originate from many sources including erosion of pervious surfaces, dust, litter, other particles deposited on impervious surfaces from human activities, sediment runoff at construction sites, and streambank erosion (Burton and Pitt, 2002).

Elevated TSS and TDS concentrations increase turbidity, reduce light penetration in streams, and limit the growth of desirable aquatic plants. TSS can settle in backwater areas or in the main channel during periods of low flow and can alter or impair aquatic habitat and aquatic life. TSS can also provide a medium for accumulation, transport, and storage of other pollutants including nutrients and metals (USEPA, 1999).

Although TSS and TDS are not typically associated with human health effects, they are used as aesthetic indicators as well as aggregate indicators of the presence of chemical contaminants. Concentrations can also be naturally elevated from natural erosion of geologic sources. Increases over background TSS and/or TDS may originate from agricultural and residential runoff as well as point-source pollution discharge from industrial and sewage treatment plants. Most aquatic ecosystems can tolerate TDS levels of 1,000 mg/L (Boyd, 1999).

2.3.3 PATHOGENS

Pathogens are disease-producing organisms that present a potential public health threat when they are present in waters (USEPA, 1999). Pathogens typically originate from warm-blooded animal excrement which can include wild animals, urban animals (e.g., pigeons, raccoons, crows, dogs), or humans (i.e., raw sewage spills). Direct exposure to pathogens in stormwater is usually limited; however, when runoff is discharged to recreational waters such as the Truckee River, there is a potential public health risk. Runoff can contain many different pathogens that cannot be measured directly; therefore, indicator organisms such as *E.coli* are used to predict the health risks (NDEP, 2018). High counts of bacteria may not necessarily confirm the presence of pathogens but provides an indicator for risk. In this report, bacteria measured is reported in units of Most Probable Number (MPN) per 100 mL of water.

2.3.4 OTHER PHYSICAL AND CHEMICAL PARAMETERS

Standard physical and chemical parameters provide additional context for stormwater quality and conditions relative to receiving waters. In addition, NDEP has water quality standards for physical parameters including temperature and turbidity as well as chemical parameters including dissolved oxygen, and pH for the Truckee River and listed tributaries (NAC 445a.).

Water temperature in an important measure of water quality and the Truckee River is listed as impaired for water temperature (NDEP, 2018). Specifically, water holds less oxygen as it becomes warmer, resulting in less oxygen available for respiration by aquatic organisms (USEPA, 1999). Stormwater runoff from high-temperature impervious surfaces can increase water temperature in the river or receiving waters and impair trout species (Jones and others, 2007).

Dissolved oxygen (DO) concentration is a measure of the amount of oxygen dissolved in water. DO is critical to biological organisms and fish. High DO levels in streams are needed to sustain the more sensitive biological organisms (MacDonald and others, 1991). Low DO levels are commonly associated with point source pollution or decomposing organic matter in the water column. Urban stormwater typically has low to moderate DO levels but DO commonly increases when diluted in receiving waters. Higher DO concentrations may indicate super-saturated conditions attributed to rapid aeration and photosynthesis. During the process of photosynthesis, plants produce oxygen as a waste product. This adds to the DO concentration in the water, potentially increasing DO to values above 100 percent saturation (YSI, 2005). The actual concentration of DO will also vary depending on water temperature and salinity. First, the solubility of oxygen decreases as temperature increases. Second, dissolved oxygen decreases exponentially as salt levels increase (Wetzel, 2001). As such, we tend to see higher DO concentrations during winter when waters are colder and fresher from snowmelt runoff.

In general, DO concentrations can be used as a proxy for other constituents. For example, nitrate occurs readily in oxidizing conditions (higher DO concentrations), but ammonia occurs primarily in reducing conditions or the absence of DO.

Most aquatic ecosystems are also sensitive to variations in pH. Most pH impacts in urban waters are caused by runoff of rainwater with low pH levels (USEPA, 1999) or rapid changes in water temperatures (i.e., runoff heated by sun-warmed asphalt). Urban and industrial areas tend to have more acidic rainfall than less developed areas. Additionally, high pH levels can be caused by eutrophication or abundance of nutrients in waters.

Specific conductance (SC) of waters refers to the ability of water to conduct an electrical current and is related to the concentration of dissolved solids. SC indicates the quantity of dissolved ions in the water and can also be used as a proxy for salinity. While there are no recommended water quality criteria for conductivity, it can be used as a surrogate for TDS and other dissolved ions. SC can exhibit a wide range if waters move through areas of differing geology. Waters that drain granitic and/or volcanic rocks tend to have a very low SC (< 400 µS (micro Siemens). Alternatively, waters that drain marine sedimentary rocks (e.g., Chalk Creek) or geothermal areas (e.g., Steamboat Creek) will typically have a much higher SC (>2,000 µS). The acceptable range for freshwater fish is between 100 and 2,000 µS (MacDonald and others, 1991).

3 STORM MONITORING STATIONS

The FY2020 stormwater monitoring program includes a total of 15 monitoring stations per the 2018 SAP: 11 tributary stations to the Truckee River and Steamboat Creek, and 4 stormwater urban outfalls to the Truckee River. Locations of monitoring stations, rain gages, and streamflow gages used for this monitoring program are shown in **Figure 3-1**. **Table 3-1** describes the characteristics of the stations and their drainage areas, including land-uses, constituents of concern, instrumentation, comments, and known existing studies. We have used information summarized in recent watershed assessments, special studies, zoning maps from Washoe County, stormwater system maps from Cities of Reno and Sparks, aerial imagery available on Google Earth®, and field observations to establish the drainage areas for each monitoring station.

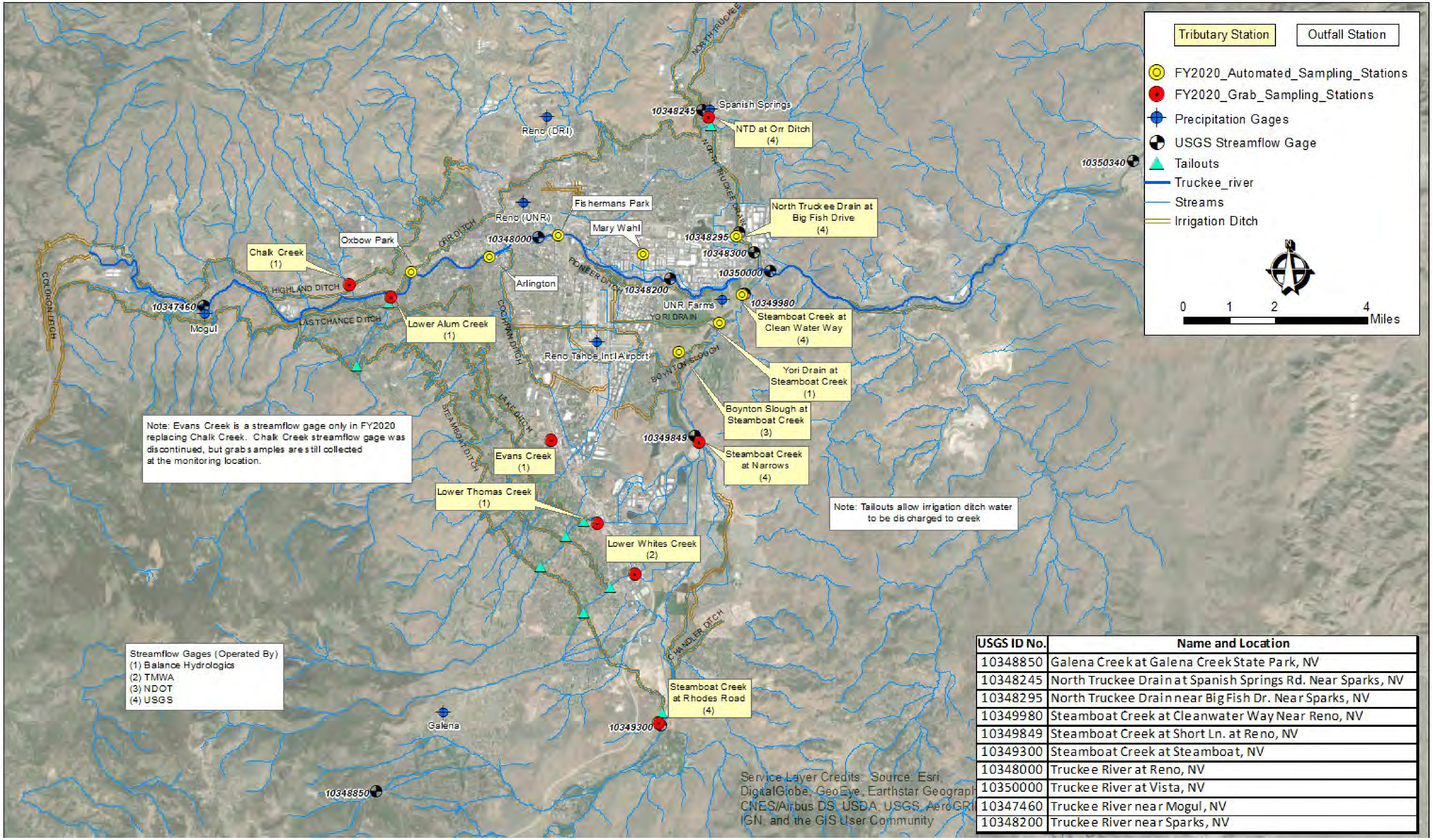
3.1 Tributary Stations

The 2018 SAP establishes 11 monitoring stations across 8 tributaries. Two of the largest tributaries, Steamboat Creek and North Truckee Drain, have more than one monitoring station along the mainstem of each stream, allowing for evaluation of possible water-quality degradation from specific sub-watersheds. Furthermore, 4 tributary stations flow to Steamboat Creek: Yori Drain, Boynton Slough, Thomas Creek, and Whites Creek. An additional tributary station located on South Evans Creek was established in FY2020. This station replaced the monitoring station at Chalk Creek, which was affected by beaver activity. Grab samples were only collected at Chalk Creek in FY2020. Streamflow monitoring began in May 2020 and stormwater sample collection will begin at South Evans Creek in FY2021.

Delineation of drainage areas for tributary monitoring stations is confounded in many cases by irrigation ditches that divert waters from the Truckee River upstream of the Truckee Meadows, receive stormwater runoff from intervening areas, then discharge water to other tributaries, or ‘tailwaters,’ at ‘tailouts’ and may affect water quality in the receiving tributary. Although water quality of tailwaters has not been investigated as part of this study, awareness of this confounding factor is required during interpretation of hydrology and water quality at affected monitoring sites. **Table 3-2** lists the locations where tailouts exist or where irrigation ditches can discharge to tributaries. These locations are also identified in **Figure 3-1**.

3.2 Stormwater Outfall Stations

The 2018 SAP identifies 4 stormwater urban outfalls as monitoring stations. Stormwater quality from discharge at these outfalls can affect water quality and beneficial uses in receiving waters of the Truckee River. Analysis of water quality from stormwater outfalls provides a perspective on the concentrations and loading from these point sources and can also be compared to water quality from monitored tributaries.



Note: Evans Creek is a streamflow gage only in FY2020 replacing Chalk Creek. Chalk Creek streamflow gage was discontinued, but grab samples are still collected at the monitoring location.

Note: Tailouts allow irrigation ditch water to be discharged to creek

Streamflow Gages (Operated By)
(1) Balance Hydrologics
(2) TMWA
(3) NDOT
(4) USGS

USGS ID No.	Name and Location
10348850	Galena Creek at Galena Creek State Park, NV
10348245	North Truckee Drain at Spanish Springs Rd. Near Sparks, NV
10348295	North Truckee Drain near Big Fish Dr. Near Sparks, NV
10349980	Steamboat Creek at Cleanwater Way Near Reno, NV
10349849	Steamboat Creek at Short Ln. at Reno, NV
10349300	Steamboat Creek at Steamboat, NV
10348000	Truckee River at Reno, NV
10350000	Truckee River at Vista, NV
10347460	Truckee River near Mogul, NV
10348200	Truckee River near Sparks, NV

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 3-1 Truckee Meadows Stormwater Monitoring Stations, Streamflow Gaging Stations, Rain Gages, and Station Equipment, FY2020

Table 3-1 Monitoring Locations and Characteristics, Truckee Meadows Stormwater Monitoring Program, FY2020

Monitoring Station Name	Station ID	Watershed	Watershed Area (mi^2)	Primary Land-Uses	Instrumentation	Comments	Existing Studies
Tributaries							
Chalk Creek at Chalk Bluff	CC@CB	Tributary to Truckee River	4.6	Upper watershed is undeveloped; lower watershed is residential; I-80 and some commercial	Grab sample and flow measurement only	Watershed includes geology of the Hunter Creek Formation: diatomaceous fine sandstone or "chalk" and lacustrine deposits which bear high concentrations of sulfates	JBR Environmental, 2010; Hastings and Trustman, 2019
Lower Alum Creek at Truckee River	AC@TR	Tributary to Truckee River	4.9	Residential, commercial, open space	Balance sampling station	Watershed geology includes Hunter Creek Formation, hydrous aluminum sulfates. 2007 Hawken Fire burned 1,000 acres in upper watershed; artifical irrigation ponds provide some flood detention; Steamboat Ditch discharges to creek at times.	Fennema, 2013; Jesch, 2008 and 2011; Hastings and Trustman, 2019
Lower Alum Creek at Mayberry Dr.	AC@MAB	Tributary to Truckee River	4.9	Residential, commercial, open space	Balance gaging station	Gaging station upstream of AC@TR to record streamflow. Gage was relocated from AC@TR site in FY2019 due to stream changes. All water quality samples are still collected at AC@TR station and instantaneous flow is measured with all sample collection for load calculation	Fennema, 2013; Jesch, 2008 and 2011
North Truckee Drain at Orr Ditch	NTD@ORD	Tributary to Truckee River	76.1	agriculture, residential, and commercial	USGS gaging station 10348245	Receives return flows from irrigation ditches; drains much of Spanish Springs Valley; part of USACE flood control project	Jesch, 2005; Hastings and Trustman, 2019
North Truckee Drain at Big Fish Drive	NTD@BFD	Tributary to Truckee River	NA	agriculture, residential, and commercial, industrial	USGS gaging station 10348295	Relocated in 2017 from a location downstream of I-80 and UPRR (Kleppe Lane) to a new location upstream of I-80 and UPRR.	Jesch, 2005; Hastings and Trustman, 2019
Evans Creek at Kietzke Lane	EC@KL	Tributary to Steamboat Creek	9.6	agriculture, residential, and commercial	Balance gaging station	Located downstream of Anderson Park just before I580. Gaging location represents mostly residential use.	Jesch, 2011
Thomas Creek at S. Meadows Pkwy	TC@SMP	Tributary to Steamboat Creek	18.5	Mixed residential and commercial, some small agriculture, golf course, new construction	Balance gaging station	Lower portions of creek are conveyed via concrete or lined flood control channels, culverts and ditches;	Jesch, 2011; Curtis, 2013; Hastings and Trustman 2019
NF Whites Creek at Old Virginia Hwy	WC@OVH	Tributary to Steamboat Creek	18.5	urban (mixed commercial and residential); new construction; open space in upper watershed	Washoe County gaging station	Additional 303(d) listed constituents for downstream reaches; channel is actively eroding in segments and increasing with increased urbanization of watershed	Jesch, 2011; Hastings and Trustman, 2019
Steamboat Creek at Rhodes Road	SBC@RHR	Tributary to Truckee River	123	Rural residential; major roads, historic gold and silver mining; geothermal operations	USGS gaging station 10349300	Washoe Lake located short distance upstream	Parametrix and Wenk Associates, 2007; Codega, 1998; Hastings and Trustman , 2019
Steamboat Creek at Narrows	SBC@NAR	Tributary to Truckee River	192	Mixed residential-commercial, major roads, agriculture, historic gold and silver mining; geothermal operations, new construction	USGS gaging station 10349849	Downstream from hot springs and geothermal operations; channel in poor condition; Southeast Connector construction completed spring 2018	Parametrix and Wenk Associates, 2007; Codega, 1998; Hastings and Trustman , 2019
Boynton Slough at Steamboat Creek	BS@SBC	Tributary to Steamboat Creek	*48.5*	Upper watershed is open space; lower:mixed residential-commercial, agriculture, golf courses, historical mining, geothermal operations, new construction, airport, major roadways	Balance /NDOT gaging station	Upper watershed includes open space from Mt. Rose; Lower section captures a large amount of urban runoff from South Reno, including outflow from Virginia Lake via Dry Creek. Watershed area is estimated using multiple sources.	City of Reno, 2016 (Virginia Lake)
Yori Drain @ Steamboat Creek	YD@SBC	Tributary to Steamboat Creek	*4.2*	Mixed residential-commercial, agriculture, golf courses, historical mining, geothermal operations, new construction, airport, major roadways	ISCO automated sampler and area-velocity module	Drains portions of urban Reno including Mill Street west to Renown Hospital, UNR Farms.; Receives Truckee River water from Pioneer Ditch; last portion of Yori Drain is directly connected to engineered overflow wetlands adjacent to the Southeast Connector. Watershed area is estimated using multiple sources.	Kennedy Jenks Consultants, 2004
Steamboat Creek at Clean Water Way	SBC@CWW	Tributary to Truckee River	244	Mixed residential-commercial, major roads, agriculture, golf courses, historic mining; geothermal operations, new construction, Reno-Tahoe Airport	USGS gaging station 10349980	Southeast Connector construction completed spring 2018	RTCWC, 2013; Parametrix and Wenk Associates, 2007; Codega, 2000; Hastings and Trustman, 2019
Stormwater Urban Outfalls							
Island at Arlington	H-19	Outfalls to Truckee River	0.32	Residential (single family), commercial with urban landscaping	ISCO automated sampler and area-velocity module	One of the oldest neighborhoods in Reno; most homes built before 1940; possible cross connections with domestic sewer lines; sampling location is an outfall directly to Truckee River	n/a
Fisherman's Park II	D-16	Outfalls to Truckee River	5.1	Mixed residential, commercial, industrial and some agriculture, major roadways, UPRR and new construction	ISCO automated sampler and area-velocity module	Area drains portions of University of Nevada-Reno, Nevada State Fair Grounds, U.S. Agriculture Research Services; sampling location is an outfall directly to the Truckee River	n/a
Oxbow Nature Park	C-24	Outfalls to Truckee River	0.36	Residential (single family and multi-family units), commercial and urban landscaping	ISCO automated sampler and area-velocity module	Drainage area is 100 percent built out with an estimated 85+ percent impervious surface; access is via a storm drain manhole cover approximately 400 feet from outfall to the Truckee River	n/a
Mary Wahl Drain	SDOE-008936	Outfalls to Truckee River	2.5	Mixed residential, commercial, industrial and some agriculture, major roads, UPRR and new construction	ISCO automated sampler and area-velocity module	Recently enclosed in a concrete box culvert (December, 2014); culvert accumulates sediment; sampling location is a manhole roughly 750 feet upstream of the outfall to the Truckee River	n/a

Note: Watershed areas in italics are estimated

Table 3-2 Tributary Monitoring Stations Receiving Tailwaters from Irrigation Ditches

Irrigation Ditch	Monitoring Sites that Receive Tailwaters
Steamboat Ditch	Alum Creek at Truckee River
	Thomas Creek at S. Meadows Parkway
	Whites Creek at Old Virginia Highway
	Steamboat Creek at Narrows and Clean Water
	Evans Creek at Kietzke Lane
Last Chance Ditch	Alum Creek at Truckee River
	Thomas Creek at S. Meadows Parkway
	Whites Creek at Old Virginia Highway
	Evans Creek at Kietzke Lane
Lake Ditch	Thomas Creek at S. Meadows Parkway
	Alum Creek at Truckee River
Orr Ditch	North Truckee Drain at Orr Ditch
	North Truckee Drain at Big Fish Drive
Cochrane Ditch	Steamboat Creek at Clean Water Way
	Boynton Slough at Steamboat Creek
Pioneer Ditch	Yori Drain at Steamboat Creek

Notes: See **Figure 3-1** for locations of ditches and diversions to tributaries.

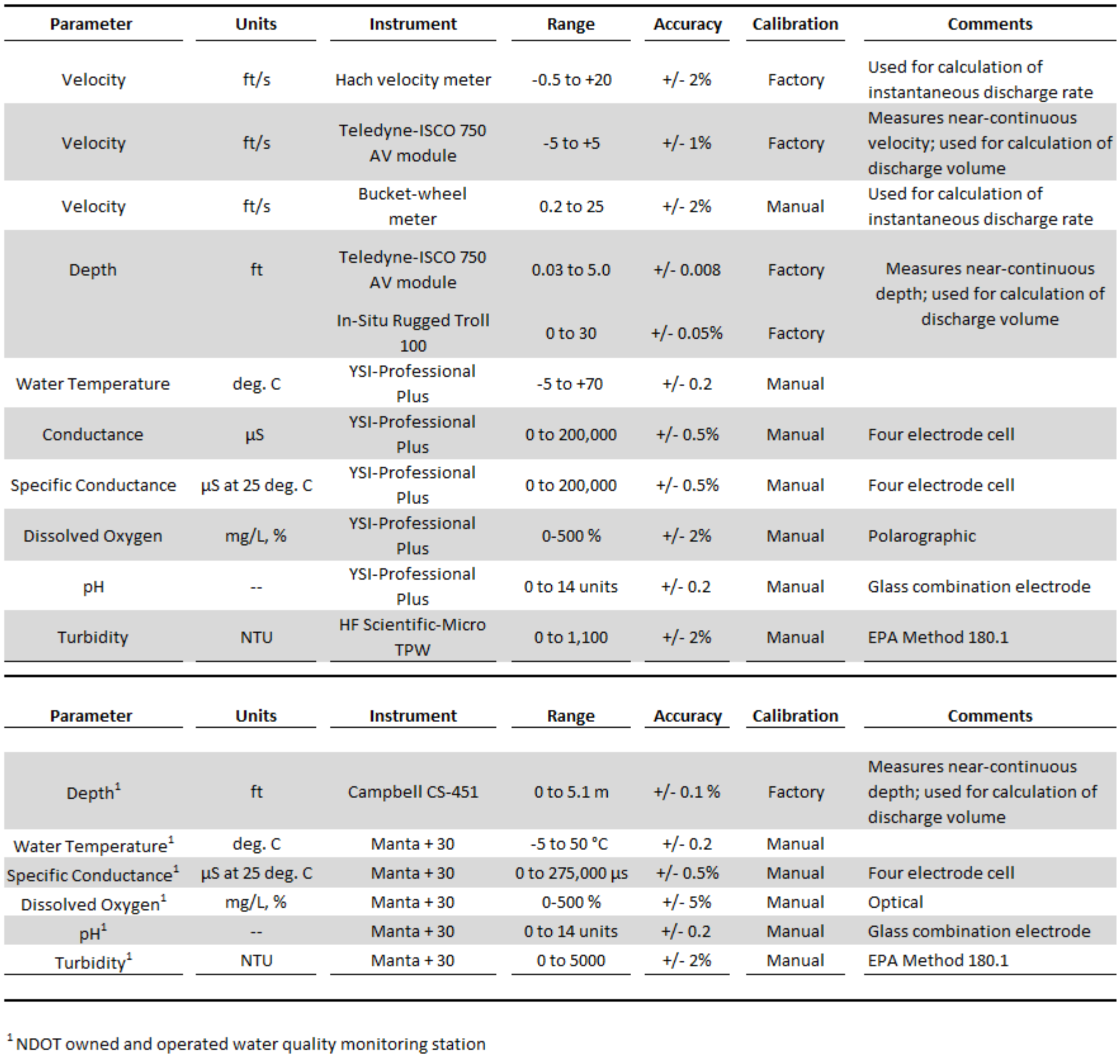
4 STORM MONITORING PROGRAM METHODS

This chapter describes the sampling equipment and methods used to collect water quality samples, measure and gage discharge or streamflow, and measure physical parameters of stormwater.

4.1 Types of Equipment

Table 4-1 lists the field parameters measured, instruments used, and the resolution and accuracy of each instrument.

Table 4-1 Instruments Used to Measure Water Quality, Runoff and Physical Parameters during Storm Events



Parameter	Units	Instrument	Range	Accuracy	Calibration	Comments
Velocity	ft/s	Hach velocity meter	-0.5 to +20	+/- 2%	Factory	Used for calculation of instantaneous discharge rate
Velocity	ft/s	Teledyne-ISCO 750 AV module	-5 to +5	+/- 1%	Factory	Measures near-continuous velocity; used for calculation of discharge volume
Velocity	ft/s	Bucket-wheel meter	0.2 to 25	+/- 2%	Manual	Used for calculation of instantaneous discharge rate
Depth	ft	Teledyne-ISCO 750 AV module	0.03 to 5.0	+/- 0.008	Factory	Measures near-continuous depth; used for calculation of discharge volume
		In-Situ Rugged Troll 100	0 to 30	+/- 0.05%	Factory	
Water Temperature	deg. C	YSI-Professional Plus	-5 to +70	+/- 0.2	Manual	
Conductance	µS	YSI-Professional Plus	0 to 200,000	+/- 0.5%	Manual	Four electrode cell
Specific Conductance	µS at 25 deg. C	YSI-Professional Plus	0 to 200,000	+/- 0.5%	Manual	Four electrode cell
Dissolved Oxygen	mg/L, %	YSI-Professional Plus	0-500 %	+/- 2%	Manual	Polarographic
pH	--	YSI-Professional Plus	0 to 14 units	+/- 0.2	Manual	Glass combination electrode
Turbidity	NTU	HF Scientific-Micro TPW	0 to 1,100	+/- 2%	Manual	EPA Method 180.1

Parameter	Units	Instrument	Range	Accuracy	Calibration	Comments
Depth[1]	ft	Campbell CS-451	0 to 5.1 m	+/- 0.1 %	Factory	Measures near-continuous depth; used for calculation of discharge volume
Water Temperature[1]	deg. C	Manta + 30	-5 to 50 °C	+/- 0.2	Manual	
Specific Conductance[1]	µS at 25 deg. C	Manta + 30	0 to 275,000 µs	+/- 0.5%	Manual	Four electrode cell
Dissolved Oxygen[1]	mg/L, %	Manta + 30	0-500 %	+/- 5%	Manual	Optical
pH[1]	--	Manta + 30	0 to 14 units	+/- 0.2	Manual	Glass combination electrode
Turbidity[1]	NTU	Manta + 30	0 to 5000	+/- 2%	Manual	EPA Method 180.1

[1] NDOT owned and operated water quality monitoring station

4.2 Sampling Procedures

Storm event or stormwater runoff samples were collected using a variety of methods depending on the site and instrumentation. Samples collected at automated sampling stations used either time-interval or flow-interval techniques to automatically fill discrete sample bottles over the duration of the storm hydrograph. This method is further described in **Section 4.4**, below; other stations require grab samples. Unless otherwise noted, grab samples were collected using a clean, triple-rinsed container, and were collected, composited, and mixed to fill laboratory-required volumes and laboratory-supplied bottles.

When site conditions permitted, Balance staff used a hand-held DH-48 sampler with a 1/4-inch nozzle, as adopted by the Federal Interagency Sedimentation Project (FISP), to capture a depth-integrated sample of water across the width of an open channel or pipe. Water samples were collected using the Equal Transit Rate (ETR) method such that each sample was collected by raising and lowering the sampler at a number of equally-spaced verticals across the stream channel or pipe; sample collection in each vertical was integrated across the full depth of the water column; and a constant transit rate was maintained while raising and lowering the equipment until the sample bottle was just less than full, consistent with standard methods outlined by Edwards and Glysson, 1999. Water samples were typically collected from between three and eight verticals, and each vertical was executed within 5 to 15 seconds, for a total of approximately 30 to 60 elapsed seconds per sample.

All storm and baseflow samples collected during an event were delivered to Western Environmental Testing Laboratory (WETLAB) in Sparks, Nevada under Chain-of-Custody (COC) procedures. Sample processing and procedures were completed as outlined in the 2018 SAP.

4.3 Streamflow/Discharge Gaging

Under this program, Balance operates and maintains three streamflow gaging stations and works with NDOT to operate a fourth station using standard hydrologic practices. The primary purpose of the gaging stations is to record near-continuous streamflow and quantify constituent loading during sampled storm events. Four stations are equipped with Type C staff plates that indicate water stage and In-Situ® and Campbell Scientific® pressure transducers that record water pressure depth. Near-continuous records of water pressure depth are converted to stage (in feet) and calibrated with each observation. Manual measurements of streamflow are completed over a range of stages to develop a stage-to-streamflow rating curve. The rating curve is used to convert the near-continuous record of stage to a near-continuous record of streamflow. If channel conditions suggest a change in the stage-to-streamflow rating curve, a stage shift is applied when appropriate.

A fifth gaging station is located within a culvert or pipe (Yori Drain) and equipped with an ISCO 750 velocity-area module. The module records velocities and water depths every 10 seconds and averages them into 5-minute near-continuous records. The ISCO program converts water depths into a cross-sectional area using a known culvert diameter and calculates discharge or streamflow using the Continuity Equation (flow = area x velocity). As a check on the automated velocity-area calculation, a secondary computation of discharge is also calculated using a standard pipe flow equation with the water depth data and manual measurements of pipe diameter and slope.

While every effort is made to collect near-continuous, accurate data, we identify the following possible limitations for this program and gaging in urban systems:

- Site visits may be limited to less than 6 times per year and may not document some changes in conditions that affect flow (e.g., channel erosion, sediment or garbage accumulation in a culvert, vandalism, stream depths that are lower than instrument sensor, etc.).
- Some gaging stations are near confluences with larger tributaries or the Truckee River and therefore backwatering can occur. In these cases, efforts are made to identify periods of backwatering and replace erroneous data with periods of estimated streamflow or discharge.
- The gaging program is not intended to be used to quantify flood magnitude, frequency or recurrence intervals. Oftentimes urban flooding generates unsafe conditions to access the gage. Moreover, while stormwater can cause flooding, not all flood conditions qualify as targeted sampling events, so site visits are not made at the widest range in conditions.

4.4 Manual Streamflow/Discharge Measurements

Balance utilized standard streamflow equipment and practices appropriate for the conditions encountered in the field (Carter and Davidian, 1968). Discharge was measured or estimated each time stormwater was sampled. A digital velocity meter was used to measure velocity and compute instantaneous stormwater discharge in closed stormwater systems (i.e., pipes) accessed by a manhole, whereas a pygmy, standard Price AA (bucket-wheel) meter or a digital velocity meter was used in open channel systems. The Mid-Section Method for computing cross-sectional flow area using multiple verticals and the Six-Tenths-Depth Method for computing mean velocity at each vertical were used (Turnipseed and Sauer, 2010). A minimum of 2 verticals were used to measure velocity in a pipe. A minimum of 4 verticals were used to measure channel depth and velocity in open channels. The total number of verticals was established based on how quickly water depth was changing. Each open channel monitoring station includes a staff plate, which allowed for a consistent datum to be used for stage readings. The cross-sectional area of the pipe or open channel was then multiplied by the velocity measured at the cross-section to compute an instantaneous discharge. Streamflow estimates were completed using measured flow widths (ft) and depths (ft) and measurements of surface velocity using a float's movement across a known distance with a stopwatch (ft/sec).

4.5 Automated Sampling and Discharge Computation

In FY2020, Balance operated and maintained Teledyne-ISCO® automated samplers at 8 Stations (4 stormwater urban outfall stations and 4 tributaries):

1. Arlington (H-19);
2. Oxbow Nature Park (C-24);
3. Fisherman's Park II (D-16);
4. Mary Wahl Drain (SDOE-008936);
5. Yori Drain at Steamboat Creek (YD@SBC);
6. Boynton Slough at Steamboat Creek (BS@SBC);
7. North Truckee Drain at Big Fish Drive (NTD@BFD); and
8. Steamboat Creek at Clean Water Way (SBC@CWW).

Automated samplers at 5 of these stations (1 through 5, above) are equipped with ISCO® 750 area-velocity modules, which allows for computation of discharge rates and discharge volume for the duration of sampled events. Automated samplers were programmed to measure stormwater depth and velocity every 5 minutes and initiate sampling once an increase in flow was detected.

Rainfall depth-runoff volume rating-curves were established at each stormwater urban outfall in an effort to use flow-weighted sampling techniques—such that samples are automatically collected at intervals of equal runoff volume. Harmel and others (2003) note that flow-weighted sampling best represents storm load because a greater number of samples are collected at higher flow rates.

The Yori Drain station (YD@SBC) can receive a significant volume of discharge from the Truckee River via the Pioneer Ditch. These discharges are not based on precipitation but are controlled by diversion operations. As such, it is not possible to develop rainfall-runoff rating curves to conduct flow-weighted sampling, so time-weighted sampling is performed instead.

The Boynton Slough station (BS@SBC) is outfitted with a Campbell Scientific pressure transducer owned and operated by NDOT. A stage to discharge relationship, as described above, was used to create a record of flow. FY2019 was the first year this monitoring station was equipped and the development of the stage to discharge relationship was on-going in FY2020. As such, the automated sampler was programmed for time-weighted sampling when operated. In the future, flow weighted programming using the Campbell data logger and a rain to runoff relationship will be used with the auto sampler.

Steamboat Creek at Clean Water Way (SBC@CWW) and North Truckee Drain at Big Fish Drive (NTD@BFD) include automated samplers co-located with USGS stream gages and programmed for time-weighted sampling. Samples were collected at equal time intervals based on the anticipated duration of the storm-runoff event. Sampling time intervals ranged between 30 minutes and 2 hours; sometimes programmed sampling intervals were changed during a sampling event to be more or less frequent to accommodate changes in the event intensity or timing.

Following each sampling event, the storm hydrograph and timing of individual, or discrete, sample collection were examined at all automated sampling stations in order to evaluate which samples best captured different portions of the storm hydrograph. Discrete samples were composited into 4 final samples, each representing a component of the hydrograph: 1) first flush, 2) rising limb, 3) peak discharge, and 4) falling limb. Composites were used to fill laboratory-provided bottles and delivered to the laboratory in accordance with the 2018 SAP. Physical water quality parameters were measured directly[2] from the source upon readying the sampler and upon retrieving samples.

4.6 Near-Continuous Streamflow Gaging Stations

Streamflow gaging provides an opportunity to compute constituent load for comparisons to established TMDLs. Streamflow gaging also provides a near-continuous record of flow to better understand which tributaries are more influenced by stormwater runoff, snowmelt runoff or returns from irrigation ditches. In FY2020, Balance operated and maintained 4 near-continuous streamflow gaging stations on monitored tributaries: (1) South Evans Creek at Kietzke Lane (EC@KL); (2) Alum Creek at Mayberry Drive (AC@MAB); (3) Thomas Creek at South Meadows Parkway (TC@SMP); and (4) Yori Drain at Steamboat Creek (YD@SBC). Flow was measured manually when water quality samples were collected at Chalk Creek at Chalk Bluff (CC@CB) to calculate instantaneous loads, but the Chalk Creek streamflow gaging station has been discontinued due to inconsistent channel conditions from extensive beaver activity.

The AC@TR stream gage was relocated to Alum Creek at Mayberry Drive (AC@MAB) due to active channel erosion and instability in 2018, but all stormwater samples have been collected downstream at the Alum Creek at Truckee River (AC@TR) station for consistency with previous years. Flow measurements are taken at the time of sampling at the AC@TR station for calculating instantaneous load. Annual streamflow records are from the AC@MAB gaging location.

NDOT operates and maintains a near-continuous streamflow gage on Boynton Slough at Steamboat Creek (BS@SBC). Balance used NDOT data and our observations of stage to develop a stage to discharge relationship and complete a record of flow. Near-continuous streamflow records were collected for all 4 stations except Yori Drain, where data were collected at 5-minute intervals. All stations were calibrated with manual observations of stage and stage shifts were applied where appropriate to produce an annual hydrograph at each station. Annual hydrographs from other monitored tributary stations were sourced from near-continuous streamflow gaging stations operated and

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[2] Efforts are made to measure physical and chemical water quality parameters directly from the runoff source; however, runoff may not be active at some locations (e.g., urban outfalls) upon each site visit (e.g., processing samples from an automated sampler). In these cases, parameters are measured directly from the composited samples; Some data including temperature and dissolved oxygen may therefore not be representative of the runoff source due to the residence time of samples in the sampler.

maintained by the US Geological Survey (USGS) or Truckee Meadows Water Authority (TMWA). Streamflow volumes calculated at all stations were used together with sampled constituent concentrations to calculate instantaneous, daily, and/or total storm load.

4.7 Calculation of Constituent Load and Yields

Constituent concentrations from grab samples only provide limited information on the range of concentrations in a single storm event for a given location. We know from the collection of grab samples over an entire hydrograph for a single event, concentrations can range from one to three orders of magnitude, depending on the constituent. Ultimately, the grab sample or 'snapshot' approach leaves many gaps in characterization of the system (McKay and others, 2013). Instantaneous discharge measured at the time of sample collection can improve our knowledge because it provides a measure of instantaneous load; however, without information about the range of likely concentrations over a runoff event or season, this technique provides limited information.

Calculation of constituent load for a given event is a key objective for many non-point source monitoring projects and is usually a more meaningful indicator than constituent concentration. Constituent load is a measure of mass transported over time, and can only be calculated when both the constituent concentration (mass/volume of water) and discharge (volume of water/time) are known:

Load (lbs.) = stormwater discharge volume (cubic feet) x concentration (mg/L) x conversion coefficient

Once loads are calculated, they can then be compared to TMDLs established for the Truckee River. Furthermore, load can also be compared across tributaries with different drainage areas if normalized by watershed area to compute yields (lbs./sq. mile)

4.8 Quality Assurance and Quality Control

The 2018 SAP outlines a quality assurance and quality control (QA/QC) project plan. Balance followed this plan using a combination of field quality control activities and data assessment and validation techniques during the monitoring program. Field quality control activities included: a) training both members of the sampling team in stormwater sampling procedures and streamflow measurements; b) assigning a minimum of one senior and experienced staff to each field team; c) adherence to USGS and EPA approved methods and procedures; c) pre- and post-event calibration of field equipment and instruments; d) field collection and analysis of duplicates and bottle blanks, and; e) complete documentation of sampling and observations.

All site visits, staff present, and observations were documented in observer logs and are provided in **Appendix A**. All field equipment and instruments were calibrated before and after each storm and records of calibrations are provided in **Appendix B**.

Separately, Balance designated a staff member who was not involved with the field activities to perform a review of all collected data, calculations, and laboratory results, in accordance with the Quality Assurance and Quality Control (QA/QC) procedures in the 2018 SAP.

4.9 Deviations from the Sampling and Analysis Plan

Weather conditions, hydrologic response, time of day, and/or need for expediency occasionally required deviations from procedures set forth in the 2018 SAP. The following are deviations from the 2018 SAP during the FY2020 monitoring year:

- Stormwater sampling excluded analysis for *E.coli* during many events because the laboratory hold times could not be met when storm sampling was conducted after hours and on weekends.
- In some cases, where automated samplers are used, sample collection was unsuccessful during one or more segments of the storm hydrograph (i.e., rising limb, peak flow, etc.) as the result of instrument malfunction, power loss, and/or insufficient sample volume. In these cases, load reported are underestimates of the actual load. Concentrations for these events are still reported.
- Due to insufficient precipitation and runoff, stormwater samples were not collected at several stations.
- To further our understand baseflow levels of bacteria in the Truckee Meadows tributaries, a separate *E.coli* sample campaign was performed at the end of the fiscal year.

5 MONITORING RESULTS FY2020

Below, we describe total annual precipitation for FY2020, characterize the storms targeted for sampling and the regional hydrologic response, and conclude with a summary of results for constituent concentrations and calculated instantaneous daily, and total storm load. Analytical results are presented graphically for visual analysis herein. The tabular results and laboratory reports can be found in **Appendix C** and **Appendix D**, respectively.

5.1 Precipitation Summary FY2020

Precipitation across the Truckee Meadows was evaluated from 5 precipitation stations. (see **Figure 3-1**). Cumulative daily precipitation across stations is compared in **Figure 5-1** and highlights the spatial variability of precipitation in the Truckee Meadows in FY2020. FY2020 was an extremely dry year across the Truckee Meadows with total annual precipitation in FY2020 ranging from 3.05 inches in North Truckee Drain at Orr Ditch (North Sparks) to 5.74 inches in Mogul (West of Reno).

Spatial variability in precipitation during each sampled event is shown in **Table 5-1**. For instance, the November 19, 2019 storm measured between 0.02 inches (North Truckee Drain at Orr Ditch) and 0.12 inches (UNR-Farms, Sparks). FY2020 annual precipitation at the Reno-Tahoe International Airport, centrally located in the Truckee Meadows, was 4.11 inches, well below the long-term climate normal precipitation (7.40 inches; 1981-2010) for this station. Finally, precipitation that did “spill-over” into the Truckee Meadows was in the form of snow. Cold temperatures and snow reduce stormwater runoff and streamflow response. Hydrologic response from snowmelt is highly variable and is not characterized in the SAP as targeted stormwater runoff for sample collection.

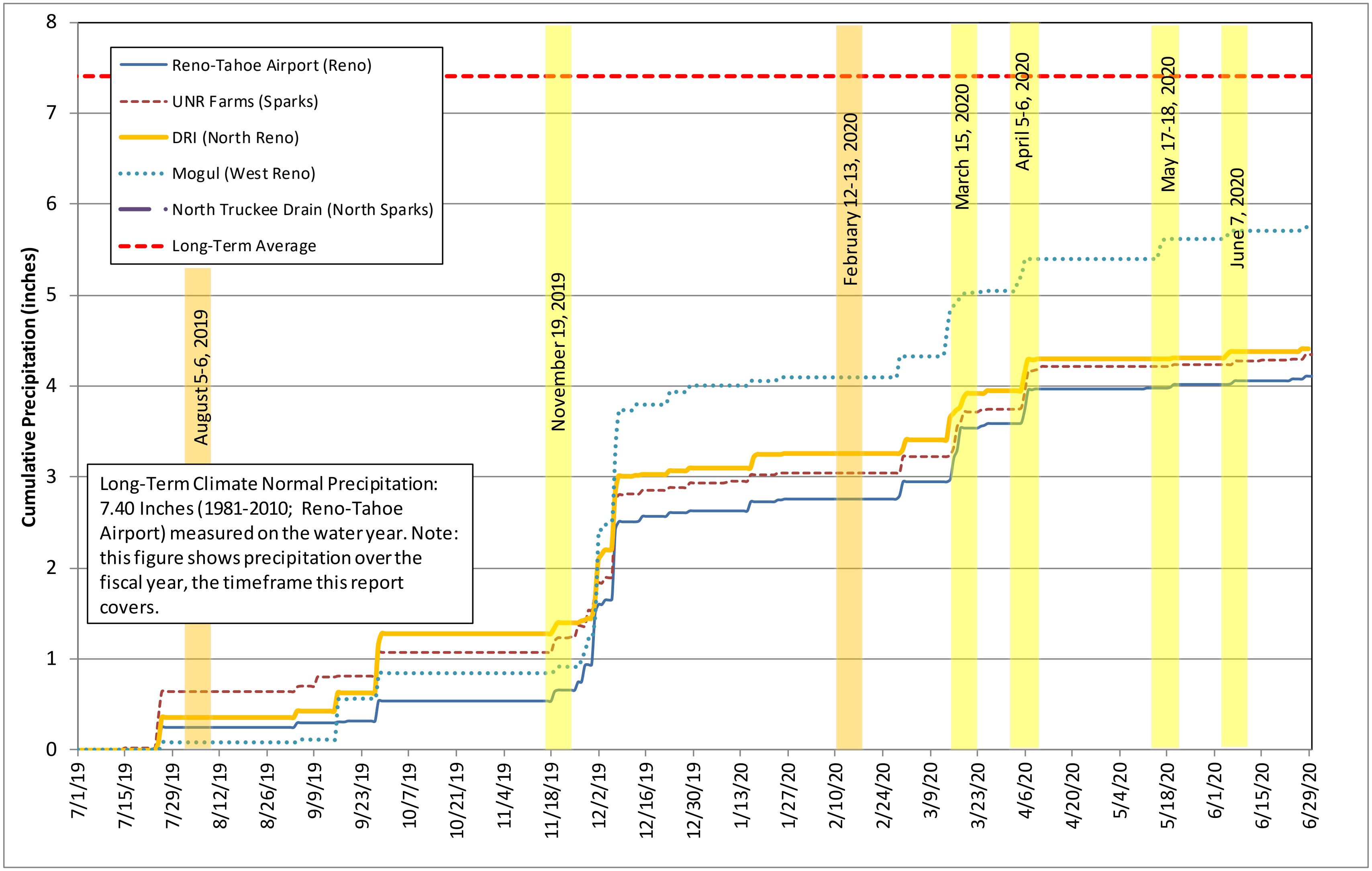

Figure 5-1 **Cumulative Precipitation at 5 Different Rain Gages, Truckee Meadows, Nevada, FY2020.** Precipitation occurrence, depths and durations varied widely across the area. The 5 events that were sampled are highlighted as well as the dates when baseflow was sampled.

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Table 5-1 **Summary of Precipitation Depths for 5 Stations over Sampled Storm Events, Truckee Meadows, FY2020**

Rainfall gage	**Location**	***November 19, 2019***	***March 15, 2020***	***April 5-6, 2020***	***May 17-18, 2020***	***June 7, 2020***
		(inches)				
Reno-Tahoe Airport	Reno	0.10	0.03	0.16	0.00	0.03
UNR-Farms	Sparks	0.12	0.02	0.20	0.00	0.04
DRI	North Reno	0.06	0.24	0.18	0.00	0.03
USGS-Mogul	West Reno (Mogul)	0.03	0.22	0.23	0.07	0.00
USGS-N. Truckee Drain	North Sparks	0.02	0.01	0.12	0.00	0.00
	Min	0.02	0.01	0.12	0.00	0.00
	Max	0.12	0.24	0.23	0.07	0.04

Note: Radar imagery indicated that the May 17-18, 2020 thunderstorms produced precipitation in the upper portion of the Thomas and Whites Creek watersheds when samples were collected.

5.2 Work Conducted in FY2020

Balance collected 13 of 30 planned stormwater samples in FY2020, due to below average annual precipitation and limited runoff-generating storms in the Truckee Meadows. (**Table 5-2**). Separately, baseflow samples were collected at all the tributary stations on August 5-6, 2019 to characterize summer baseflow and on February 12-13, 2020 to characterize winter baseflow. Summer baseflow coincides with the irrigation season (April to October). Baseflow conditions were defined as a non-storm period with a minimum of 10 consecutive days without precipitation preceding the day of sampling.

Table 5-2 Storm Events and Baseflow Sampled in FY2020 and Stations Sampled in Each Event

Fiscal Year 2020 **(July 1, 2019 - June 30, 2020)**		***August 5-6, 2019***	***February 12-13, 2020***	***November 19, 2019***	***March 15, 2020***	***April 5-6, 2020***	***May 17-18, 2020***	***June 7, 2020***	FY2020 Sample Count
Station	*Station ID*	*Summer*	*Winter*						
Tributaries									
Steamboat Cr at Rhodes Rd	SBC@RR	X	X						
Steamboat Cr at Narrows	SBC@NAR	X	X						
Steamboat Cr at Clean Water Way	SBC@CWW	X	X						
Whites Cr at Old Virginia Hwy	WC@OVH	X	X				X	X	2
Thomas Cr at S. Meadows Pkwy	TC@SMP	X	X				X	X	2
North Truckee Drain at Orr Ditch	NTD@ORD	X	X			X			1
North Truckee Drain at Big Fish Dr.	NTD@BFD	X	X			X			1
Chalk Cr at Chalk Bluff	CC@CB	X	X						
Alum Creek at Truckee River	AC@TR	X	X				X		1
Yori Drain at Steamboat Creek	YD@SBC	X	X						
Boynton Slough at Steamboat Creek	BS@SBC	X	X						
Urban Outfalls									
Oxbow Nature Park	C-24	NA	NA		X				1
Arlington	H-19	NA	NA	X	X				2
Fisherman's Park II	D-16	NA	NA		X	X			2
Mary Wahl Ditch	SDOE008936	NA	NA			X			1

Notes:

X =Denotes that samples were collected at this station during the identified storm event

NA =Not applicable; stormwater urban outfalls do not exhibit baseflow

5.3 FY2020 Hydrologic Response

Annual hydrographs for 8 tributaries to the Truckee River monitored in FY2020 are presented and described in this section. For context, we also show daily mean streamflow for the Truckee River during the monitoring period. Streamflow for all monitored and gaged tributaries are illustrated using either 5-minute, 15-minute or hourly data. The higher resolution 5- and 15-minute data are required at tributary stations to illustrate the urban "flashy" nature of storm event runoff in these tributaries where instantaneous streamflow can exceed the daily mean streamflow by an order of magnitude.

5.3.1 TRUCKEE RIVER HYDROLOGIC RESPONSE, FY2020

Figure 5-2 shows FY2020 daily mean streamflow for the Truckee River at three different USGS gaging stations within the Truckee Meadows: Truckee River at Mogul, Truckee River at Reno, and Truckee River at Vista, in FY2020. These gaging stations were selected because they bracket the upstream and downstream extents of the Truckee Meadows where tributaries and outfalls sampled under this program discharge to the Truckee River.

Streamflow in the Truckee River through Truckee Meadows is affected by many factors, including: (a) precipitation and snowmelt in the upper watershed, upstream from the Truckee Meadows, (b) regulated flows from 6 upstream dams, and (c) upstream diversions. At the beginning of the fiscal year (July 1, 2020), during the tail end of the snowmelt runoff period, daily streamflow was 687 cfs (Mogul), 703 cfs (Reno), and 857 cfs (Vista). The November 19, 2019 event was sampled, representing a small frontal storm, however, this event resulted in little to no increase to daily streamflow in the Truckee River. In mid-March, mean daily flow in the Truckee River increased from their annual lows between 200 cfs and 300 cfs to flows exceeding 500 cfs in response to upstream dam releases as administered by the Truckee River Operations Agreement (TROA). A small frontal storm sampled on March 15, 2020 increased daily streamflow a total of 10 cfs at Reno and 30 cfs at Vista gaging stations. An isolated storm in the Carson Range upper watershed of the Truckee Meadows on May 17-18, 2020 resulted in the Truckee River daily mean streamflow rise above 1550 cfs at Reno from a baseflow of 960cfs and the annual peak flow of 1900 cfs at Vista. Streamflow in the Truckee River began to recede on June 1, 2020 and continued to recede through the end of the fiscal year in the absence of additional precipitation.

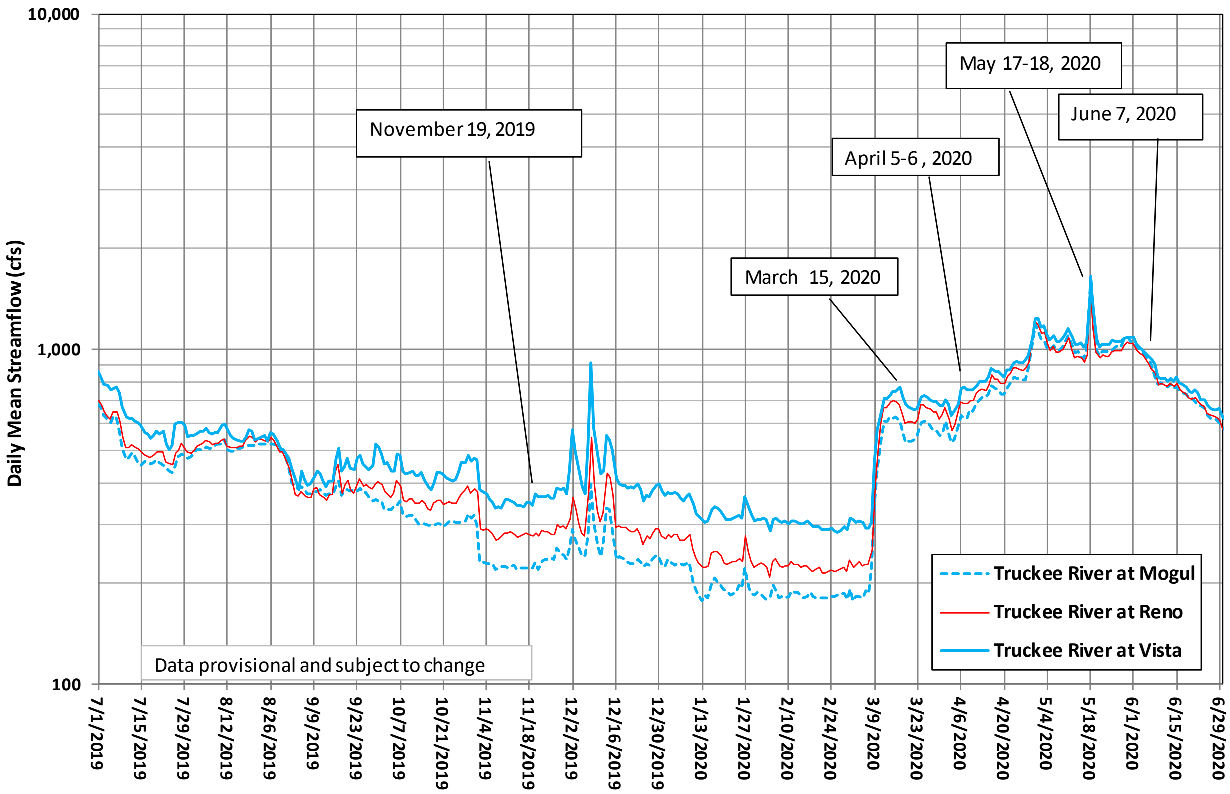

Figure 5-2 **Hydrologic response in the Truckee River to five sampled storms in FY2020, Truckee River at Three Stations (USGS Stations 10347460, 10348000 and 10350000), Truckee Meadows, Nevada, FY2020** As the Truckee River flows through the Cities of Reno and Sparks, it receives contributing flows from North Truckee Drain, Steamboat Creek, several other smaller tributaries, and stormwater urban outfalls.

5.3.2 NORTH TRUCKEE DRAIN HYDROLOGIC RESPONSE, FY2020

Figure 5-3 displays a record of near-continuous (15-minute) streamflow in the North Truckee Drain (NTD) at two monitoring stations, Orr Ditch (NTD@ORD) and Big Fish Drive (NTD@BFD) in FY2020. At the beginning of the fiscal year, baseflow in the North Truckee Drain was measured to be 0.5 cfs at NTD@ORD and approximately 1.7 cfs downstream at NTD@BFD. Streamflow records at both stations exhibited rapid rising and falling during storm events, reflecting the high degree of imperviousness in the watershed. Due to timing of storms within the 10-day dry period and the lack of precipitation during January and February, only one storm was sampled on North Truckee drain on April 6-7, 2020. Peak flow as a result of this event measured 5.4 cfs at Big Fish Drive, and 2.7 cfs upstream at Orr Ditch. The annual peak flow on North Truckee Drain occurred on December 7, 2019 and was measured to be 103 cfs at Big Fish Drive and 41.7 cfs at Orr Ditch, but this storm occurred within 10 day of previous precipitation and was therefore not sampled. Baseflow was sampled at both stations on August 5-6, 2019 and February 12-13, 2020 to characterize the summer and winter ambient water quality, respectively.

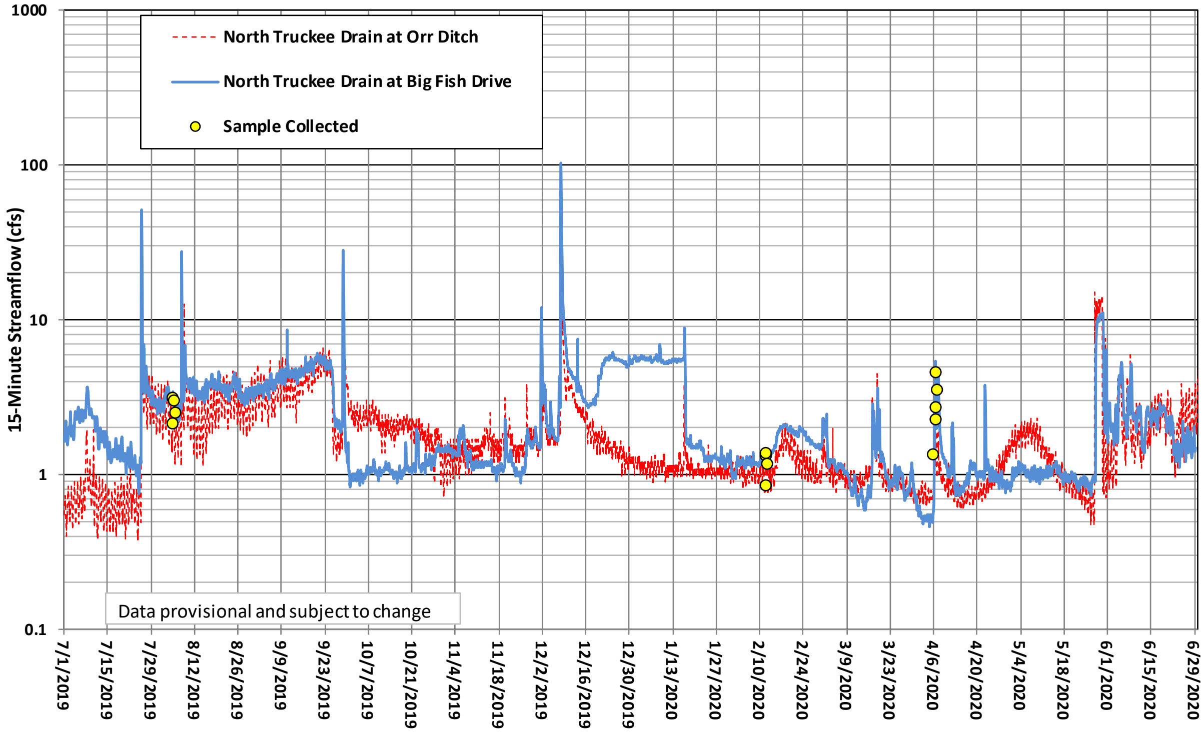

Figure 5-3 Continuous (15-minute) Streamflow, North Truckee Drain at Orr Ditch (USGS 10348245) and Big Fish Drive (USGS 10348295), Sparks, Nevada, FY2020

5.3.3 STEAMBOAT CREEK HYDROLOGIC RESPONSE, FY2020

FY2020 continuous streamflow for three monitoring stations on Steamboat Creek at Rhodes Road (SBC@RR), the Narrows (SBC@NAR), and Clean Water Way (SBC@CWW) are shown in **Figure 5-4**. At the beginning of FY2020 (July 1, 2019) all three gages show receding flows from decreasing snowmelt runoff with streamflow ranging from 79 cfs at SBC@RR, 77 cfs at SBC@NAR, and 116 cfs at SBC@CWW and receding to mid-October baseflow values of 3 cfs at SBC@RR, 21 cfs at SBC@NAR, and 50 cfs at SBC@CWW. No stormwater samples were collected at any of the three Steamboat Creek locations during FY2020 due to lack of hydrologic response from precipitation and/or occurrence of storm events within 10-day dry period window. A storm occurring on December 8, 2019 was one of only two measurable hydrologic responses to precipitation in FY2020, the other being on December 1, 2019. The annual peak flow of 350 cfs was recorded at SBC@CWW on December 8, 2019. Neither storm was sampled due to a smaller storm that reset the 10-day dry period at Thanksgiving with all storms falling within 10 days of each other. Baseflow was sampled from all three stations on August 5-6, 2019 and February 12-13, 2020 to characterize the summer and winter ambient water quality, respectively.

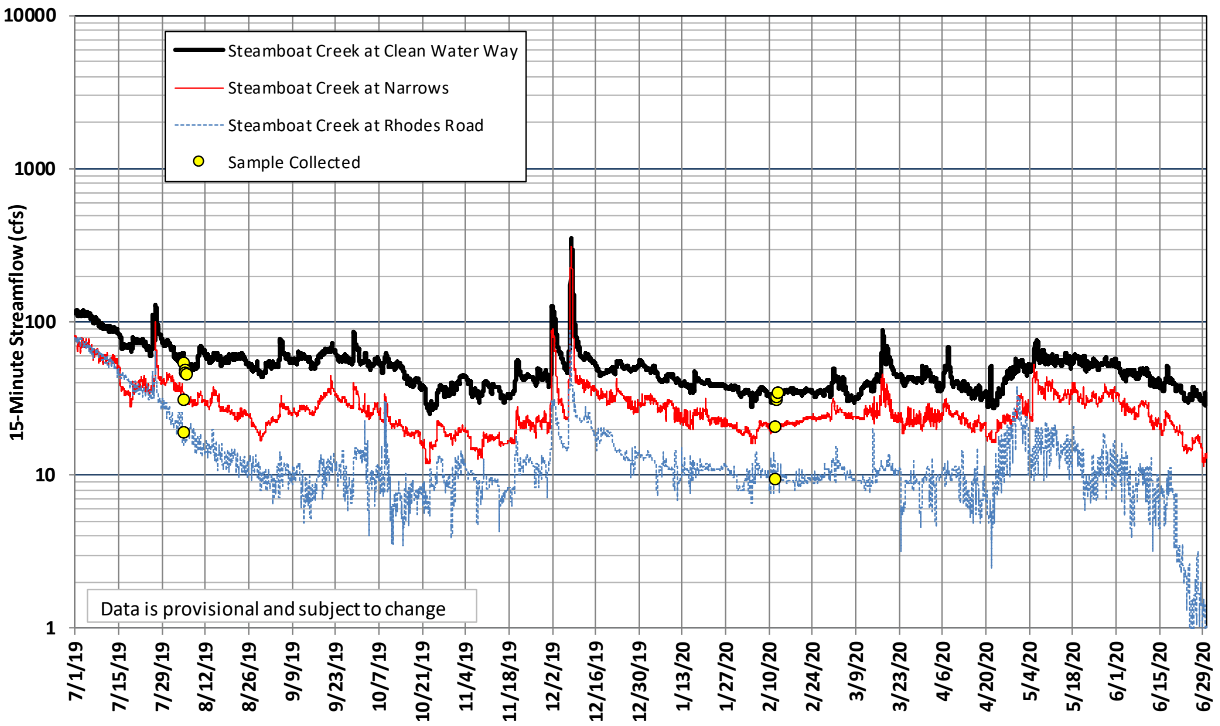

Figure 5-4 Continuous (15-minute) Streamflow, Steamboat Creek at Three Stations, Truckee Meadows, Nevada, FY2020 (USGS Stations 10349300, 10349849 Alum Creek Hydrologic Response, FY2020

Figure 5-5 shows 15-minute continuous streamflow for Alum Creek at Mayberry Drive in FY2020. Manual measurements of streamflow and the collection dates of water quality samples (collected at AC@TR) are also shown.

As is typical for Alum Creek, the hydrograph in FY2020 exhibited flashy peak flows with rapid rise and fall of stage, indicative of an urbanized watershed. Streamflow in Alum Creek is perennial but is also affected by irrigation ditch releases from Steamboat Ditch. Recorded flow at Alum Creek at the beginning of FY2020 was between 0.5 and 0.6 cfs. An annual peak flow of 12 cfs occurred on December 7, 2019. The December 7 storm was the only measurable hydrologic response by Alum Creek during the FY2020 and it occurred within the 10-day dry period, which excluded Balance's ability to collect stormwater runoff samples. Only one stormwater runoff sample was collected in FY2020, on May 18, 2020 as the result of a thunderstorm isolated to the upper watershed. Streamflow receded in early October 2019 and rose in early May 2020, likely in response to irrigation operations at the golf course upstream of the gaging location.

Baseflow water quality samples were collected on August 6, 2019 and February 13, 2020. We note that baseflow during the summer was an order magnitude greater than baseflow measured during the winter and likely associated with irrigation operations.

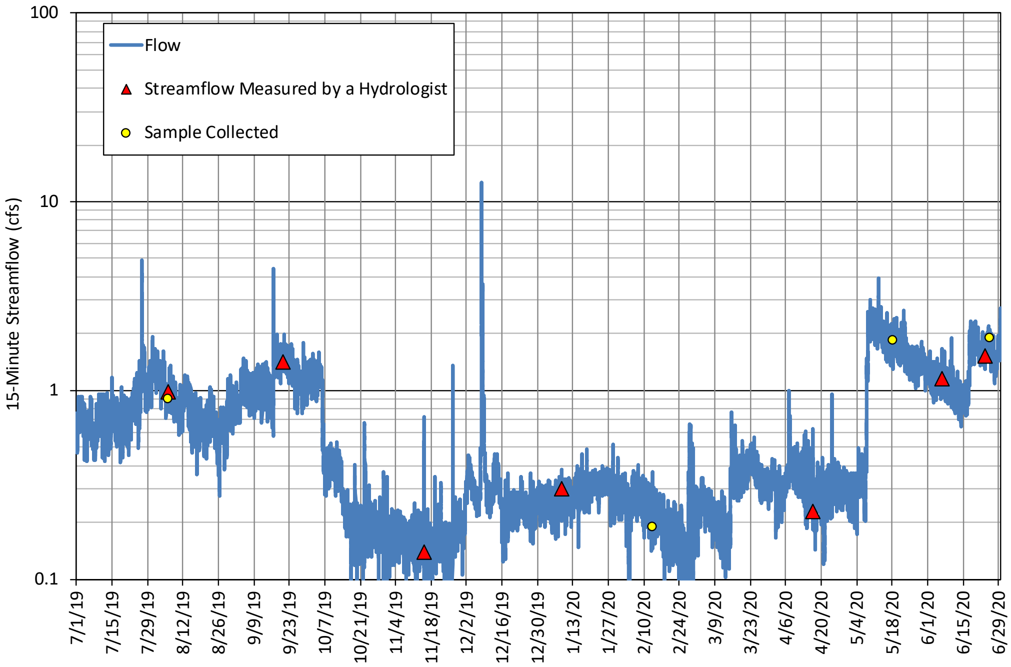

Figure 5-5 Continuous (15-minute) Streamflow, Alum Creek at Mayberry Drive, FY2020

5.3.4 SOUTH EVANS CREEK HYDROLOGIC RESPONSE, FY2020

Figure 5-6 shows 15-minute continuous record of stage for South Evans Creek at Kietzke Lane (EC@KL) in partial FY2020(May 11, 2020-June 30, 2020). Manual measurements of streamflow are also shown. The South Evans Creek at Kietzke Lane stream gage was installed on May 11, 2020. Due to the limited record and manual streamflow measurements to date, a stage to streamflow rating curve has not yet been established. The South Evans Creek gage was selected to characterize water quality in another tributary[3] to Steamboat Creek as part of a nested sampling approach. Preliminary data recorded for South Evans Creek were limited to baseflow and the absence of any precipitation events.

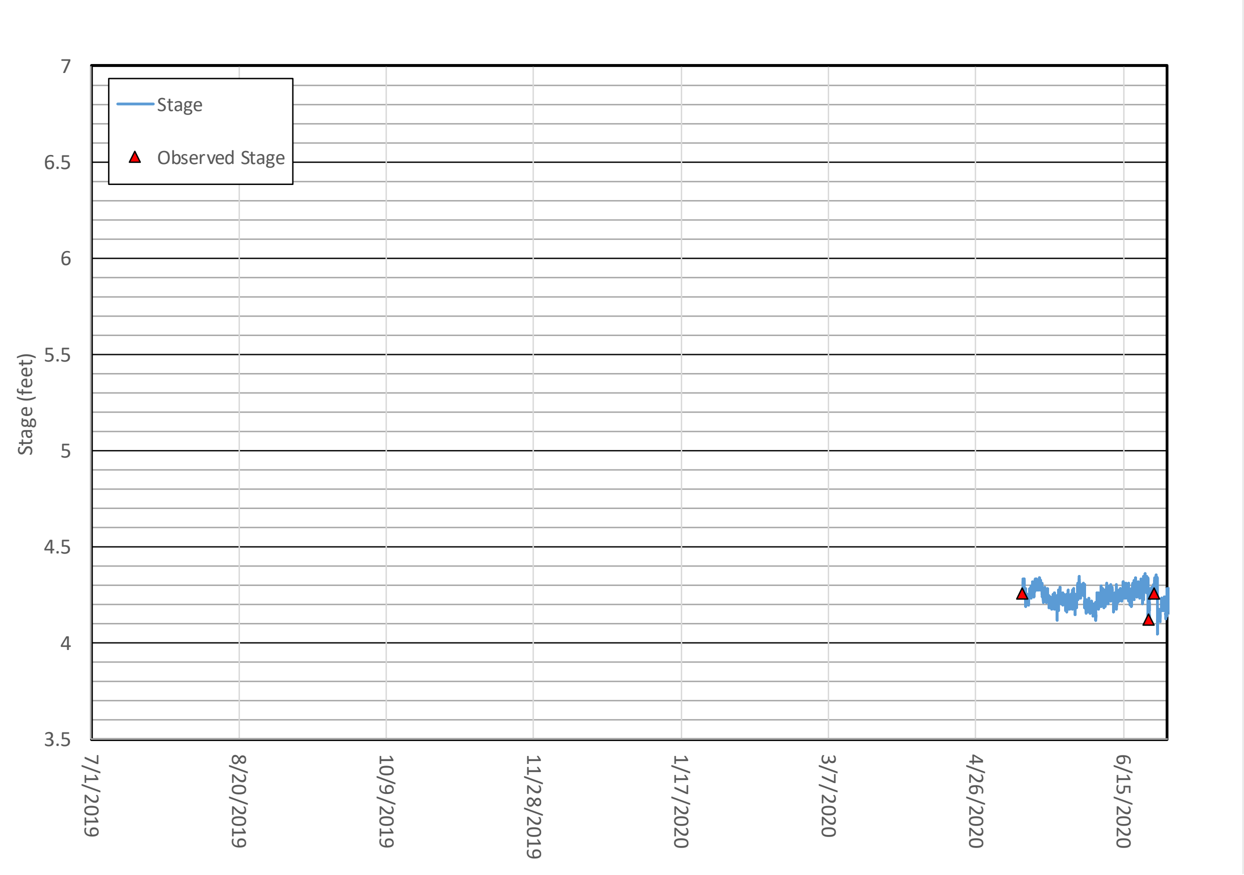

Figure 5-6 Continuous Stage (15-minute), South Evans Creek at Kietzke Lane, FY2020

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[3] S. Evans Creek is a tributary to Dry Creek, tributary to Boynton Slough, tributary to Steamboat Creek

5.3.5 THOMAS CREEK HYDROLOGIC RESPONSE, FY2020

Figure 5-7 shows 15-minute continuous streamflow for Thomas Creek at South Meadows Parkway (TC@SMP) in FY2020. Manual measurements of streamflow and the collection dates for water quality samples are also shown. Thomas Creek originates above 8,000 feet and receives snowmelt runoff from Mount Rose, urban runoff from the lower watershed, and irrigation return flows from Last Chance Ditch. As such, we observed daily fluctuations in streamflow associated with a diurnal snowmelt cycle and flashy peak flows (rapid rise and fall of stage), indicative of urban stormwater runoff.

Thomas Creek exhibited perennial streamflow in FY2020. Streamflow in the beginning of the fiscal year reflected snowmelt recession with daily flow around 8 cfs on July 1, and receding to near 1 cfs by the beginning of August 2019. Fluctuations in streamflow in September 2019, absent of precipitation, are likely associated with irrigation return flows. Streamflow sharply decreased in October 2019 and shortly after, the gaging pool and station became backwatered from a downstream beaver dam. The downstream channel and beaver dam were cleared by NDOT in February 2020 and a record of streamflow was re-established through the end of the fiscal year.

A stormwater runoff sample was collected on May 18, 2020 as the result of a thunderstorm isolated to the upper watershed. Another stormwater runoff sample was collected after a thunderstorm on June 7, 2020. Baseflow water quality samples were collected on August 6, 2019, and February 13, 2020. Annual peak flow was recorded on December 7, 2019, but we cannot estimate the magnitude due to the backwater affect from the beaver dam.

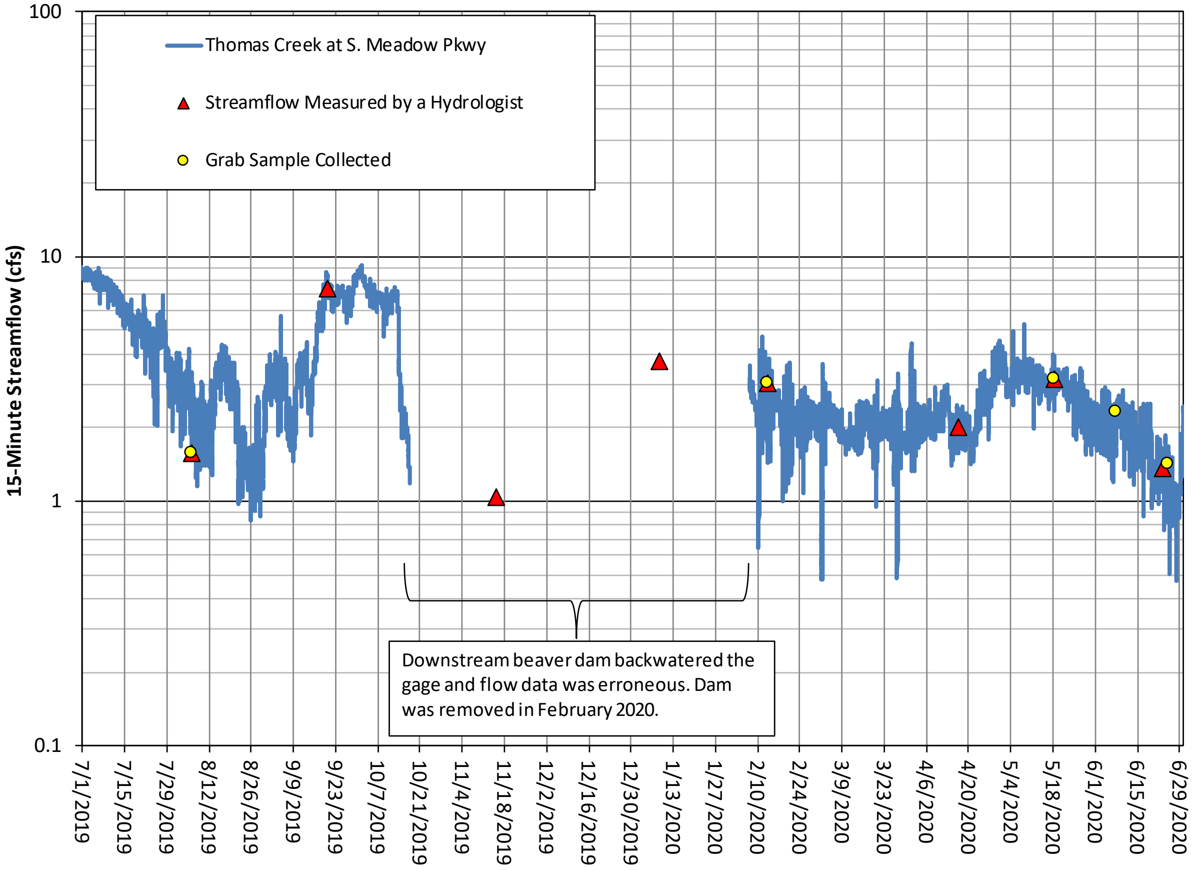


Figure 5-7 **Continuous Streamflow (15-minute), Thomas Creek at S. Meadows Parkway, FY2020**

5.3.6 WHITES CREEK HYDROLOGIC RESPONSE, FY2020

Figure 5-8 shows hourly streamflow on Whites Creek at Old Virginia Highway (WC@OVH) and collection dates of water quality samples. This gaging station is operated and maintained by Truckee Meadows Water Authority (TMWA); accuracy of streamflow was not verified. Whites Creek exhibited perennial streamflow in FY2020. Streamflow in the beginning of the fiscal year was reported between 8 and 9cfs and falling to near 1.0 cfs in late October 2019. The annual peak flow of 28 cfs was recorded on July 26, 2019. A stormwater runoff sample was collected June 7, 2020 as the result of a series of thunderstorms.

Baseflow water quality samples were collected on August 5, 2019 and February 12, 2020 and at nearly similar streamflow

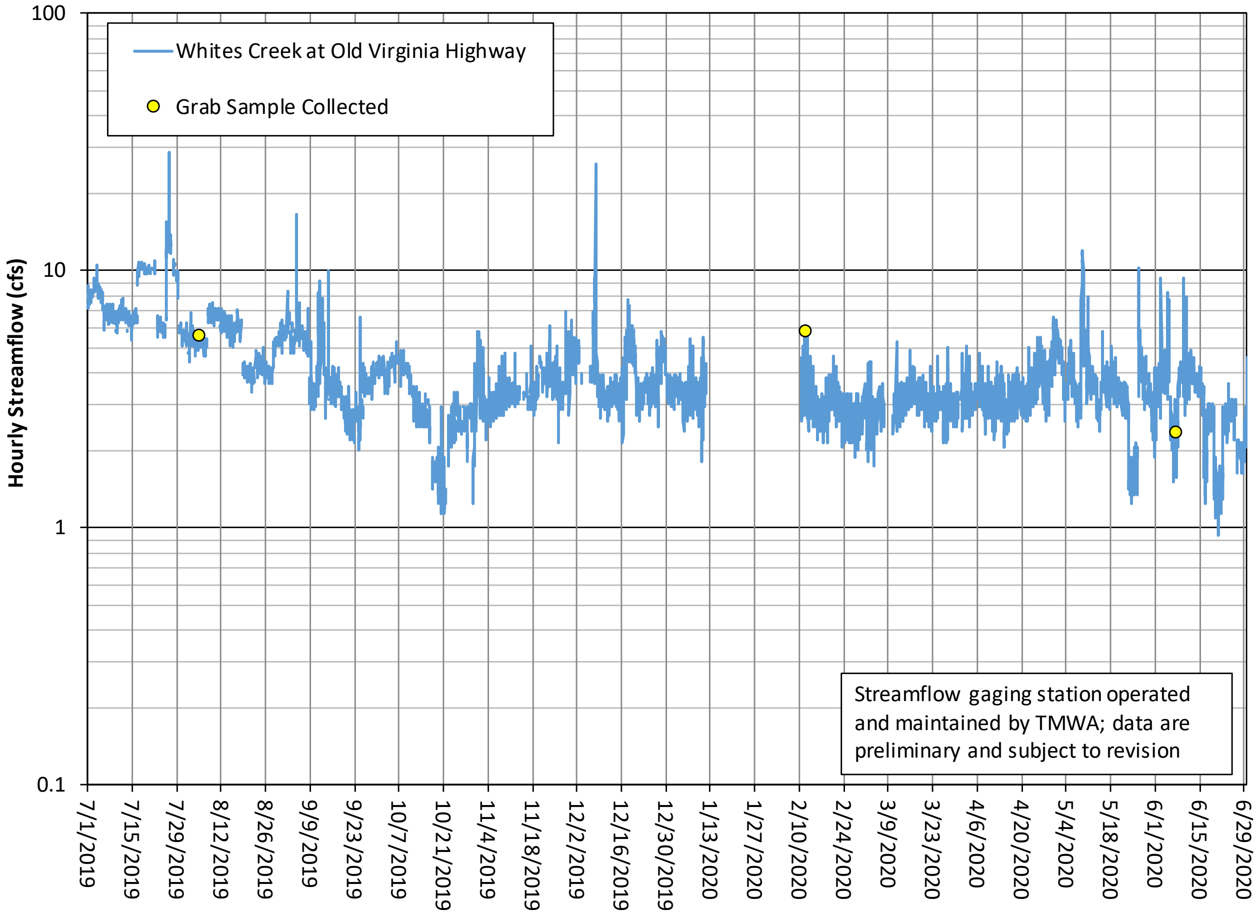


Figure 5-8 Continuous Streamflow (hourly), Whites Creek at Old Virginia Highway, FY2020.

5.3.7 YORI DRAIN HYDROLOGIC RESPONSE, FY2020

Figure 5-9 shows discharge events for Yori Drain at Steamboat Creek (YD@SBC), during FY2020. Near-continuous data is reported in 5-minute intervals. Yori Drain exhibited perennial flow in FY2020, with baseflow ranging between 2 cfs and 10 cfs. Annual peak flow was 21 cfs and recorded on December 8, 2019.

Stormwater runoff samples were not collected at Yori Drain in FY2020 due to lack of precipitation or hydrologic response during the 10-day dry period. Baseflow samples were collected on August 5-6, 2019 and on February 12-13, 2020 using the automated sampler.

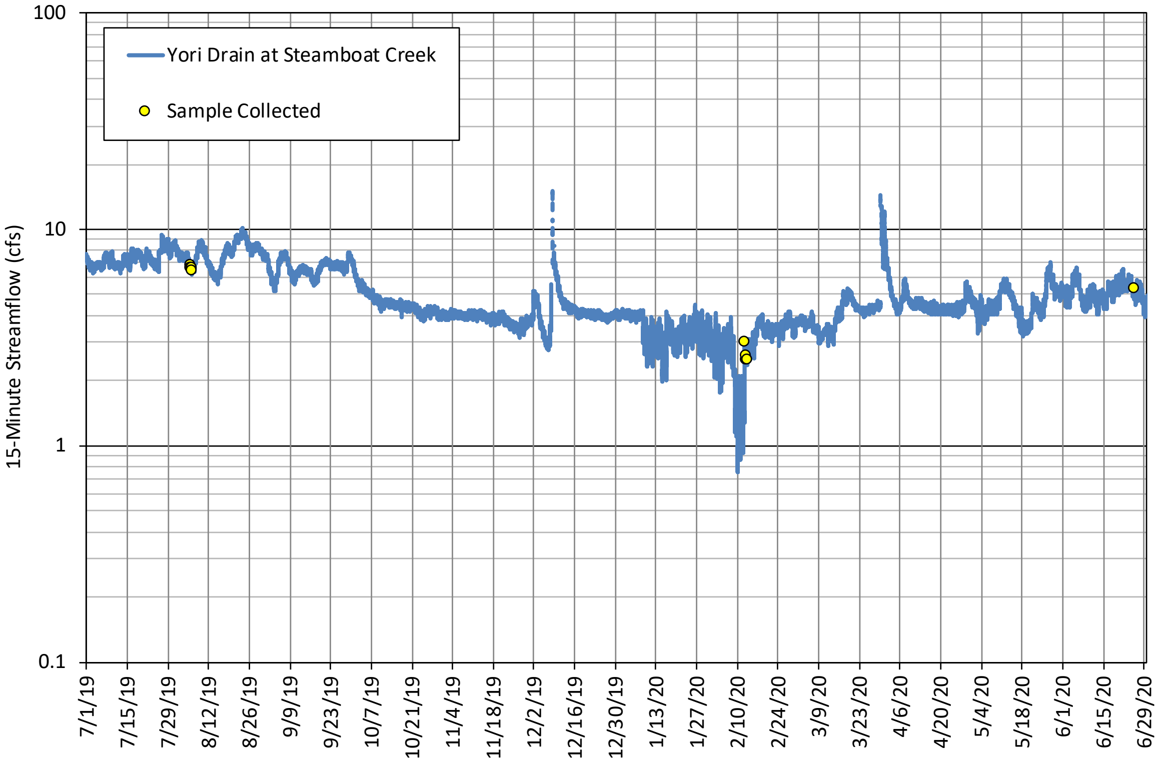


Figure 5-9 Continuous Streamflow (5-minute), Yori Drain at Steamboat Creek, FY2020

5.3.8 BOYNTON SLOUGH HYDROLOGIC RESPONSE, FY2020

Figure 5-10 shows 15-minute continuous streamflow for Boynton Slough at Steamboat Creek (BS@SBC) in FY2020. Manual measurements of streamflow and the collection dates for water quality samples are also shown. Boynton Slough drains a 52 square mile watershed consisting of open space in the upper watershed and mixed residential and commercial use in the lower watershed.

Boynton Slough shows perennial flow. Streamflow at the beginning of the fiscal year was between 12 and 13 cfs. Baseflow at Boynton Slough was recorded at 4 to 5 cfs. An annual peak flow of 278 cfs was recorded on December 7, 2020.

Stormwater runoff samples were not collected at Boynton Slough in FY2020 due to lack of precipitation or hydrologic response during the 10-day dry period. Baseflow samples were collected on August 5-6, 2019 and on February 12-13, 2020 using the automated sampler.

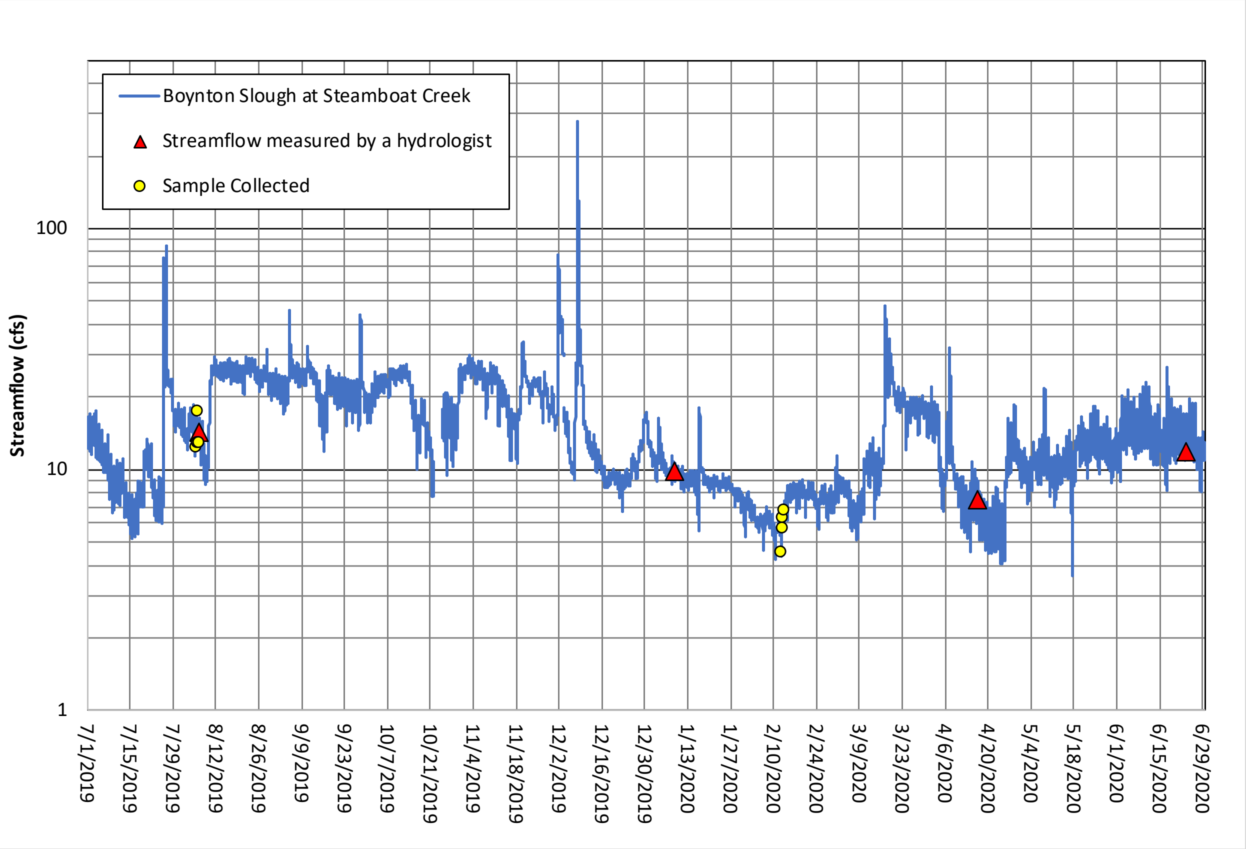


Figure 5-10 Continuous streamflow (15-minute), Boynton Slough (BS@SBC), FY2020

5.3.9 ARLINGTON (H-19) STORMWATER URBAN OUTFALL HYDROLOGIC RESPONSE, FY2020

Figure 5-11 shows discharge events for the stormwater urban outfall located at Arlington Street (H-19) in FY2020. Near-continuous data is reported in 5-minute intervals due to the flashy and ephemeral nature of runoff in this steep, highly urbanized stormwater outfall. This station exhibits short-lived runoff during precipitation and non-precipitation events. Runoff during non-storm periods may be the result of residential irrigation runoff, illicit discharges, or other urban nuisance flow.

In FY2020 the annual peak flows were roughly 12 cfs and occurred on November 30, 2019. However, many other events resulted in discharges near 12 cfs. Stormwater runoff samples were collected on November 19, 2019 and March 15, 2020. Stormwater urban outfalls are not currently sampled for baseflow conditions as part of this monitoring program; the presence and frequency of urban nuisance flows from this outfall requires further investigation.

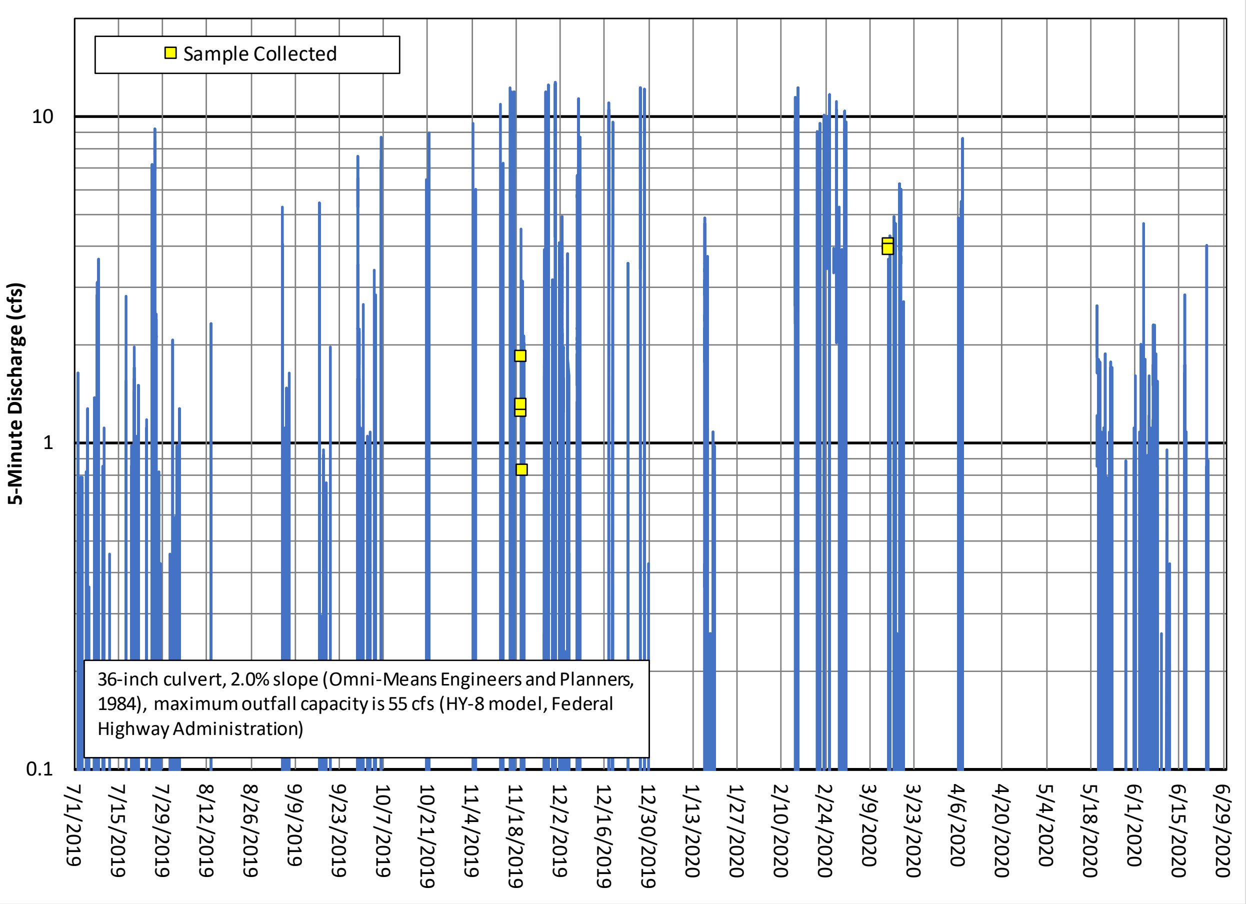


Figure 5-11 Discharge (5-minute), Arlington outfall (H-19), FY2020

5.4 Stormwater and Baseflow Constituent Concentrations and Physical Parameters

The established WQS and requirements to maintain higher quality differ from one monitoring location to another, as described in Section 1.3. Below we present results for both stormwater and baseflow samples collected and for each constituent analyzed in FY2020. In some cases, no WQS are established for a given waterway location, but the water quality of the reach in question must be protective of downstream receiving waters per the Tributary Rule (NAC 445A.1239). Any samples that the laboratory reported as ‘non-detect’ are not shown in graphs.

5.4.1 TOTAL NITROGEN, NITRATE, NITRITE, AND TOTAL KJELDAHL NITROGEN

Total-N concentrations for all samples collected in FY2020 are shown in **Figure 5-12**, **Figure 5-13**, **Figure 5-14**, **Figure 5-15**, and **Figure 5-16**, grouped by their listed water body and specific WQS or numeric criteria, if one exists. Stations that are instrumented with automated samplers may show concentrations measured in 4 different samples per sampling event to correspond to the composited samples across a storm hydrograph. All other stations will show a single concentration per grab sample or per sampling event.

Total-N results from baseflow samples collected at 1) Chalk Creek, 2) a baseflow sample collected at Alum Creek, and 3) stormwater samples collected at Oxbow Nature Park (an urban outfall) are shown **Figure 5-12**. These stations represent discharge to the Truckee River upstream of Idlewild. Total-N concentrations from all samples where Total-N was detected ranged from 0.71 mg/L to 1.90 mg/L and exceeded established WQS for Total-N for this segment of the Truckee River above Idlewild Park (≤ 0.43 mg/L, NAC 445a. 1684). Stormwater samples collected at Oxbow Park in FY2020 exhibited the highest concentrations ranging from 1.40 mg/L to 1.90 mg/L.

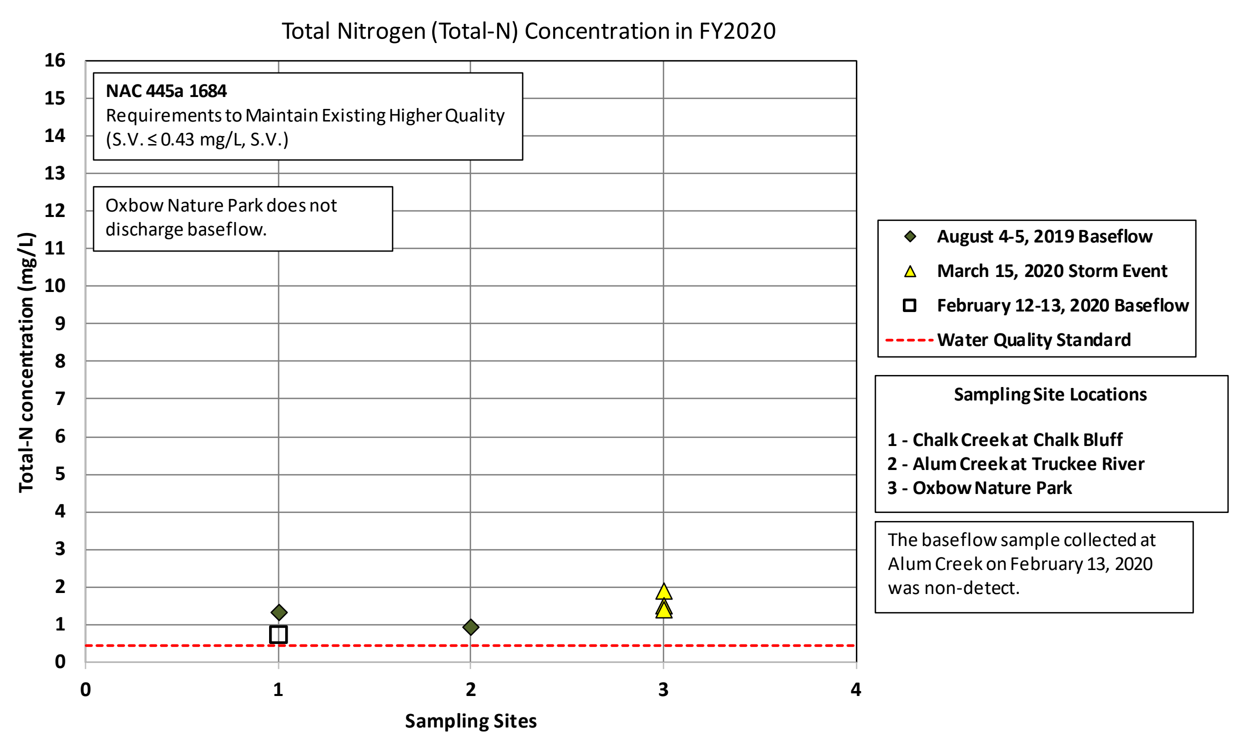


Figure 5-12 Total Nitrogen (Total-N) Concentrations for Tributaries and Stormwater Urban Outfalls to the Truckee River upstream of Idlewild, FY2020

Total-N was detected in all storm event samples collected from three stormwater urban outfalls that discharge to the Truckee River between East McCarran Boulevard and Idlewild (see **Figure 5-13**). All sample concentrations exceeded the WQS (≤ 0.43 mg/L) for this segment of the Truckee River and ranged from 2.2 mg/L to as high as 12.0 mg/L. Stormwater urban outfalls do not discharge baseflow and were therefore not sampled during baseflow conditions.

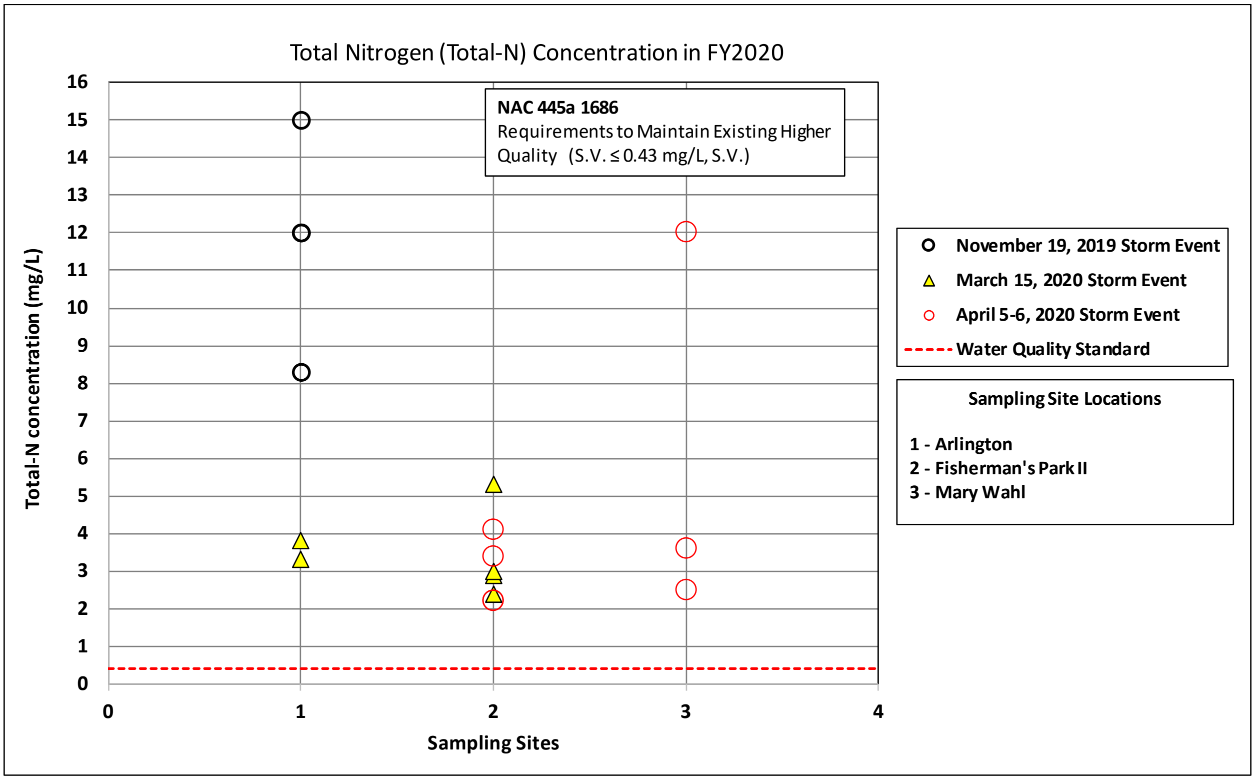


Figure 5-13 Total Nitrogen (Total-N) Concentrations for a Stormwater Urban Outfall to the Truckee River from E. McCarran upstream to Idlewild, FY2020

Total-N was detected in all stormwater and baseflow samples collected from the North Truckee Drain, a tributary to the Truckee River upstream of Lockwood, as shown in **Figure 5-14**. All samples exceeded the WQS for this segment of the Truckee River (≤ 1.2 mg/L) and ranged from 1.4 mg/L to 4.3 mg/L. It should be noted that baseflow concentrations from February 2020 exceeded not only the storm event concentrations at both North Truckee Drain stations, but the established WQS as well.

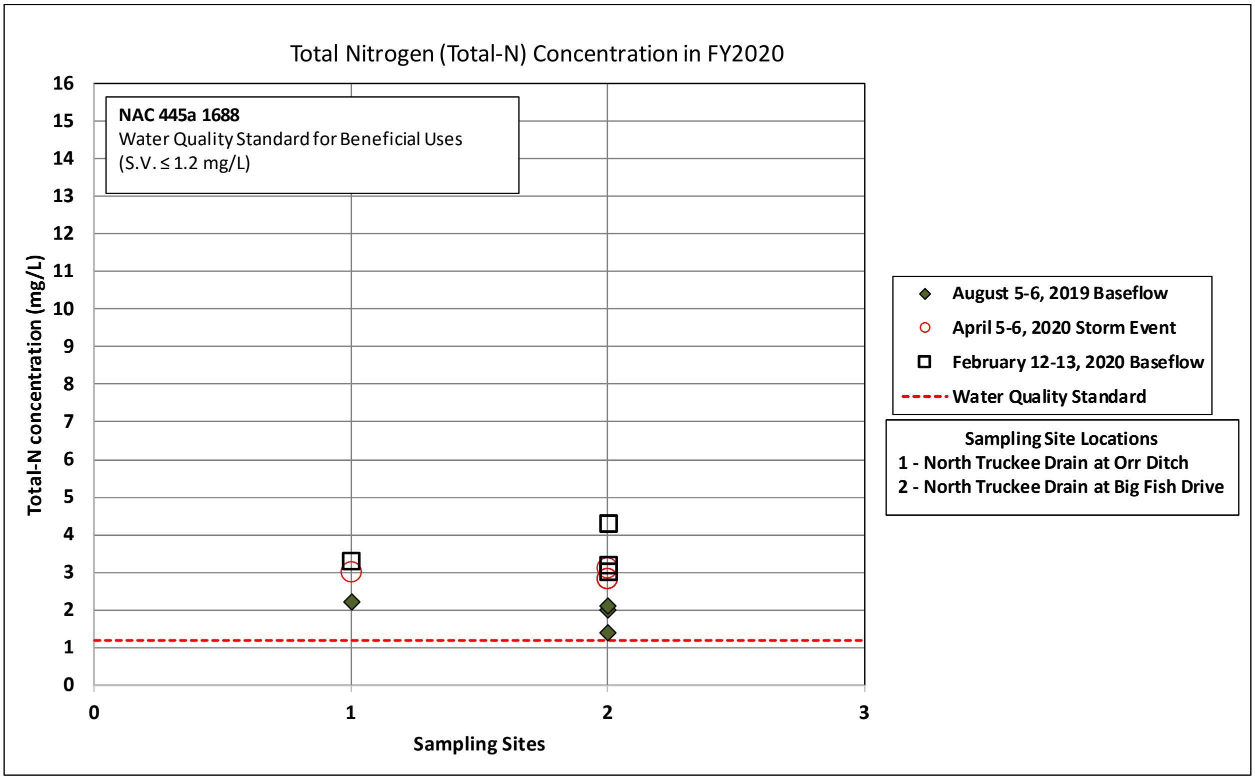


Figure 5-14 Total Nitrogen (Total-N) Concentrations for the North Truckee Drain, FY2020

Total-N concentrations from stormwater and baseflow samples collected in Steamboat Creek and Thomas Creek ranged from 0.26 mg/L to 2.60 mg/L, as shown in **Figure 5-15**. There are no Total-N WQS for Steamboat Creek. Total-N concentrations were higher in the summer baseflow samples from Steamboat Creek at Rhodes Road and Steamboat Creek at Narrows than in the winter baseflow samples, whereas lower concentrations were found the summer baseflow samples at Steamboat Creek at Clean Water Way, Yori Drain and Boynton Slough when compared to winter baseflow samples. Summer baseflow also includes irrigation return flows-- the Upper Steamboat Creek watershed is primarily agricultural; whereas the lower Steamboat Creek watershed and tributaries are primarily urban.

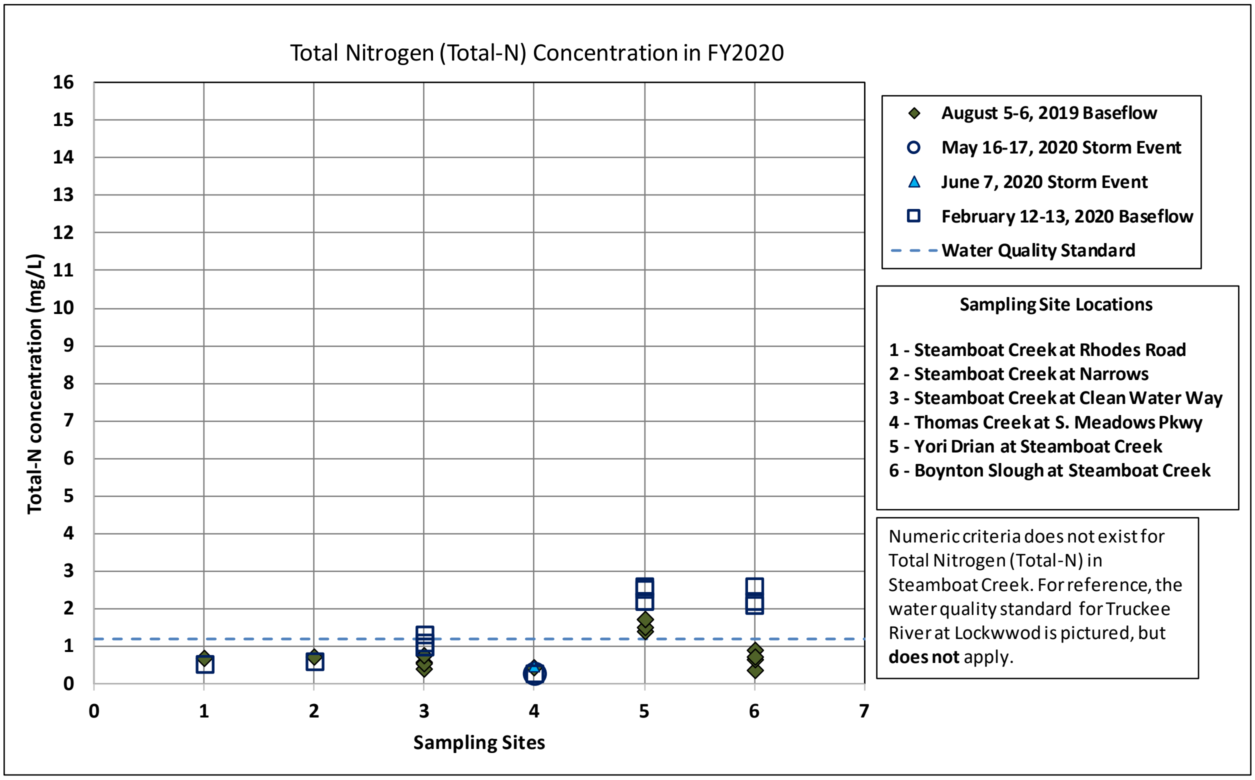


Figure 5-15 Total Nitrogen (Total-N) Concentrations for Steamboat Creek and Tributaries, FY2020

Total-N concentrations from baseflow samples collected in Whites Creek measured 0.27 mg/L (winter) and 0.80 mg/L (summer) (**Figure 5-16**). Total-N was not detected in stormwater samples collected from thunderstorms in May and June 2020. There are no Total-N WQS for Whites Creek. There are no Total-N WQS for Whites Creek.

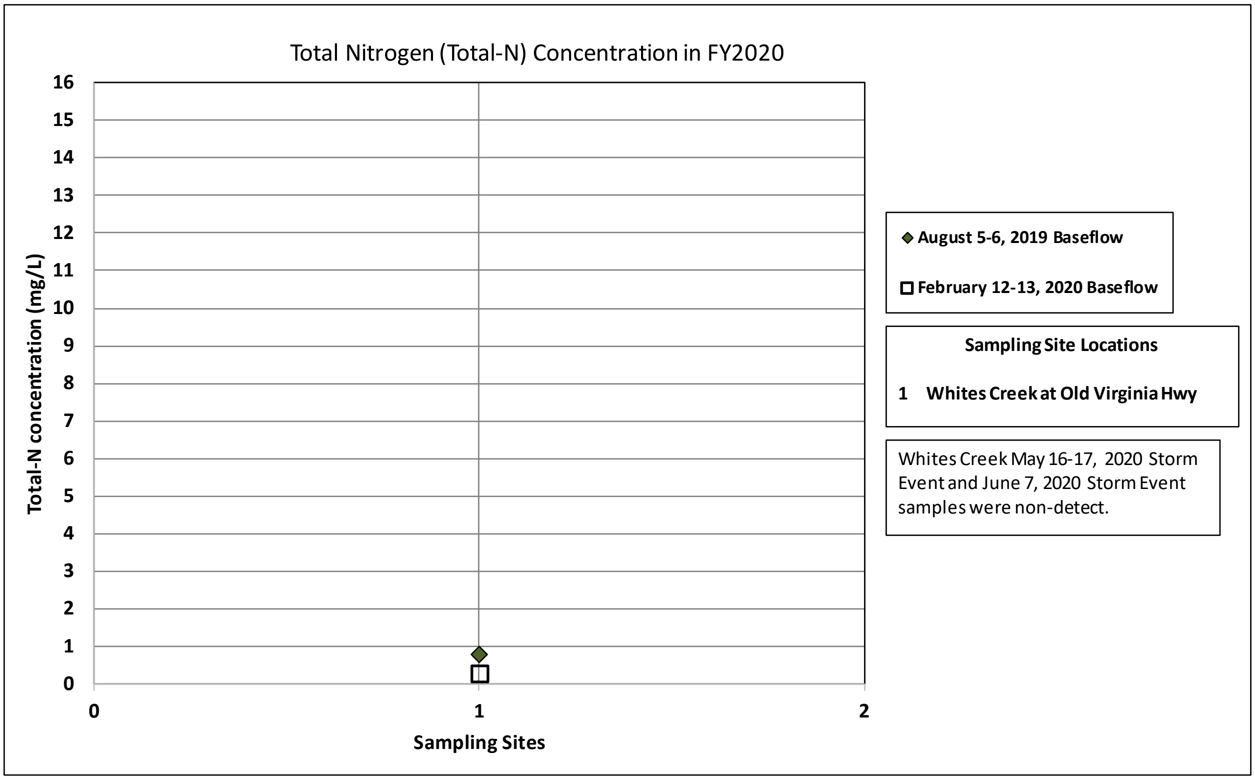


Figure 5-16 Total Nitrogen (Total-N) Concentrations for Whites Creek, FY2020

Analysis for nitrate (NO_3) is required only at selected stations (as per the 2018 SAP), however laboratory analysis of NO_3 is performed on all samples for the calculation of Total-N. We therefore present NO_3 results from all stations/samples in **Figure 5-17**, **Figure 5-18**, **Figure 5-19**, and **Figure 5-21,** grouped by their listed water body and specific numeric criteria. After hours sampling in storm events can result in the exceedance of laboratory holding times for nitrate analysis, therefore, samples that exceed holding times are processed using an alternative assay: EPA 353.2, Determination of Nitrate-Nitrite Nitrogen by Automated Colorimetry, the Lachat Method (noted in figures where method was used for sample results). In this method, results of nitrite and nitrate are combined (mg N (as NO_3 + NO_2)/L). Nitrite concentrations, when detected, are typically low or below laboratory reporting limits.

NO_3 was detected at levels below the WQS (S.V. = 2.0 mg/L) in one baseflow sample from Chalk Creek and one stormwater sample from Oxbow Park urban outfall. These locations discharge to the Truckee River upstream of Idlewild, and concentrations ranged from 0.30 mg/L to 0.74 mg/L (**Figure 5-17**) NO_3 was not detected in any other samples.

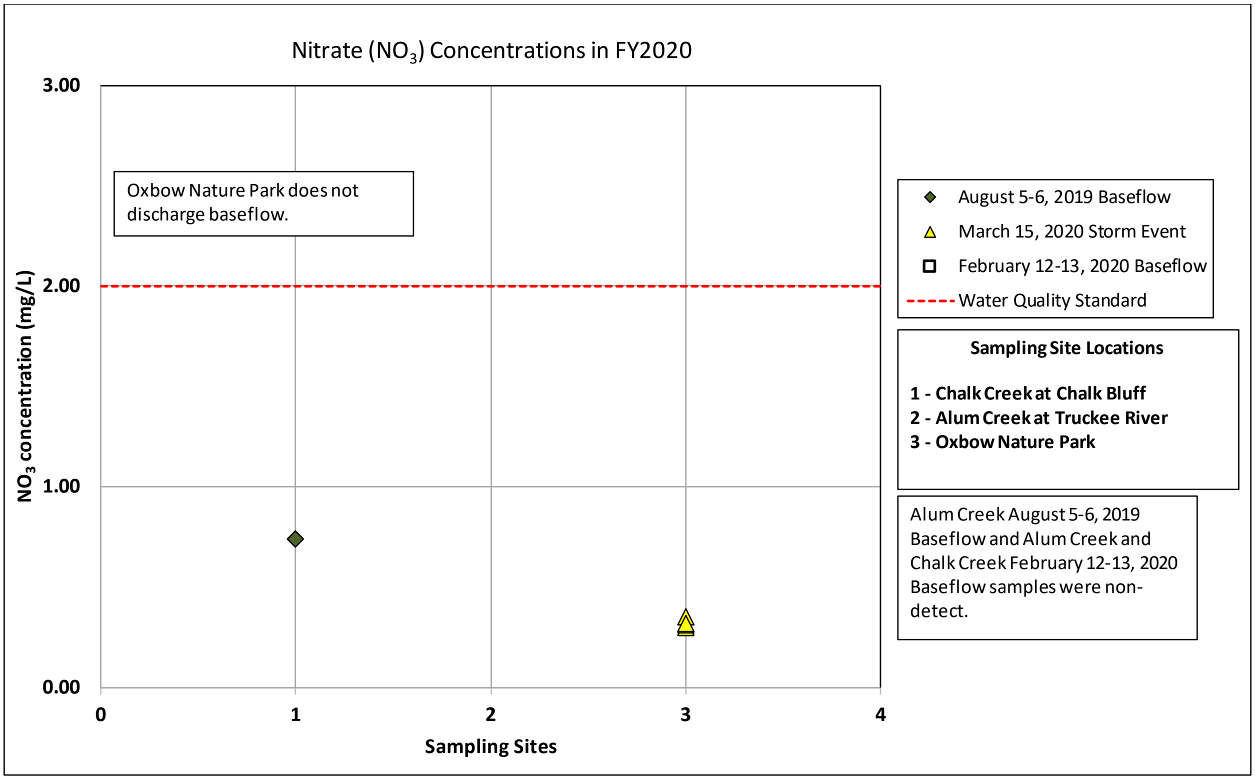


Figure 5-17 **Nitrate Concentrations for Tributaries and a Stormwater Urban Outfall to the Truckee River Upstream of Idlewild, FY2020**

NO_3 concentrations measured from stormwater samples collected between E. McCarran and Idlewild ranged between 0.43 mg/L and 2.4 mg/L (**Figure 5-18**). Two samples collected from Arlington during the November 19, 2019 storm exceeded the WQS established for this segment (S.V. = 2.0 mg/L) with NO_3 concentrations of 2.1 mg/L and 2.4 mg/L. Stormwater urban outfalls do not typically convey baseflow and were therefore not sampled during non-storm conditions.

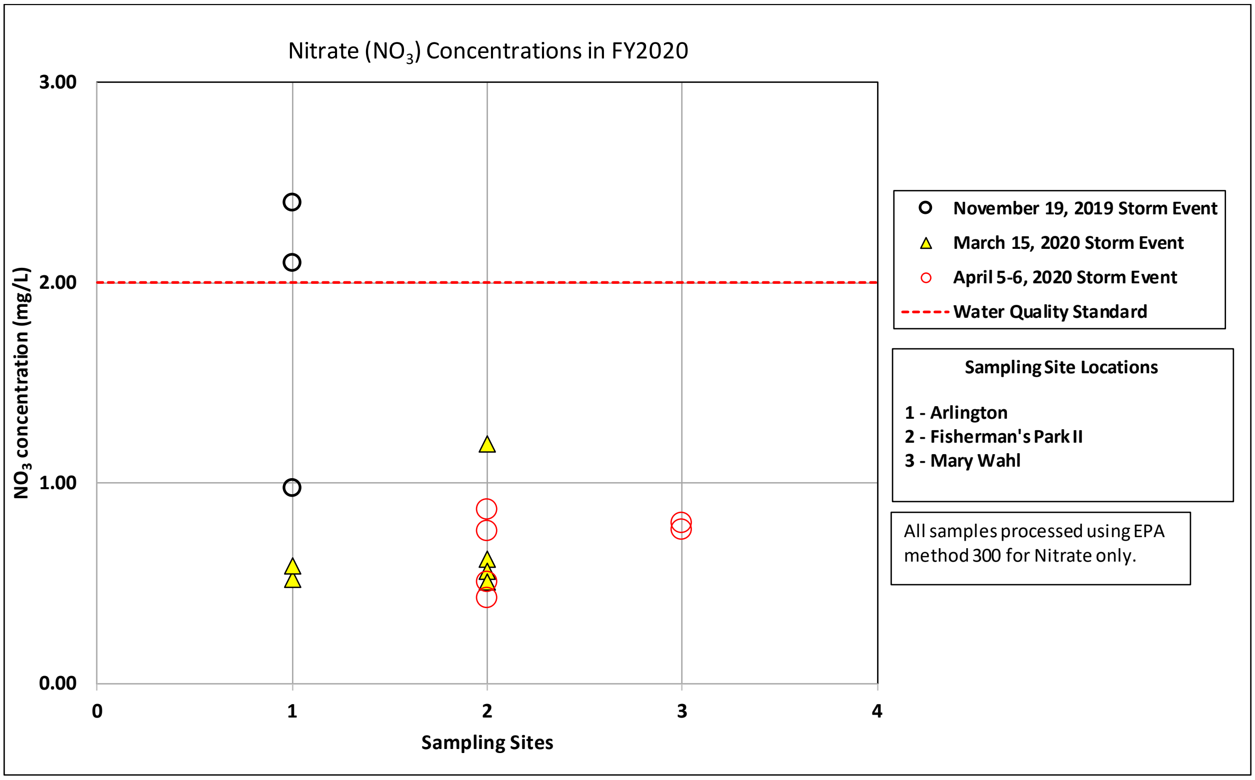


Figure 5-18 **Nitrate Concentrations for Stormwater Urban Outfalls to the Truckee River from E. McCarran upstream to Idlewild, FY2020**

NO_3 concentrations measured from stormwater and baseflow samples collected in North Truckee Drain, a tributary to the Truckee River upstream of Lockwood, ranged between 1.1 mg/L and 2.6 mg/L (**Figure 5-19**). The February 12, 2020 baseflow sample collected at the Orr Ditch station exceeded the WQS established for this segment (≤ 2.0 mg/L) with NO_3 concentrations of 2.6 mg/L. All other baseflow and stormwater samples met the WQS.

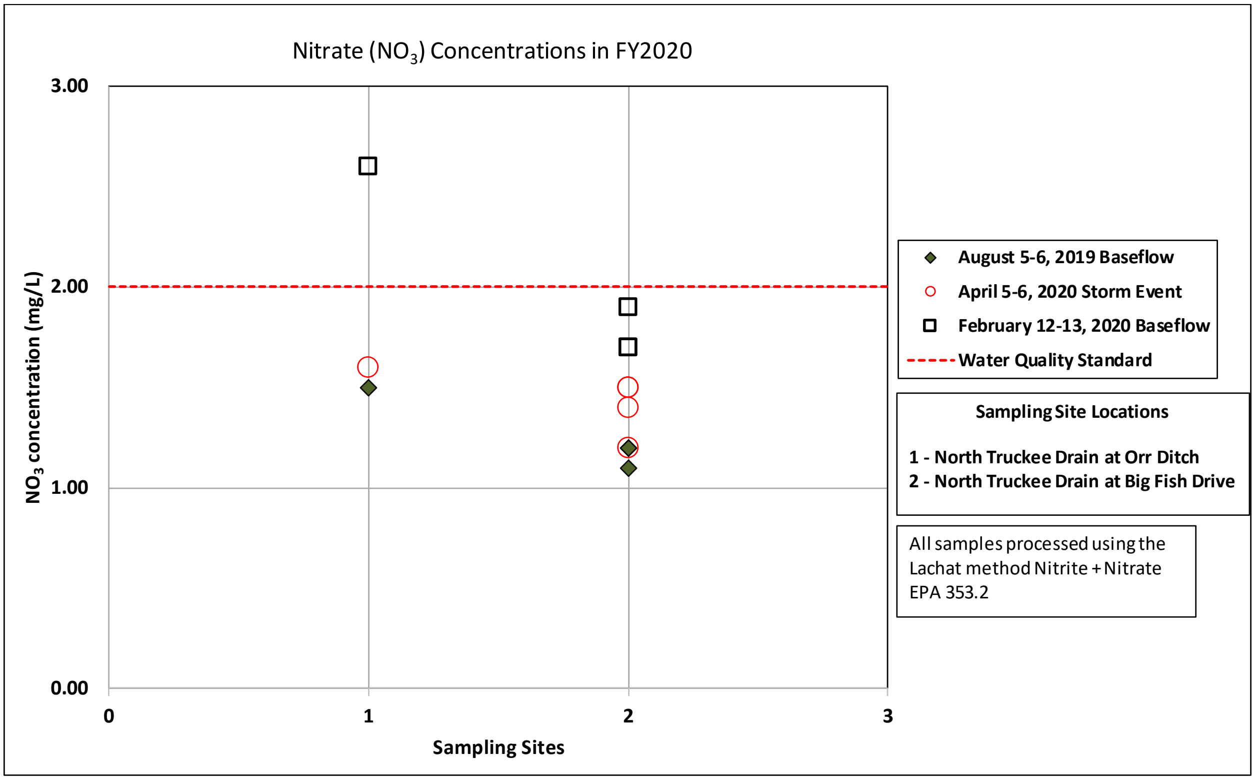


Figure 5-19 **Nitrate Concentrations for the North Truckee Drain, FY2020**

NO_3 concentrations measured in samples collected at three different stations in Steamboat Creek and three tributaries to Steamboat Creek ranged from 0.04 mg/L to 1.5 mg/L. (**Figure 5-20**). Similar to Total-N, the highest NO_3 concentrations were measured in Yori Drain and Boynton Slough during winter baseflow. NO_3 was not detected in stormwater samples collected from Thomas Creek.

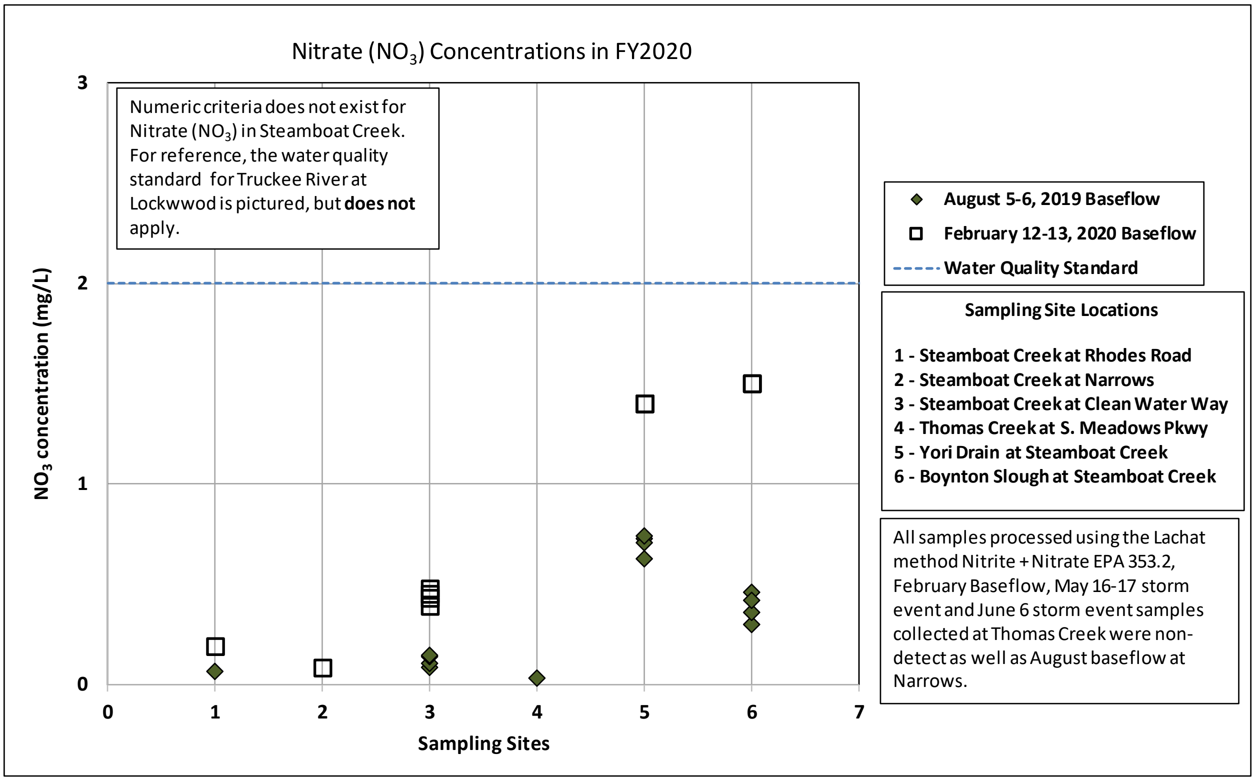


Figure 5-20 Nitrate Concentrations for Steamboat Creek, FY2020

NO_3 was not detected in any samples collected at Whites Creek.

Total Kjeldahl Nitrogen (TKN) concentrations in stormwater and baseflow samples collected in FY2020 are shown in **Figure 5-21**, **Figure 5-22**, **Figure 5-23**, **Figure 5-24**, and **Figure 5-25**, grouped by their listed water body. Numeric criteria do not exist for TKN in the listed water bodies monitored under this program or in the Truckee River.

TKN concentrations measured in two tributaries and one stormwater urban outfall that discharge to the Truckee River upstream of Idlewild ranged from 0.6 mg/L to 1.6 mg/L (**Figure 5-21**). The highest concentrations were detected in stormwater from Oxbow Nature Park during the March 15, 2020 storm event. TKN was not detected in baseflow sampled at Alum Creek in February.

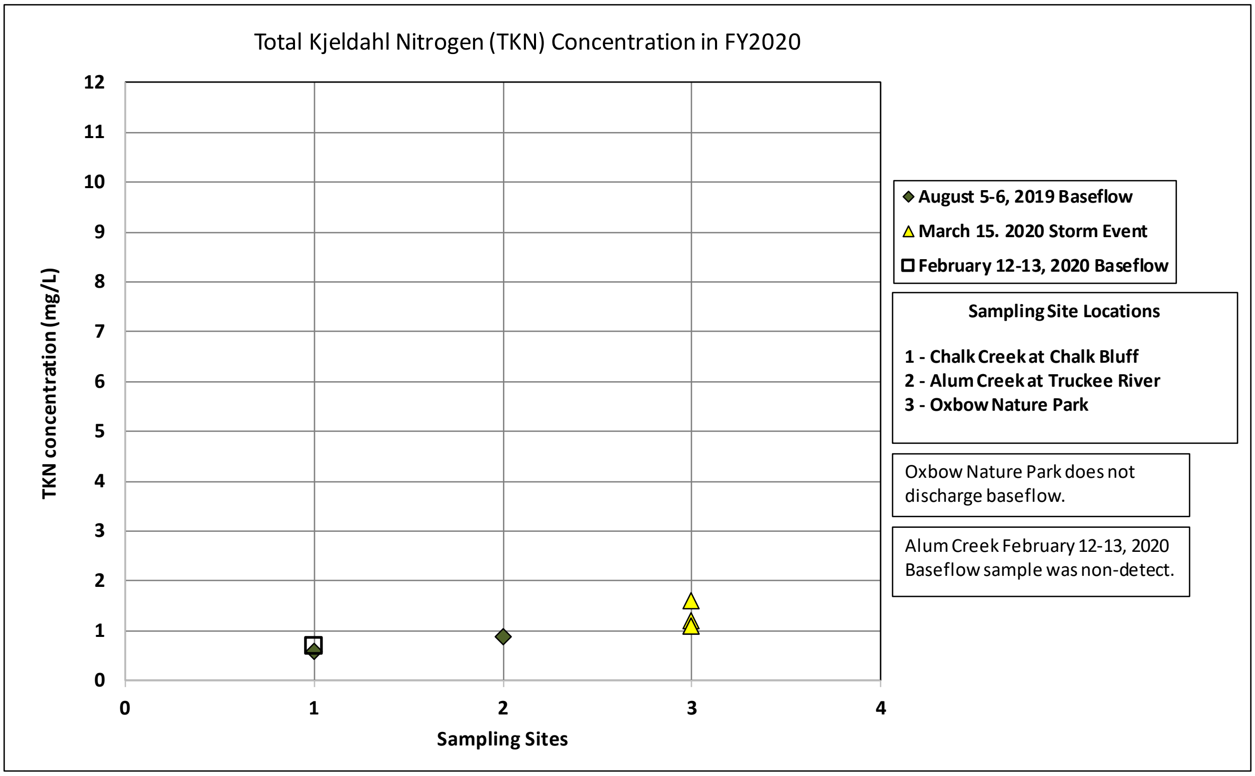


Figure 5-21 TKN Concentrations for Tributaries and Stormwater Urban Outfalls to the Truckee River upstream of Idlewild, FY2020

TKN concentrations measured from samples collected in three stormwater urban outfalls that discharge to the Truckee River between E. McCarran and Idlewild ranged between 1.0 mg/L and 12.0 mg/L (**Figure 5-22**). The highest concentrations were associated with stormwater collected on November 19, 2019 at the Arlington outfall. Stormwater outfalls do not typically convey baseflow and are not sampled during non-storm conditions.

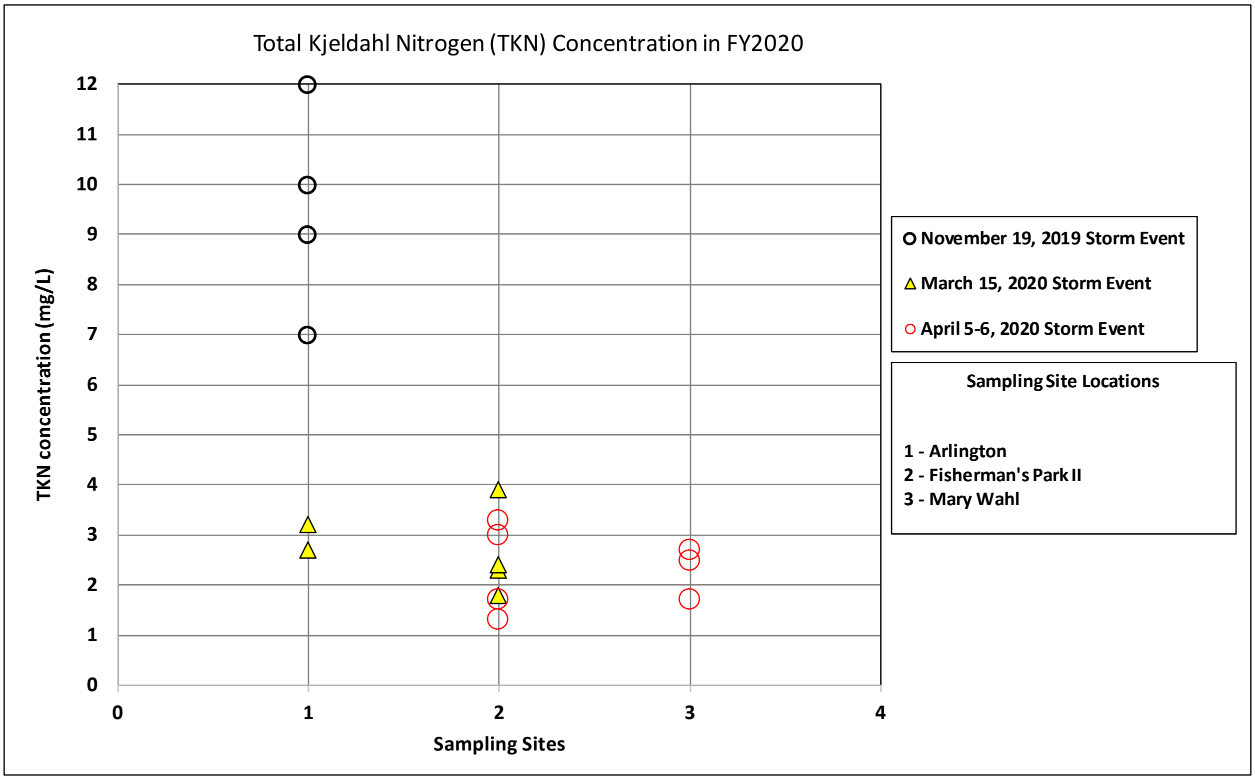


Figure 5-22 **TKN Concentrations for Stormwater Urban Outfalls to the Truckee River from E. McCarran upstream to Idlewild, FY2020**

TKN concentrations measured from samples collected in the North Truckee Drain ranged between 0.20 mg/L and 2.4 mg/L (**Figure 5-23**). In most cases, the storm event concentrations and the winter baseflow concentrations were slightly higher than summer baseflow concentrations.

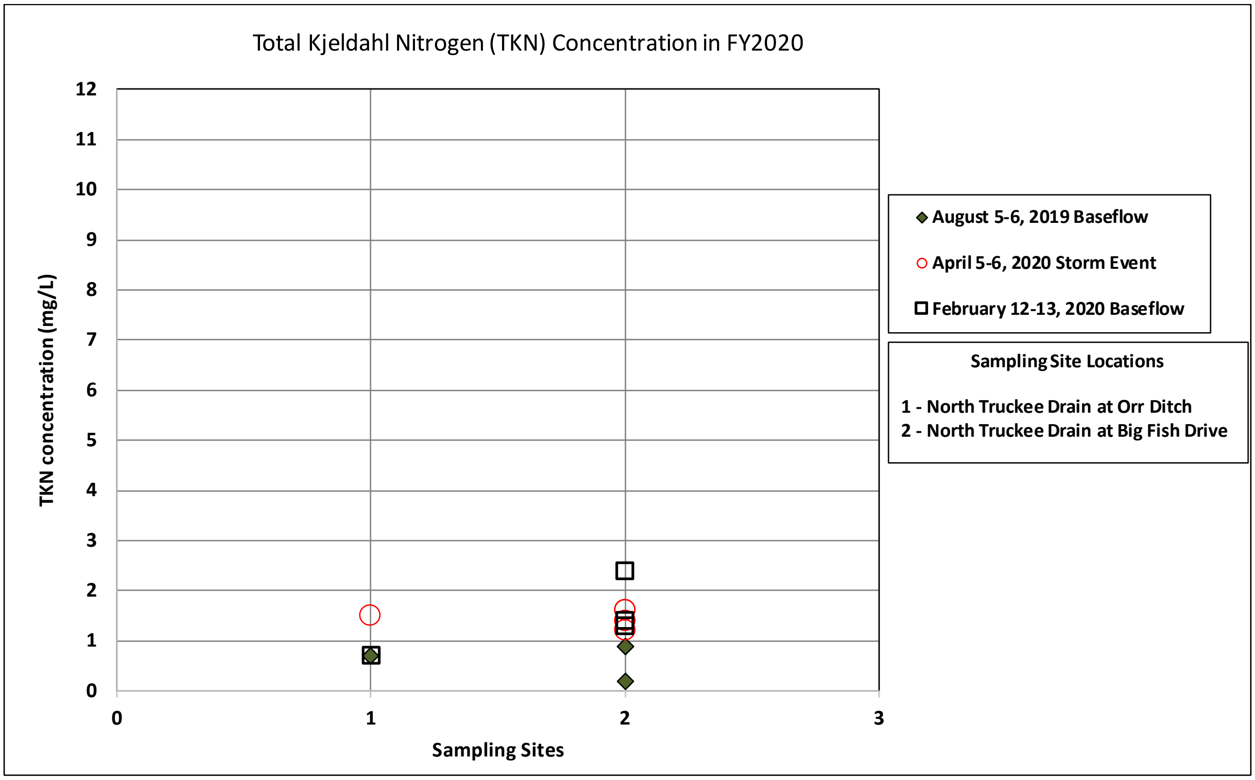


Figure 5-23 TKN Concentrations for the North Truckee Drain, FY2020

TKN concentrations measured from samples collected at three different stations in Steamboat Creek and three tributaries ranged from 0.20 mg/L to 1.2 mg/L (**Figure 5-24**).

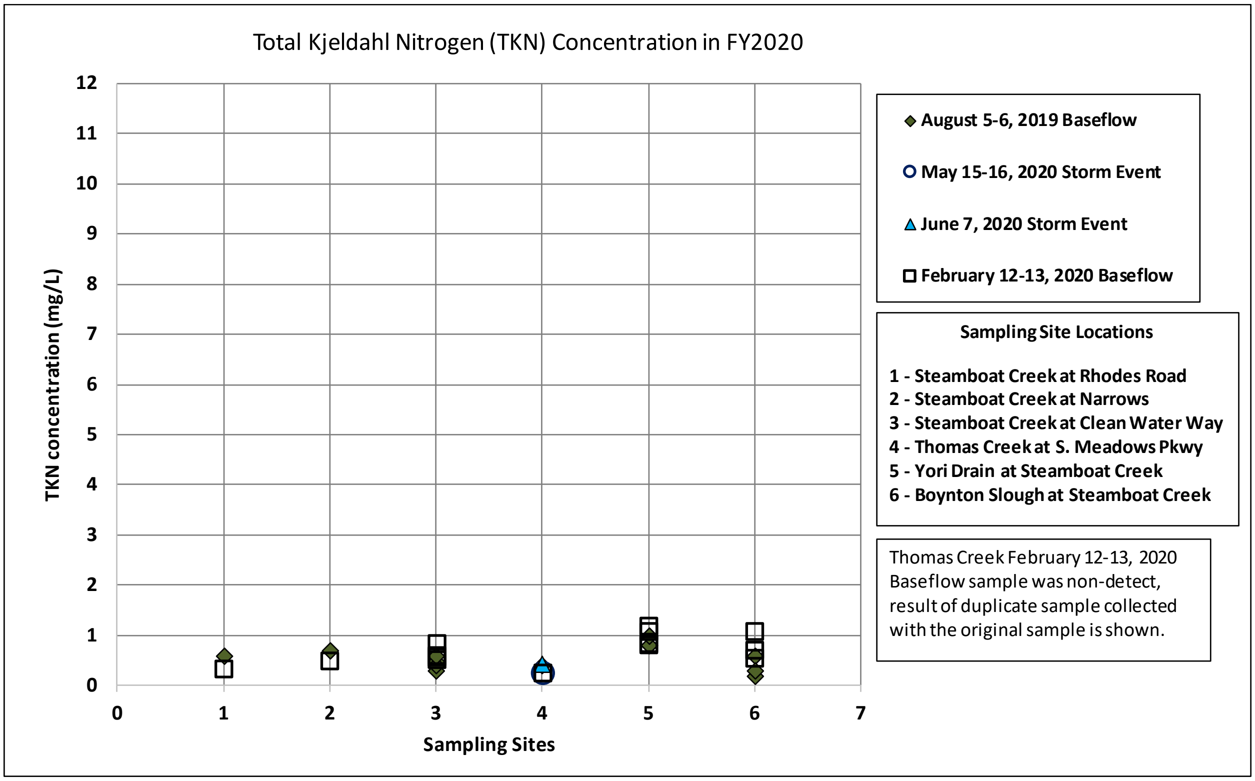
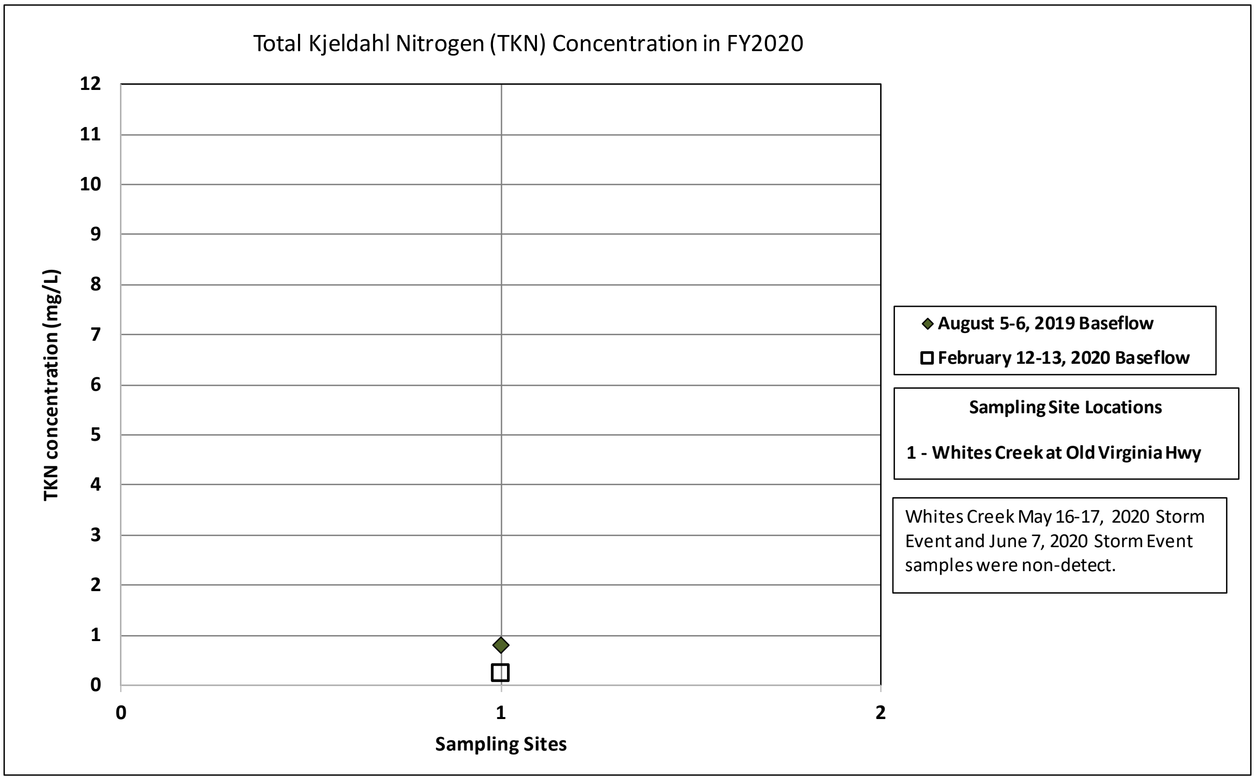


Figure 5-24 TKN Concentrations for Steamboat Creek and Tributaries, FY2020

TKN was not measured in Whites Creek above laboratory detection limits in stormwater samples. TKN concentrations measured from baseflow samples collected in Whites Creek were 0.80 mg/L (summer) and 0.26 mg/L (winter) (**Figure 5-25**).



Whites Creek May 16-17, 2020 Storm Event and June 7, 2020 Storm Event samples were non-detect.

Figure 5-25 TKN Concentrations for Whites Creek, FY2020

5.4.2 TOTAL PHOSPHORUS AND ORTHO PHOSPHATE

Total-P concentrations for stormwater runoff and baseflow samples collected in FY2020 are shown in **Figure 5-26**, **Figure 5-27**, **Figure 5-28**, **Figure 5-29**, **Figure 5-30** and **Figure 5-31**, grouped by their listed water body. Single value WQS (red dashed line) do not exist for Total-P in most of the tributaries monitored. Where none exist, we compare concentrations to Annual-Averages to Maintain Existing Higher Quality (≤ 0.05 mg/L, NAC 445a. 1684, 1686, 1688, 1724, 1726 and 1758) and/or to protect beneficial uses (≤ 0.10 mg/L). Although most samples exceeded these annual average standards, they are single values that may not represent long-term averages.

Total-P concentrations measured from both stormwater and baseflow samples collected from two tributaries and one stormwater urban outfall that discharge to the Truckee River upstream of Idlewild ranged from 0.03 mg/L to 0.43 mg/L (**Figure 5-26**). Highest concentrations were measured in the baseflow sample collected at Chalk Creek in August 2019.

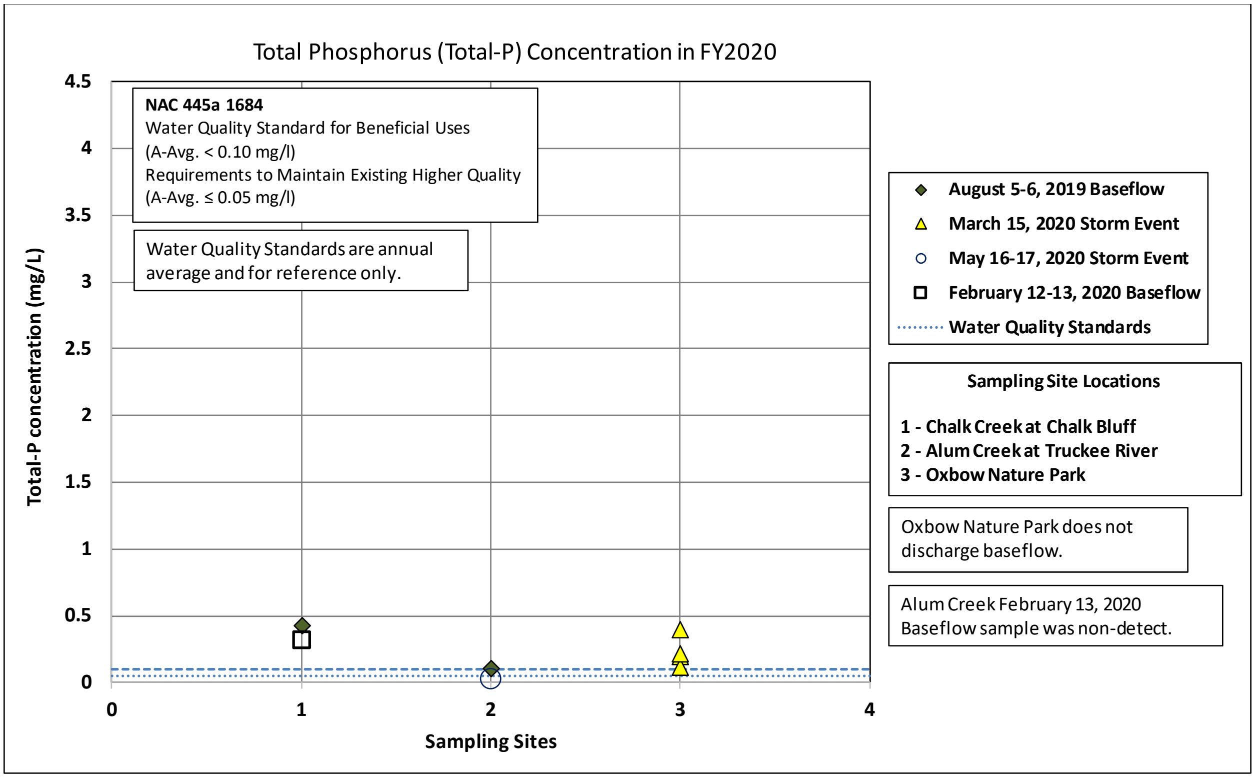


Figure 5-26 Total-P Concentrations for Tributaries and a Stormwater Urban Outfall to the Truckee River upstream of Idlewild, FY2020

Total-P concentrations measured from stormwater samples in three stormwater urban outfalls that discharge to the Truckee River between E. McCarran and Idlewild ranged from 0.09 mg/L to as high as 4.2 mg/L (**Figure 5-27**). The highest concentration was measured from storm event samples collected from Arlington outfall during the November 2019 storm event. All but one sample exceeded the WQS.

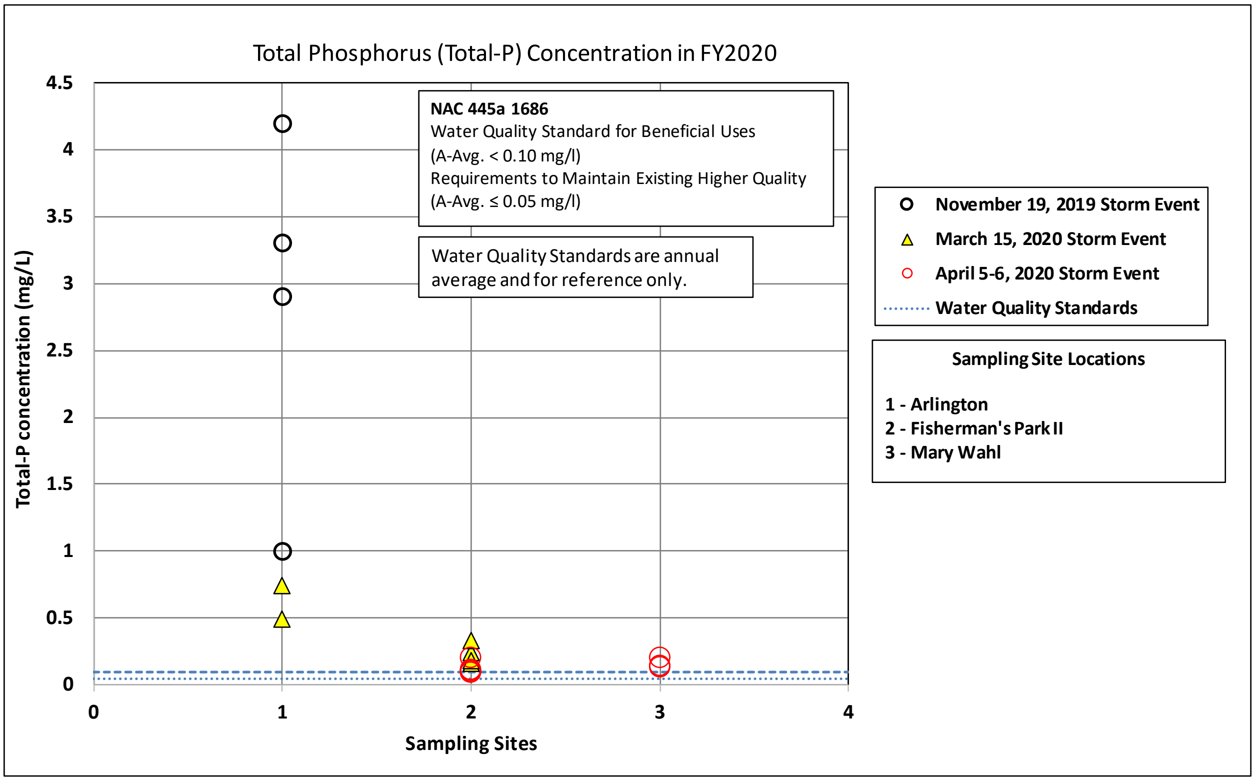


Figure 5-27 Total-P Concentrations for Stormwater Urban Outfalls to the Truckee River from E. McCarran upstream to Idlewild, FY2020

Total-P concentrations measured from stormwater and baseflow samples collected in North Truckee Drain ranged between 0.10 mg/L and 0.35 mg/L (**Figure 5-28**).

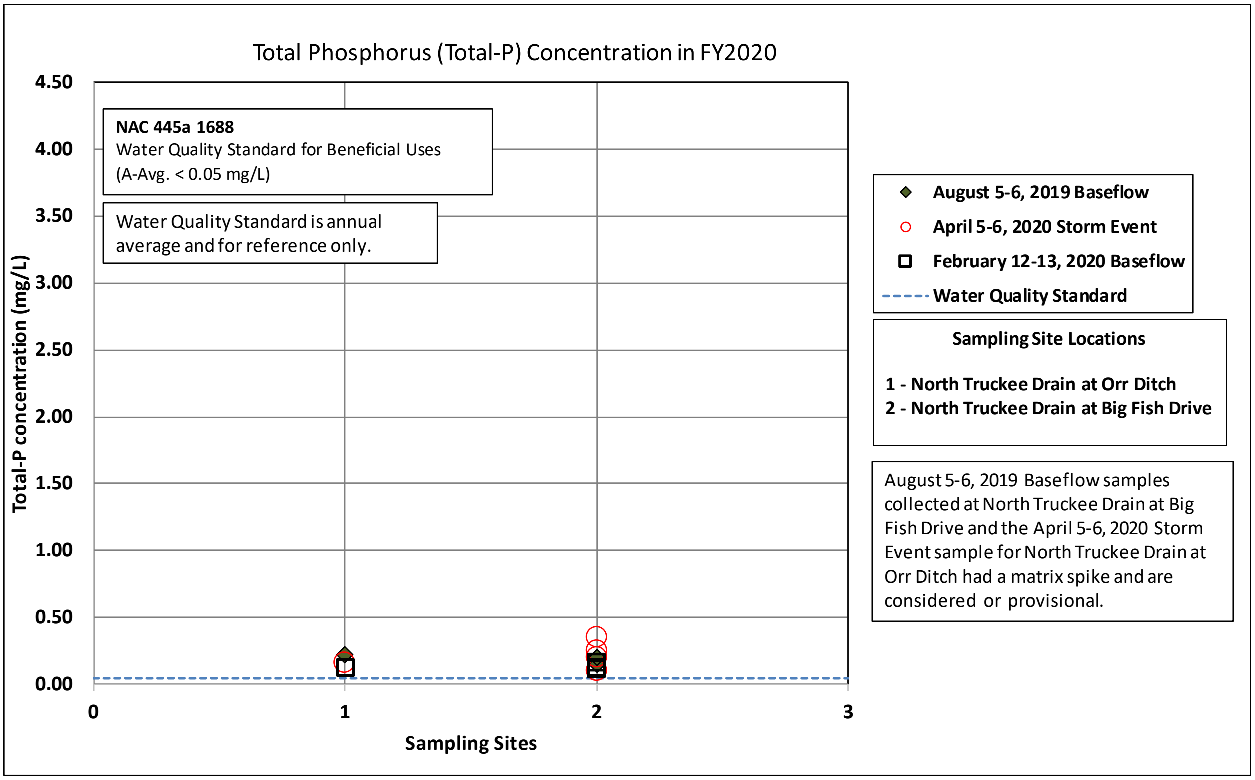


Figure 5-28 Total-P Concentrations for the North Truckee Drain, FY2020

Total-P concentrations measured from baseflow samples collected in Steamboat Creek at Rhodes Road ranged from 0.07 mg/L to 0.29 mg/L (**Figure 5-29**). Results from all baseflow samples met the WQS for this segment of Steamboat Creek (S.V. ≤ 0.33 mg/L). No storm samples were collected from Steamboat Creek at Rhodes Road during FY2020.

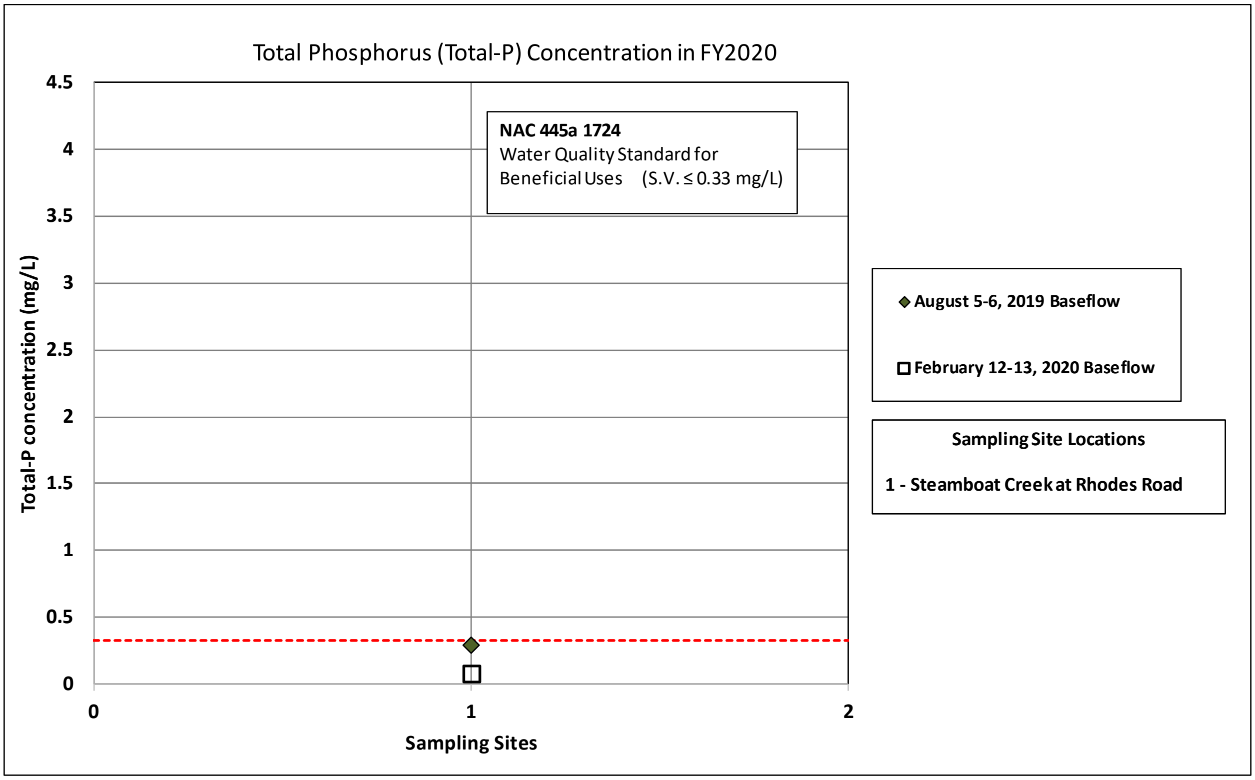


Figure 5-29 Total-P Concentrations for Steamboat Creek at Rhodes Road, FY2020

Total-P concentrations measured from stormwater and baseflow samples collected in Steamboat Creek and three tributaries below Rhodes Road ranged from 0.05 mg/L to 0.37mg/L (**Figure 5-30**). Numeric criteria to protect water quality does not exist for this segment of Steamboat Creek.

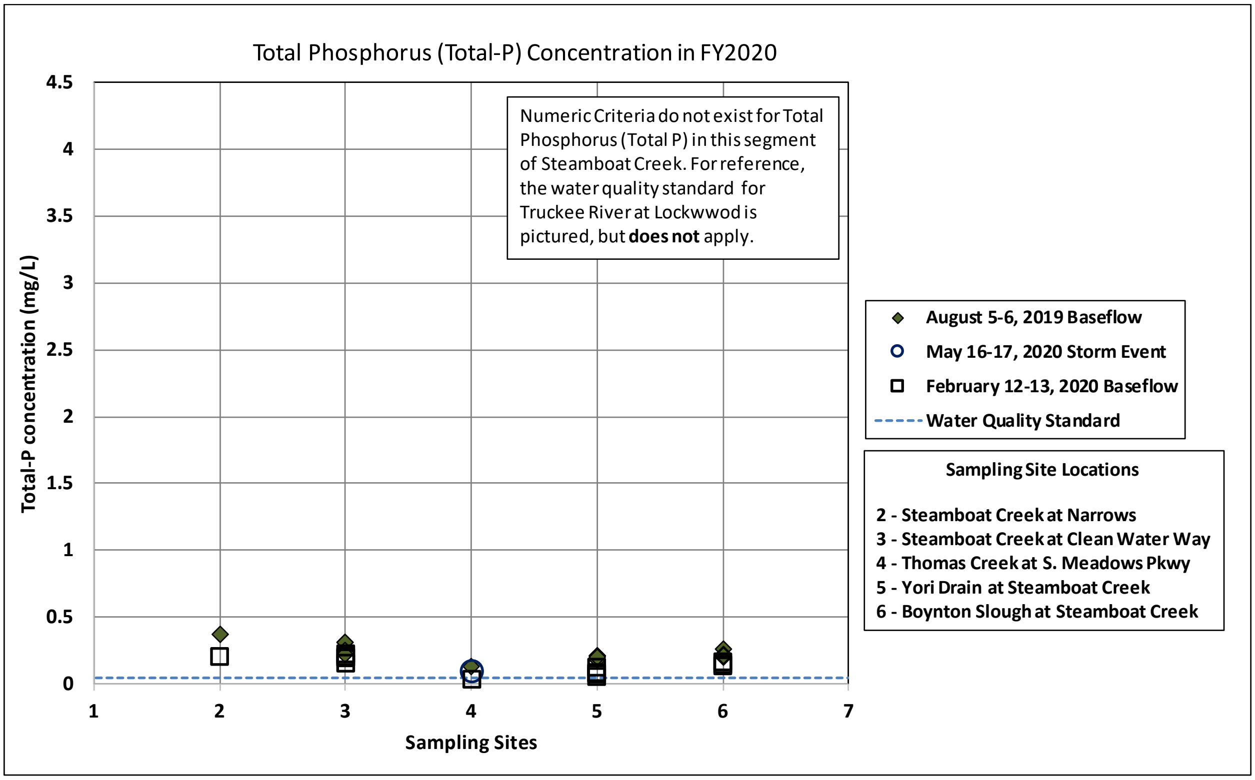


Figure 5-30 Total-P Concentrations for Steamboat Creek and Tributaries, FY2020

Total-P concentrations measured from stormwater and baseflow samples collected in Whites Creek ranged from 0.03 mg/L to 0.08 mg/L (**Figure 5-31**). All stormwater and baseflow samples met the WQS at Whites Creek in FY2020 (A-Avg. ≤0.10 mg/L, NAC 445a. 1758).

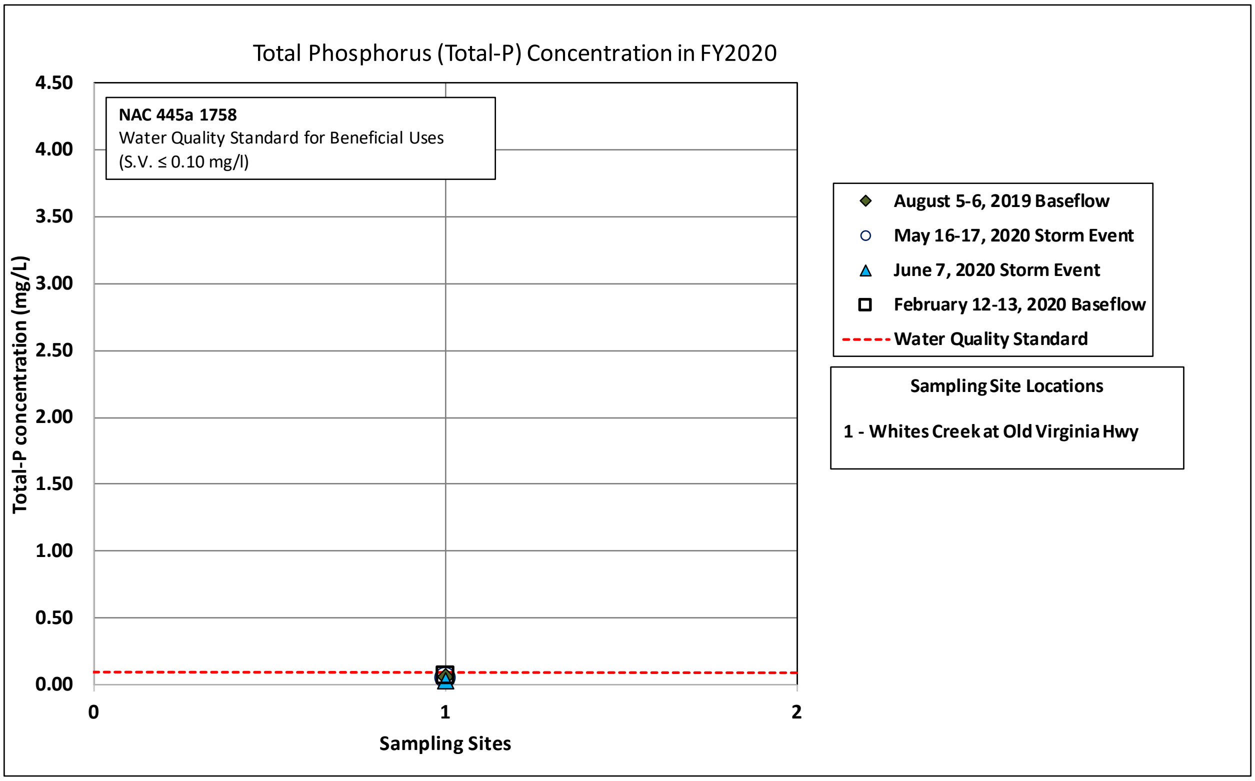


Figure 5-31 Total P Concentrations for Whites Creek, FY2020

Orthophosphate (Ortho-P) concentrations for stormwater and baseflow samples collected in WY2020 are shown in **Figure 5-32**, **Figure 5-33**, **Figure 5-34, Figure 5-35, Figure 5-36, and Figure 5-37** grouped by their listed water body and specific numeric criteria (if applicable-red dashed line).

Ortho-P concentrations measured from two tributaries and a stormwater urban outfall that discharge to the Truckee River upstream of Idlewild ranged from 0.03 mg/L to 0.39 mg/L (**Figure 5-32**). The highest concentrations were measured from both baseflow samples collected from Chalk Creek and stormwater samples collected from Oxbow Park urban outfall. All samples collected from Chalk Creek and Oxbow Park urban outfall exceeded the WQS (≤0.05 mg/L, NAC 445a. 1684) and requirements to maintain existing higher quality (≤0.02 mg/L, NAC 445a. 1684). One stormwater sample in May 2020 and the August 2019 baseflow sample collected at Alum Creek met the WQS for this section of the Truckee River. Ortho-P was not detected in the winter baseflow sample at Alum Creek.

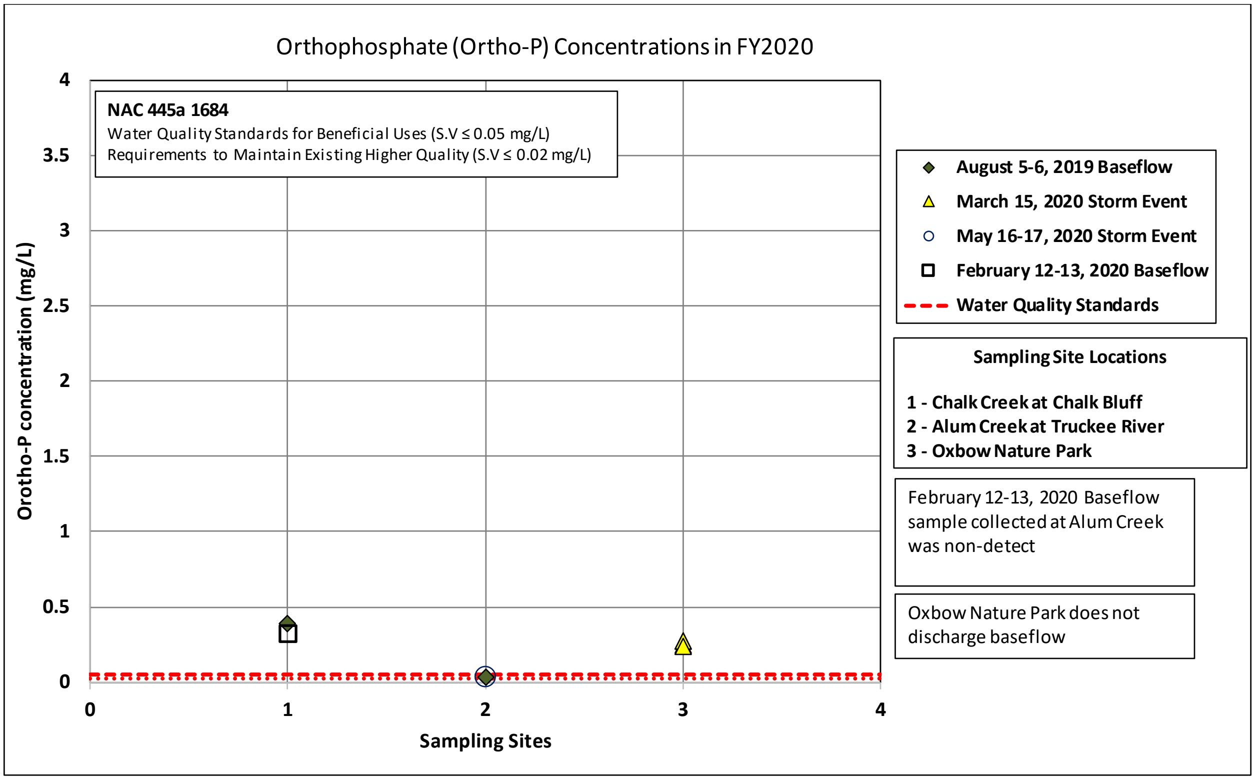


Figure 5-32 Ortho-P Concentrations for Tributaries and a Stormwater Urban Outfall to the Truckee River upstream of Idlewild, FY2020

Ortho-P concentrations measured from stormwater samples collected from three stormwater urban outfalls that discharge to the Truckee River between E. McCarran and Idlewild ranged from 0.12 mg/L to 3.8 mg/L (**Figure 5-33**). All samples exceeded WQS (≤0.05 mg/L) and requirements to maintain existing higher quality (≤0.02 mg/L). Highest concentrations were measured in stormwater collected from the Arlington urban outfall during the November 2019 storm event.

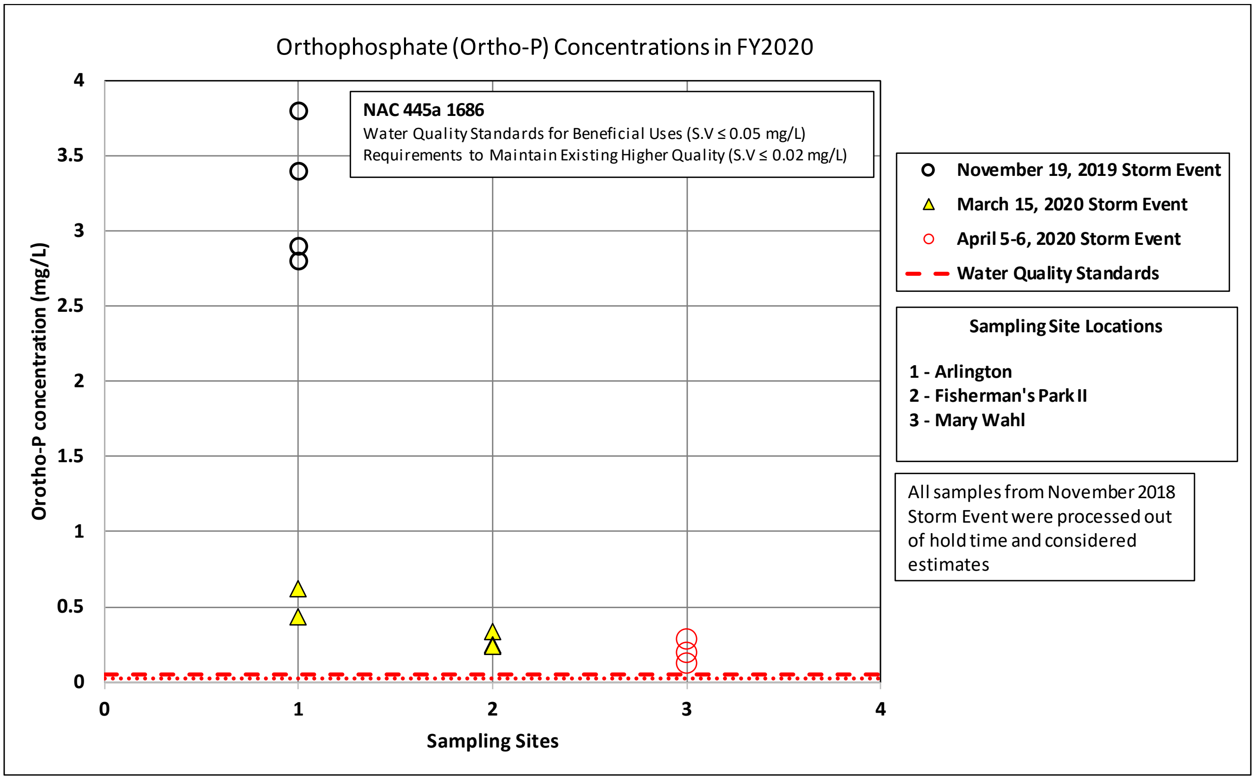


Figure 5-33 Ortho-P Concentrations for Stormwater Urban Outfalls to the Truckee River from E. McCarran upstream to Idlewild, FY2020

Ortho-P concentrations measured from stormwater and baseflow samples collected in the North Truckee Drain ranged between 0.03 mg/L and 0.15 mg/L (**Figure 5-34**). There are no established WQS for Ortho-P in the North Truckee Drain or the Truckee River at Lockwood.

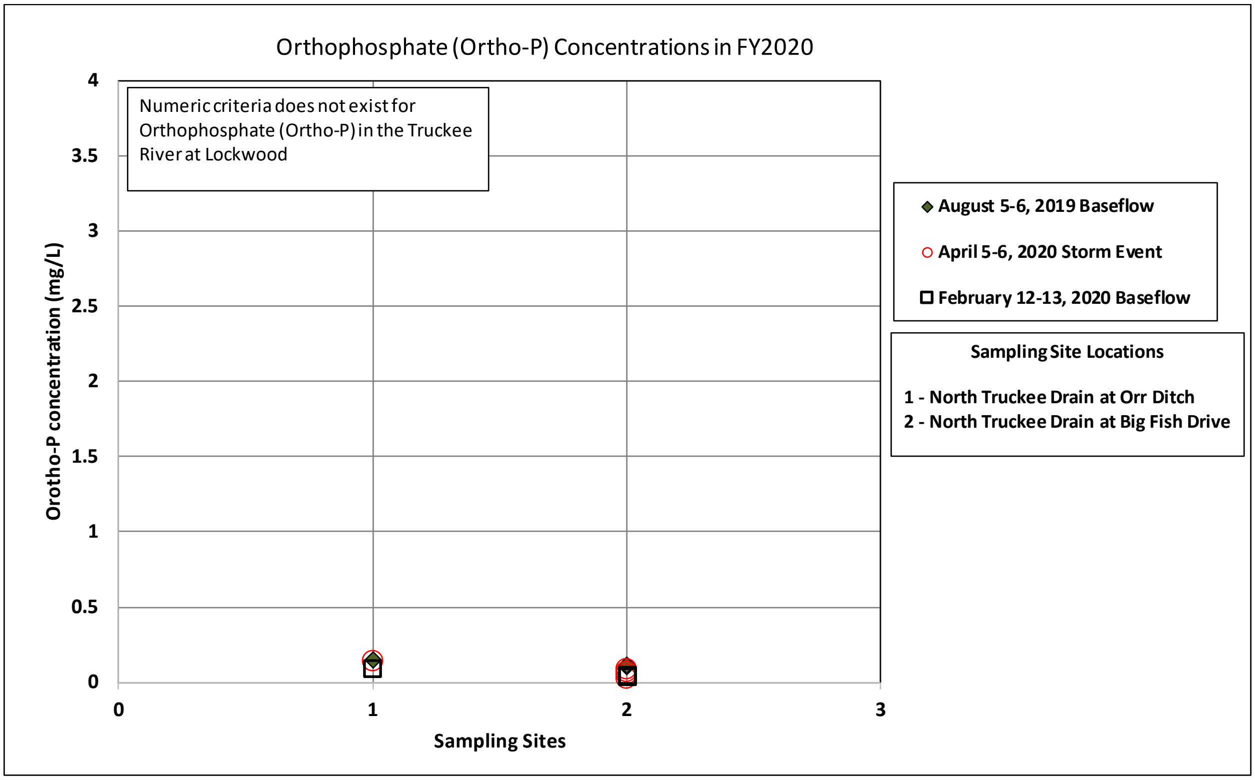


Figure 5-34 Ortho-P Concentrations for the North Truckee Drain, FY2020

There are no established WQS for Ortho-P in Steamboat Creek. Ortho-P concentrations measured from baseflow samples collected in Steamboat Creek at Rhodes Road ranged from 0.05 mg/L to 0.21 mg/L (**Figure 5-35**). No storm samples were collected at this location during FY2020.

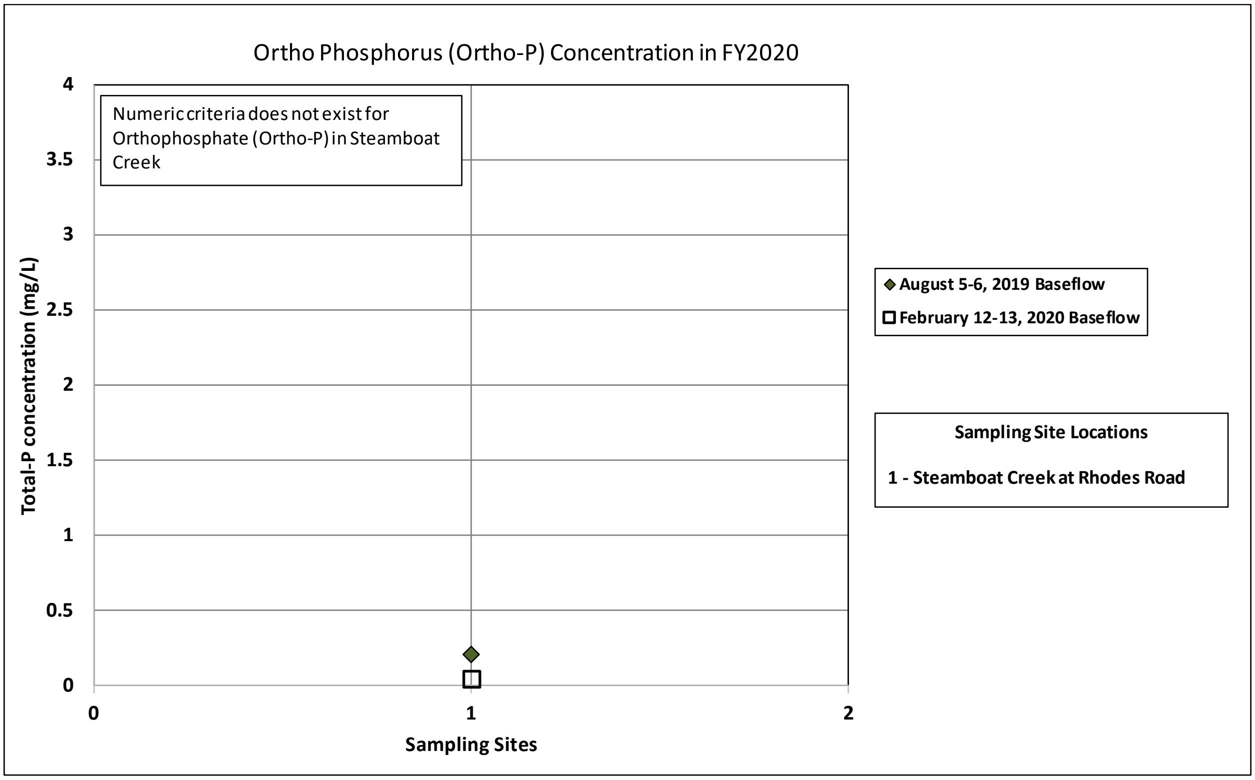


Figure 5-35 Ortho-P Concentrations for Steamboat Creek at Rhodes Road, FY2020

Ortho-P concentrations measured from stormwater and baseflow samples collected in Steamboat Creek and three tributaries below Rhodes Road ranged from 0.02 mg/L to 0.28 mg/L (**Figure 5-36**). The highest concentrations were measured in Steamboat Creek at Narrows during summer baseflow sampling. With the exception of Yori Drain, winter baseflow sample concentrations at Yori Drain were lower than summer baseflow samples. Numeric criteria to protect water quality does not exist for this segment of Steamboat Creek.

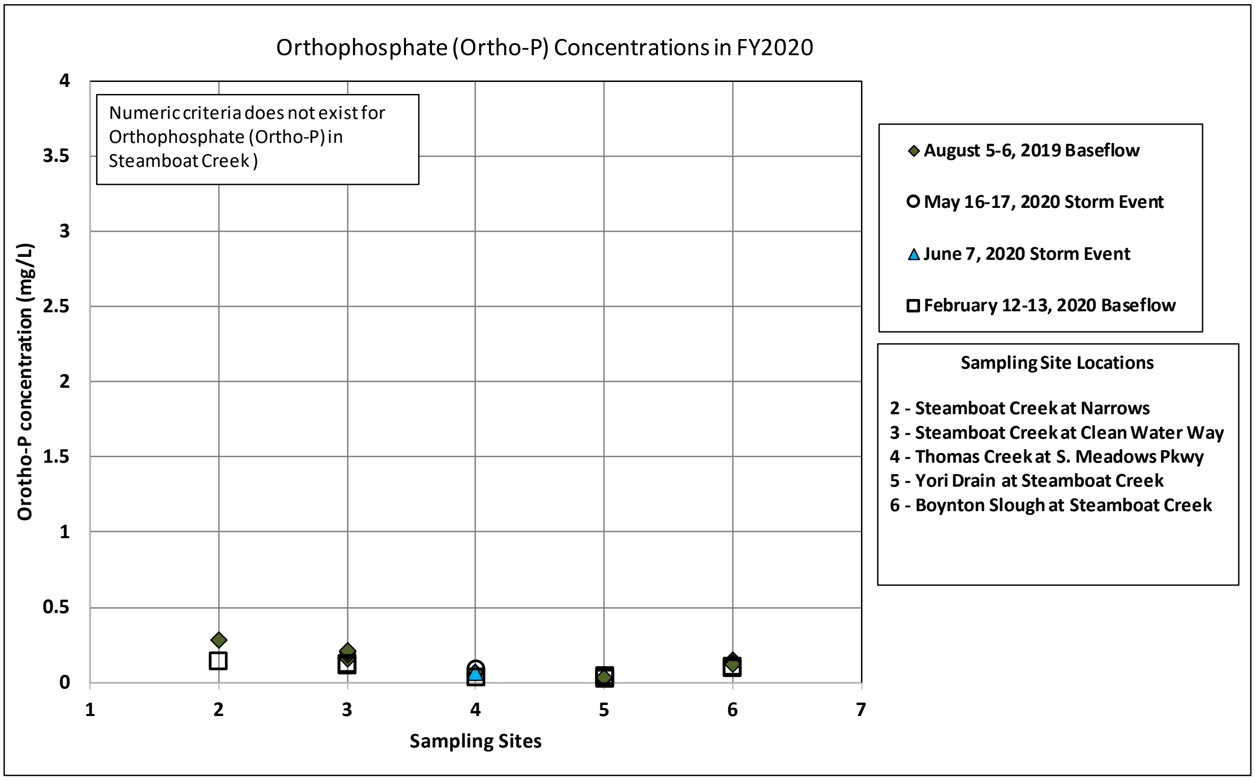


Figure 5-36 Ortho-P Concentrations for Steamboat Creek and Tributaries, FY2020

Ortho-P concentrations measured from stormwater and baseflow samples collected in Whites Creek ranged from 0.02 mg/L to 0.06 mg/L (**Figure 5-37**). The highest concentration was measured in the winter baseflow sample; however, these concentrations are low relative to other tributaries.

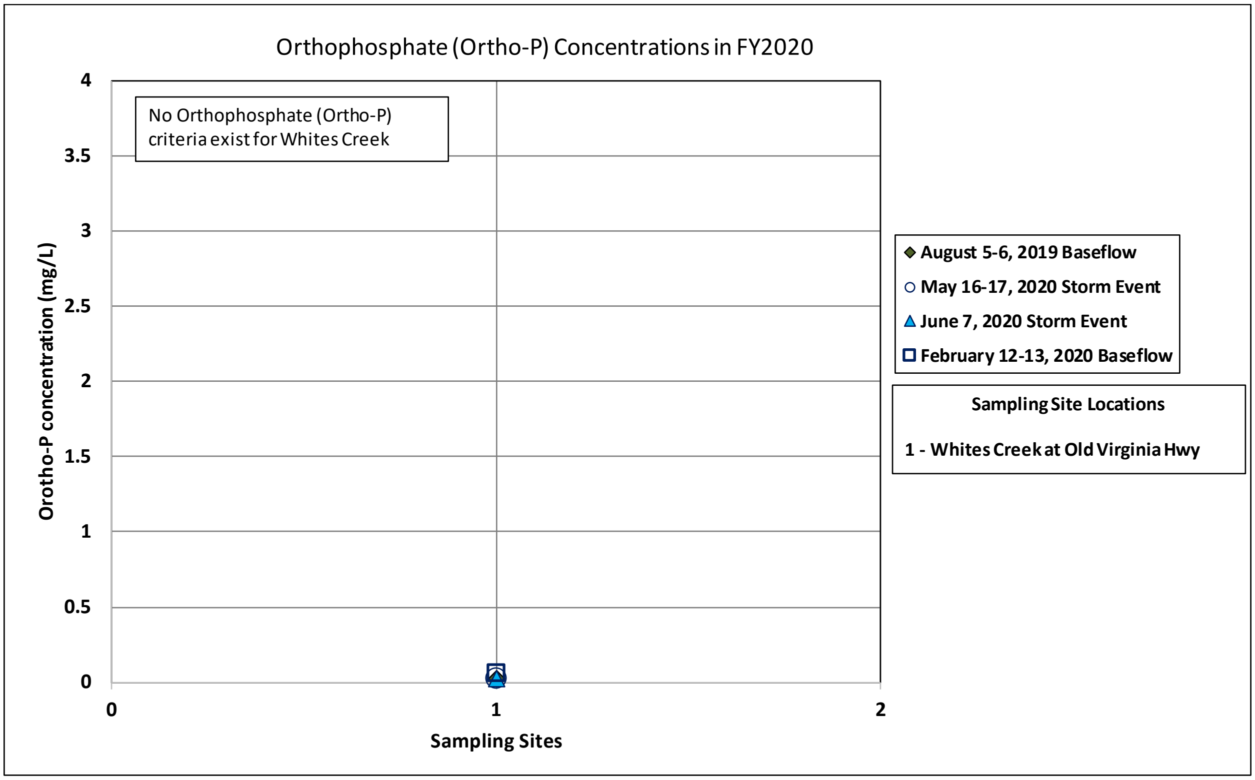


Figure 5-37 Ortho-P Concentrations for Whites Creek, FY2020

5.4.3 TOTAL DISSOLVED SOLIDS AND TOTAL SUSPENDED SOLIDS

TDS concentrations for stormwater and baseflow samples collected in FY2020 are shown in **Figure 5-38**, **Figure 5-39**, **Figure 5-40**, **Figure 5-41**, **Figure 5-42**, and **Figure 5-43**, grouped by their listed water body and specific numeric criteria. Vertical axes in all graphs are logarithmic to show the range of values detected.

TDS concentrations measured in samples from two tributaries and one stormwater urban outfall that discharge to the Truckee River upstream of Idlewild ranged from 41 mg/L to 2,400 mg/L (**Figure 5-38**). We compare these concentrations to the single value Requirement to Maintain Existing Higher Quality (≤ 95 mg/L) and WQS for Beneficial Uses (≤ 500 mg/L) for this segment of Truckee River; the annual-average numeric criterion to protect beneficial uses is shown for reference. All samples collected in Alum Creek and Chalk Creek exceeded the water quality requirement. Stormwater samples collected from Oxbow Nature Park urban outfall all met this requirement.

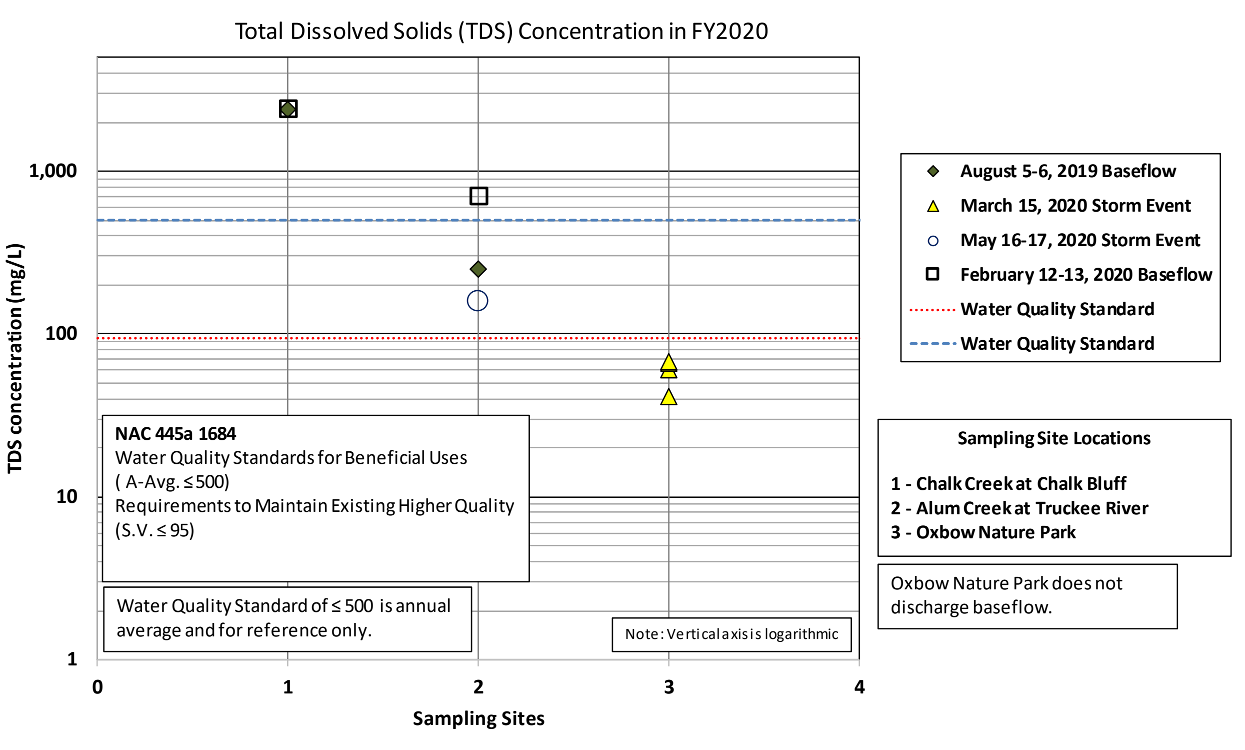


Figure 5-38 Total Dissolved Solids (TDS) Concentrations for Tributaries and a Stormwater Urban Outfall to the Truckee River upstream of Idlewild, FY2020

TDS concentrations measured from stormwater samples in three stormwater urban outfalls that discharge to the Truckee River between E. McCarran and Idlewild ranged from 110 mg/L to 1,100 mg/L (**Figure 5-39**). We compare these concentrations to Requirements used to Maintain Existing Higher Quality (≤ 120 mg/L) and WQS for Beneficial Uses (≤ 500 mg/L) for this segment of Truckee River; the annual-average numeric criterion to protect beneficial uses is shown for reference. All but one sample collected from Arlington outfall exceeded this WQS.

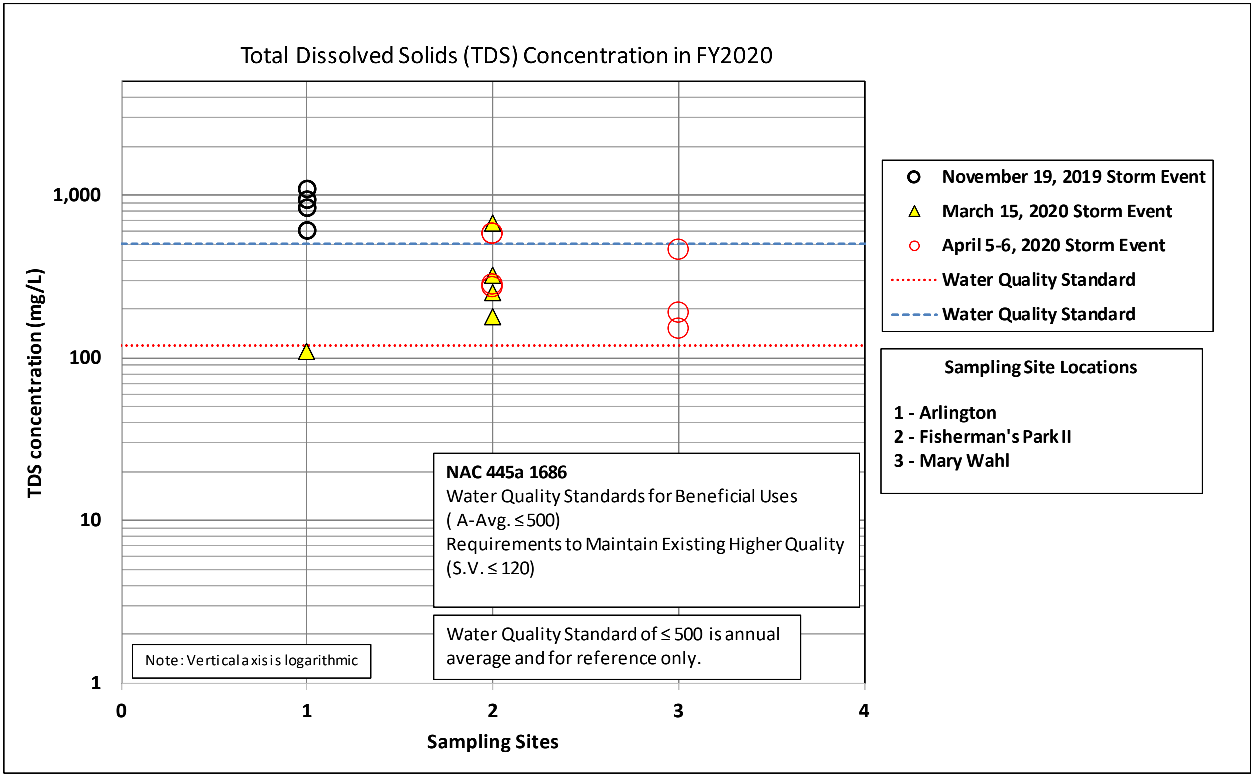


Figure 5-39 TDS Concentrations for Stormwater urban outfalls to the Truckee River from E. McCarran upstream to Idlewild, FY2020

TDS concentrations measured from stormwater and baseflow samples collected in North Truckee Drain, a tributary to the Truckee River upstream of Lockwood, ranged from 560 mg/L to as high as 1,200 mg/L (**Figure 5-40**). We compare these concentrations to Requirements used to Maintain Existing Higher Quality (≤ 260 mg/L) for this segment of Truckee River; the annual-average WQS is shown for reference. All concentrations measured in North Truckee Drain exceeded this requirement.

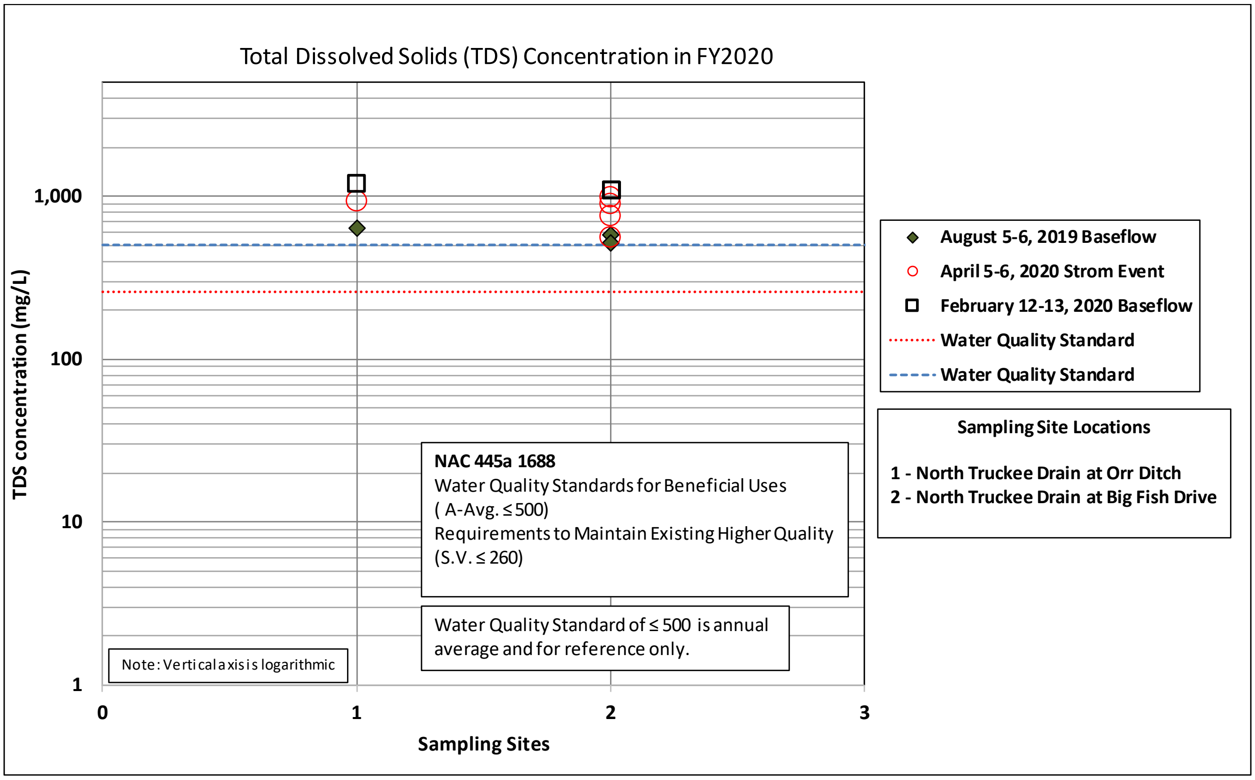


Figure 5-40 TDS Concentrations the North Truckee Drain, FY2020

TDS concentrations measured from both summer and winter baseflow samples collected in Steamboat Creek at Rhodes Road measured 170 mg/L (**Figure 5-41**). These values meet the WQS for TDS established for this segment of Steamboat Creek (≤500 mg/L). No stormwater samples were collected at this location in FY2020.

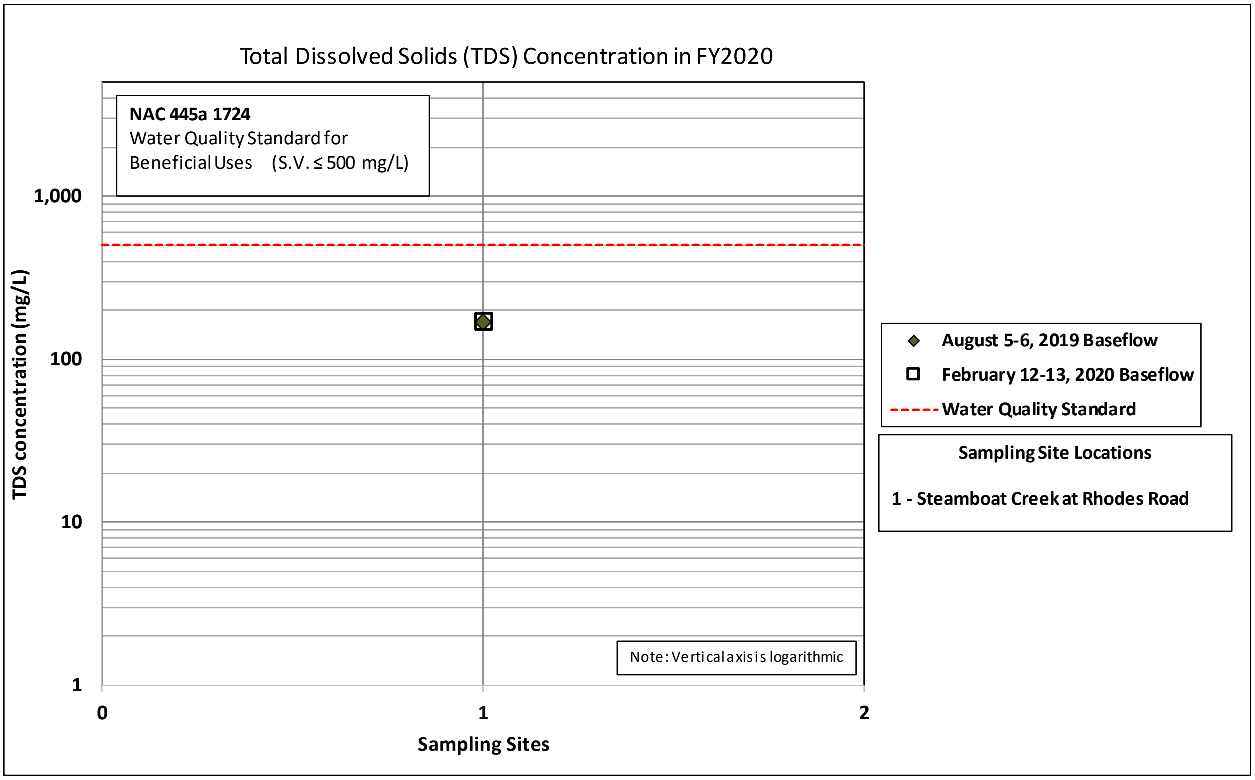


Figure 5-41 TDS Concentrations for Steamboat Creek at Rhodes Road, FY2020

TDS concentrations measured from stormwater and baseflow samples collected at two stations in Steamboat Creek and three tributaries downstream of Rhodes Road ranged from 81 mg/L to 480 mg/L (**Figure 5-42**). WQS established to protect water quality in Steamboat Creek and tributaries do not exist for TDS; however, there is a maximum annual average, anti-degradation level for the Truckee River (<215 mg/L). TDS concentrations were measured above 215 mg/L consistently in Steamboat Creek, Yori Drain, and Boynton Slough in both baseflow samples, with winter baseflow samples having higher concentrations than summer baseflow. All samples collected from Thomas Creek were below the anti-degradation level.

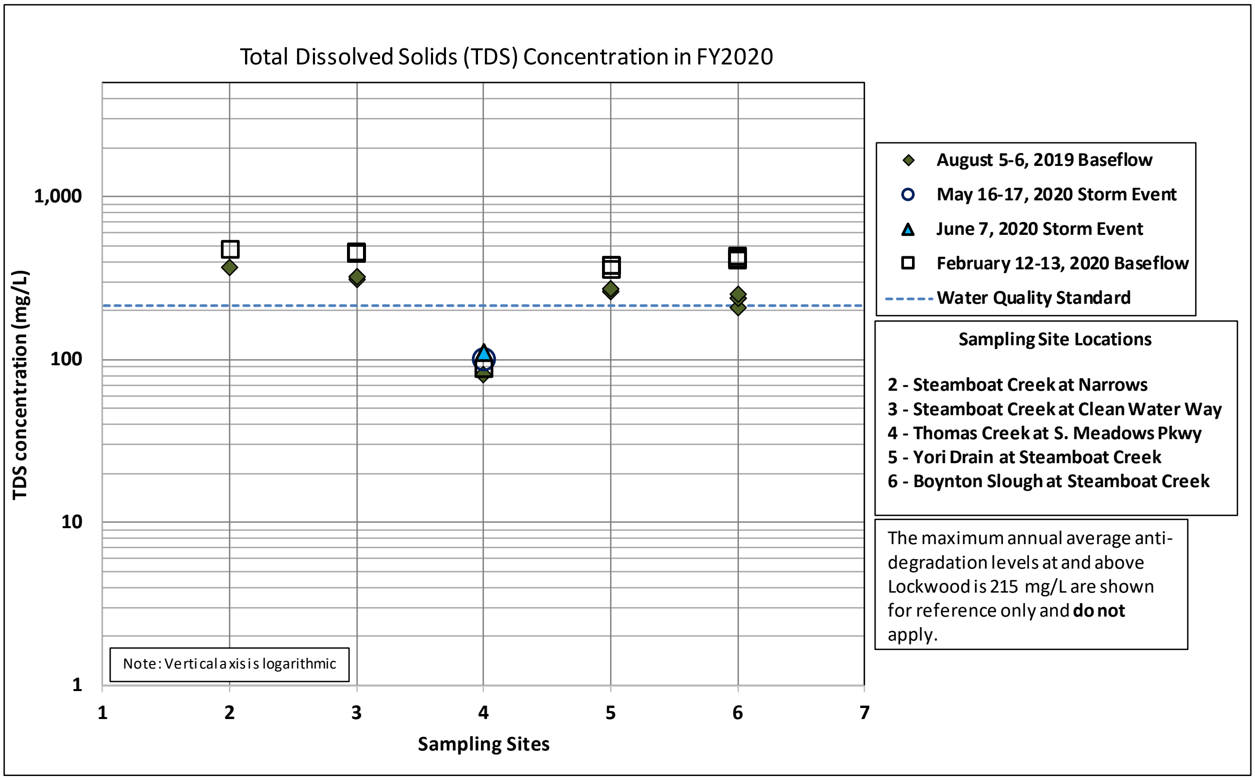


Figure 5-42 TDS Concentrations for Steamboat Creek and Tributaries, FY2020

TDS concentrations measured from stormwater and baseflow samples collected in Whites Creek ranged from 62 mg/L to 74 mg/L (**Figure 5-43**). A single value WQS does not exist for Whites Creek; however, the annual-average criterion of ≤ 500 mg/L is established to protect beneficial uses and shown for reference. All concentrations measured from Whites Creek met this WQS.

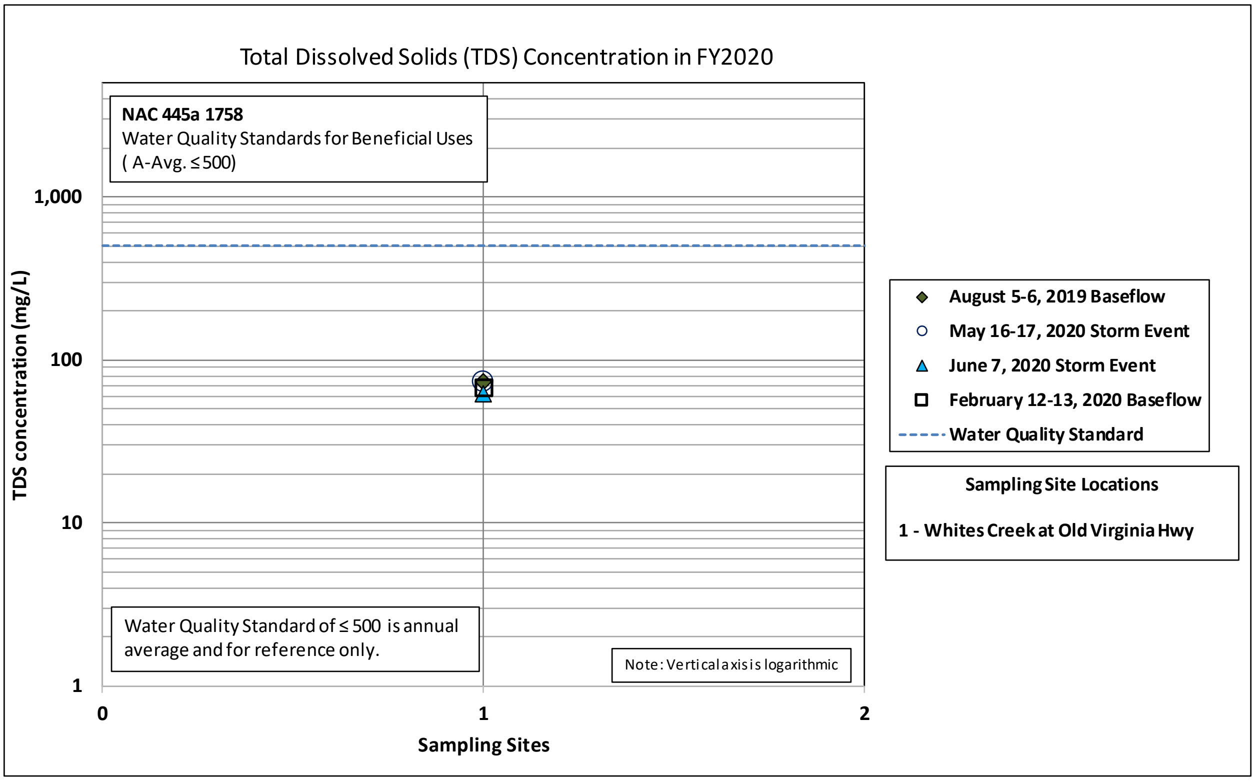


Figure 5-43 TDS Concentrations for Whites Creek, FY2020

TSS concentrations for stormwater and baseflow samples collected in FY2020 are shown in **Figure 5-44**, **Figure 5-45**, **Figure 5-46**, **Figure 5-47**, and **Figure 5-47**, grouped by their listed water body and specific WQS or numeric criteria. Vertical axes in all graphs are logarithmic to better show the range in values detected.

TSS concentrations measured from two tributaries and one stormwater urban outfall that discharge to the Truckee River upstream of Idlewild ranged from 11 mg/L to 28 mg/L (**Figure 5-44**). We compare these concentrations to single value WQS used to protect beneficial uses (≤ 25 mg/L) for this segment of the Truckee River; the annual-average numeric criterion (≤ 15 mg/L) to maintain higher quality is shown for reference. Only one stormwater sample collected at Oxbow Nature Park urban outfall exceeded the WQS for TSS. All other samples collected met the WQS. TSS was not detected in the Alum Creek and Chalk Creek winter baseflow samples.

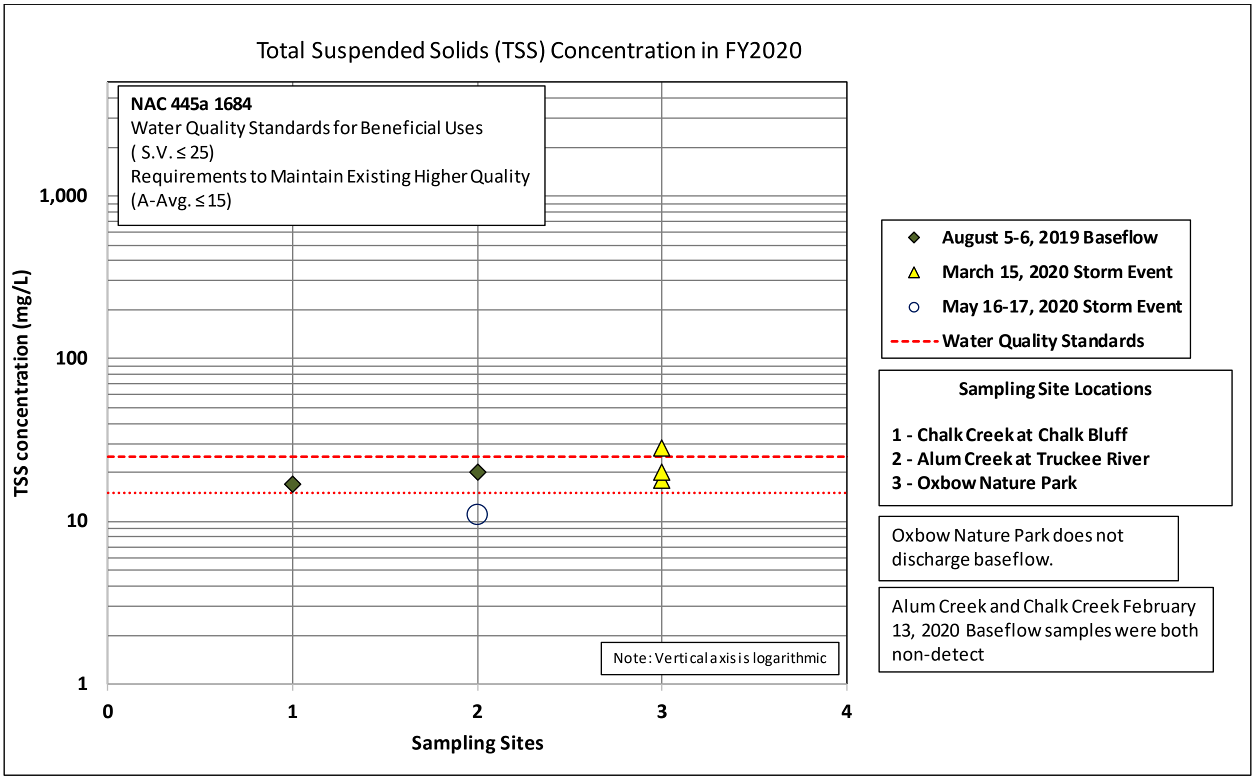


Figure 5-44 **Total Suspended Solids (TSS) Concentrations for Tributaries and a Stormwater Urban Outfall to the Truckee River upstream of Idlewild, FY2020**

TSS concentrations measured in stormwater from three stormwater urban outfalls that discharge to the Truckee River between E. McCarran and Idlewild ranged from 14 mg/L to 230 mg/L (**Figure 5-45**). We compare these concentrations to the single value WQS used to protect beneficial uses (≤ 25 mg/L) for this segment of the Truckee River; annual-average numeric criterion (≤ 15 mg/L) to maintain higher quality is shown for reference. All stormwater samples collected from these three stormwater urban outfalls exceeded the WQS with the exception of one stormwater sample from Fisherman's Park II and one stormwater sample from Arlington during the March 2020 storm.

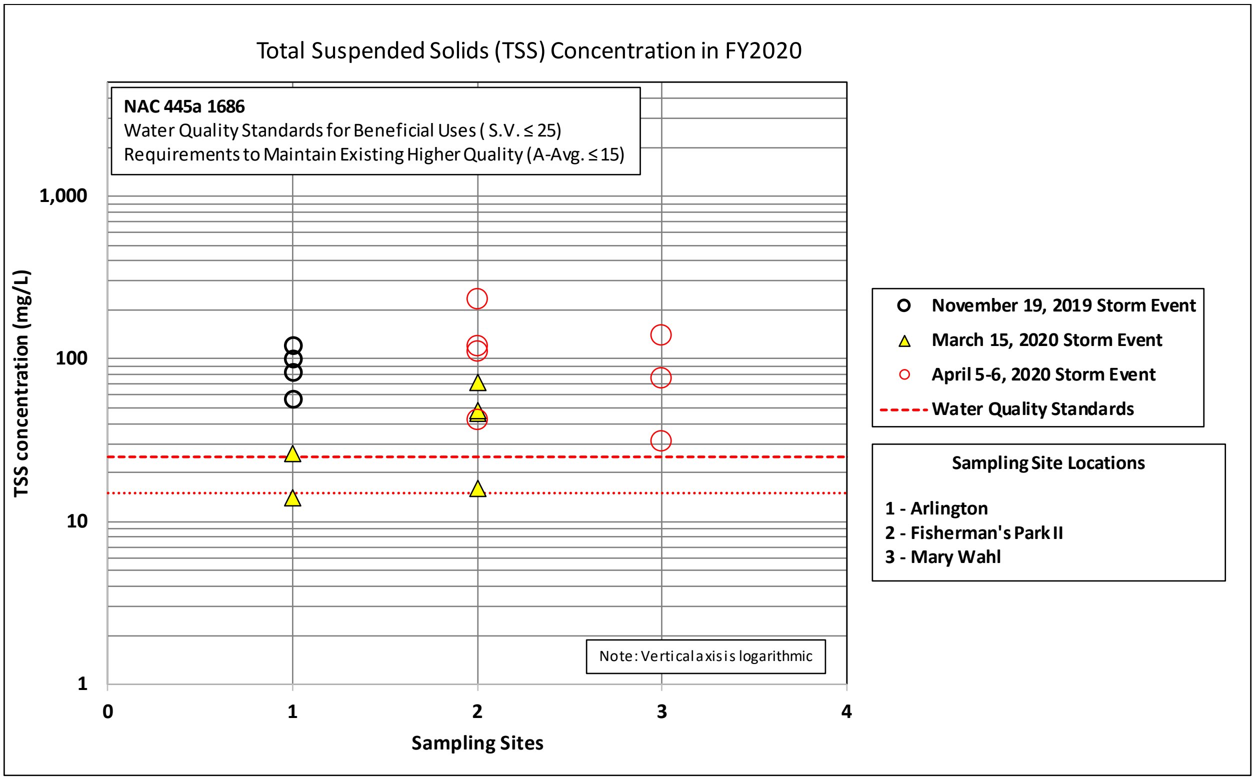


Figure 5-45 **TSS Concentrations for Stormwater Urban Outfalls to the Truckee River from E. McCarran Upstream to Idlewild, FY2020**

TSS concentrations measured from stormwater and baseflow samples collected from two stations along the North Truckee Drain ranged from 20 mg/L to 88 mg/L (**Figure 5-46**). We compare these concentrations to single value WQS used to protect beneficial uses (≤ 50 mg/L) for this segment of the Truckee River; the annual-average Requirement to Maintain Existing Higher Quality (≤ 25 mg/L) is shown for reference. All stormwater samples met the WQS. One summer baseflow sample and two winter baseflow samples collected from the Big Fish Drive site exceeded the WQS for TSS. TSS was not detected in winter baseflow at Orr Ditch.

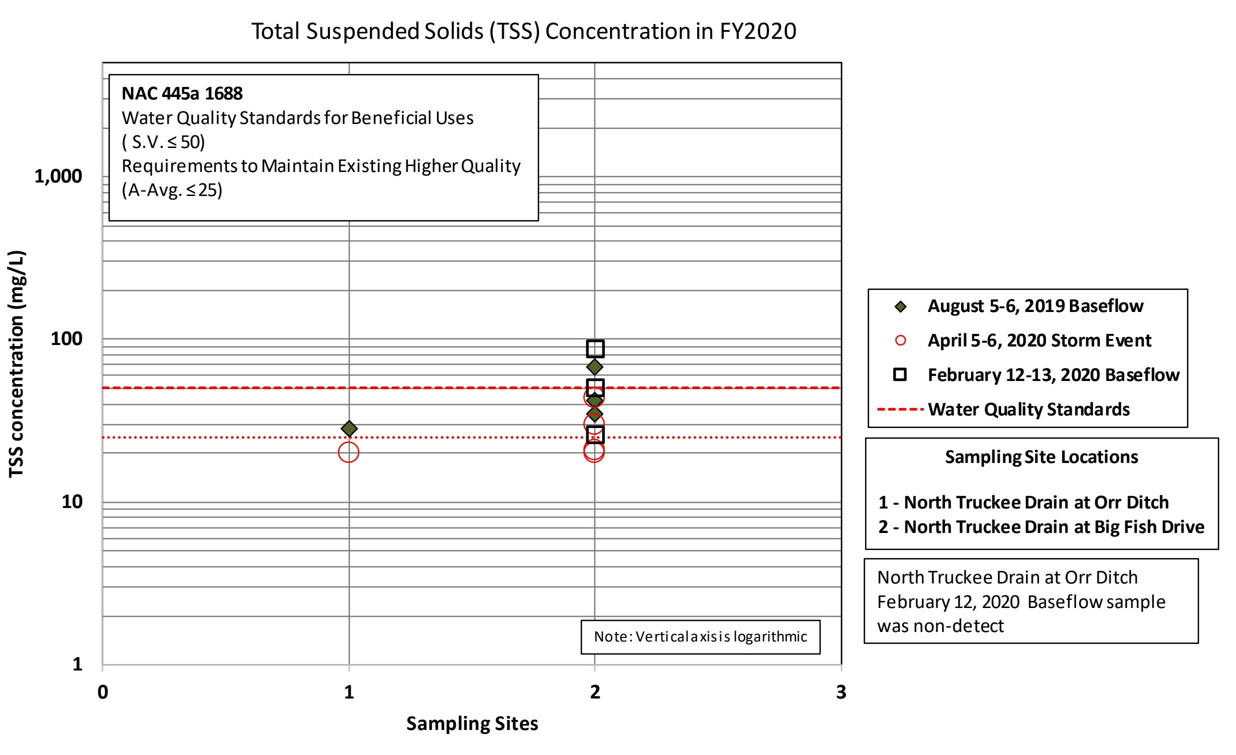


Figure 5-46 TSS Concentrations for the North Truckee Drain, FY2020

TSS concentrations measured from stormwater and baseflow samples collected at two different stations in Steamboat Creek and three tributaries downstream from Rhodes Road ranged from 17 mg/L to 47 mg/L (**Figure 5-47**). There are no numerical standards for TSS in Steamboat Creek or its tributaries, but WQS for Truckee River at Lockwood are shown for reference. The highest TSS concentrations were measured from Boynton Slough (47 mg/L) and Yori Drain (45 mg/L). TSS was not detected in winter baseflow samples at Steamboat Creek at Rhodes Road and Thomas Creek, or in stormwater samples collected at Thomas Creek in May and June 2020.

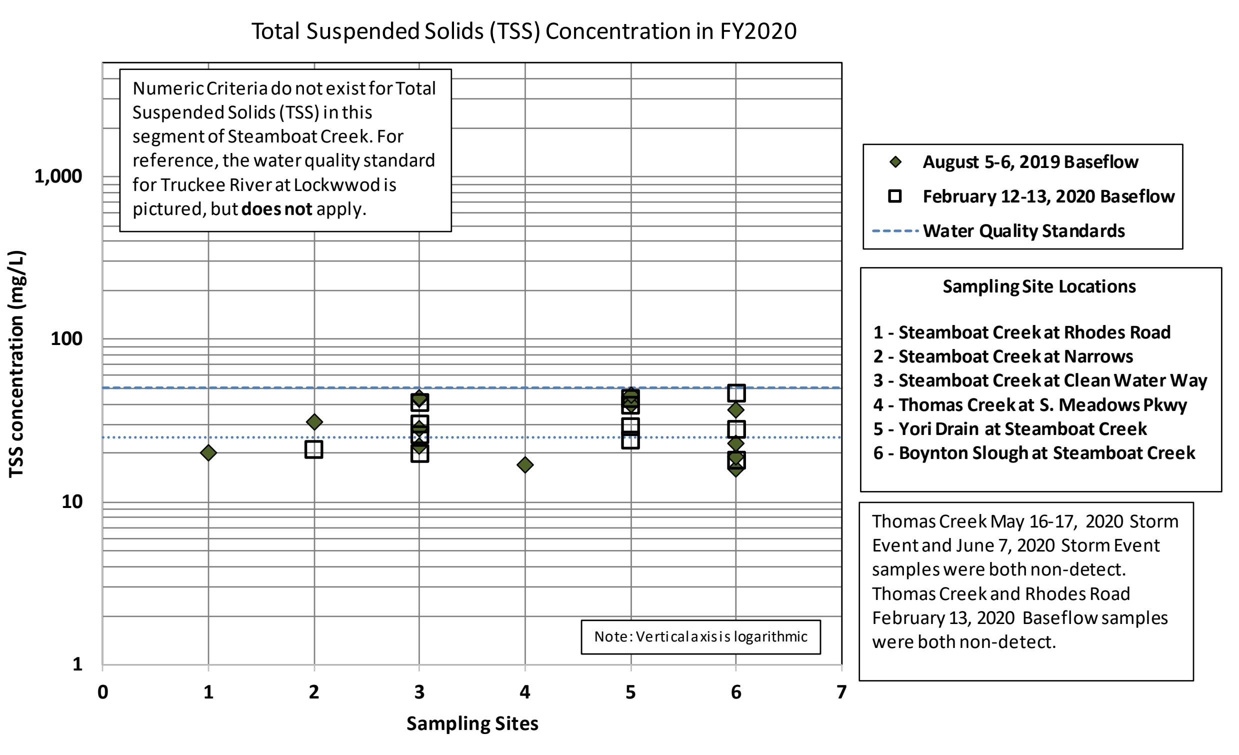


Figure 5-47 TSS Concentrations for Steamboat Creek and Tributaries, FY2020

TSS concentrations measured from baseflow samples collected in Whites Creek ranged from 18 mg/L to 25 mg/L (**Figure 5-48**). WQS do not exist for Whites Creek. TSS was not detected in stormwater samples collected from Whites Creek in May and June 2020.

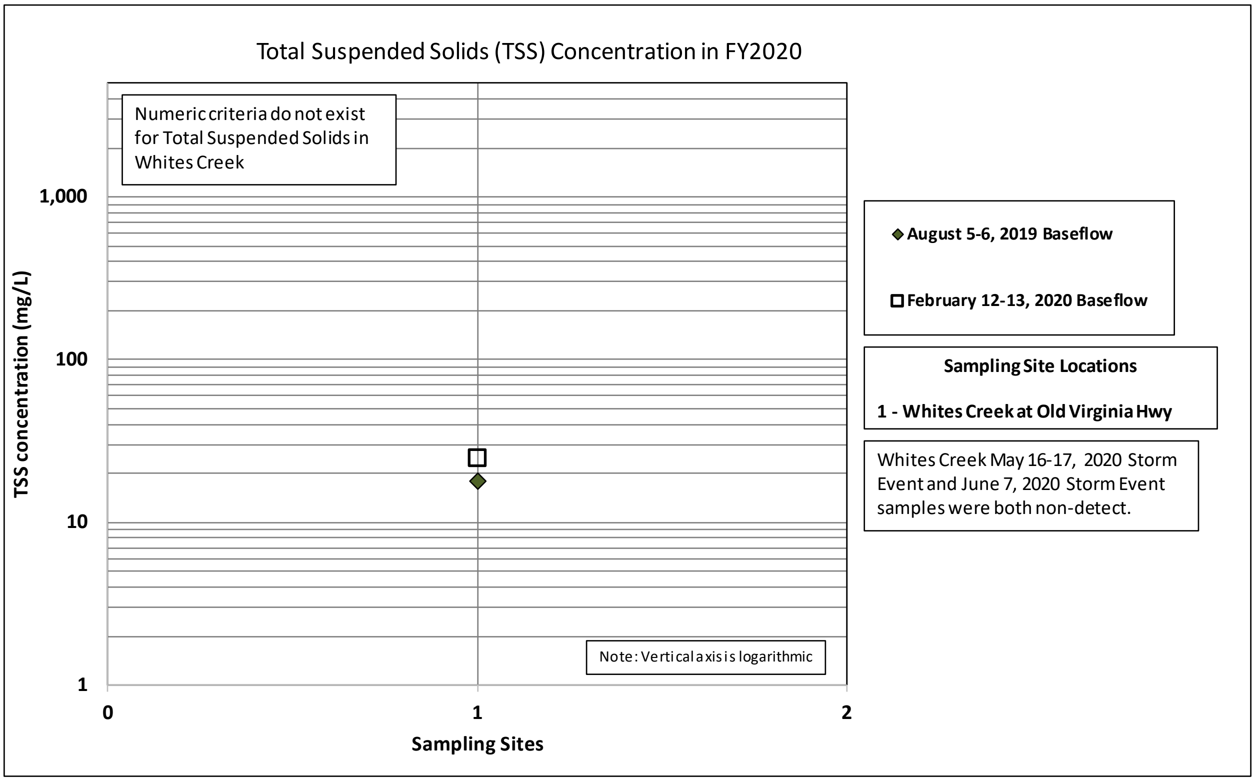


Figure 5-48 TSS Concentrations for Whites Creek, FY2020

5.4.4 ESCHERICHIA COLI BACTERIA

E.coli WQS require a single value ≤ 410 MPN/1000 (MPN=most probable number/1000mL)(NAC 445a. 1684, 1686, 1688, 1724 and 1758), with the exception of Steamboat Creek at Clean Water Way to the confluence of the Truckee river which has a WQS of Single Value ≤ 576 MPN/1000 (NAC 445a. 1726). Efforts to collect and analyze for *E. coli* are limited by a holding time of 8 hours for analysis. In FY2020, one storm sample was successfully sampled and transferred to the laboratory within the strict holding time from Alum Creek. *E.coli* samples were also collected and analyzed during winter and summer baseflow at stations identified for E.coli sampling in the 2018 SAP (**Figure 5-49, Figure 5-47**and **Figure 5-51**).

E.coli counts for the May 2020 stormwater sample collected at Alum Creek measured 866 MPN/100 mL. The Alum Creek summer baseflow measured 137 MPN/100 mL and the winter baseflow was non-detect. Baseflow *E.coli* counts ranged between 107 MPN/100 mL and 127 MPN/100 mL at Whites Creek and ranged between 26 MPN/100 mL and 410 MPN/100 mL at Steamboat Creek at Rhodes Road.

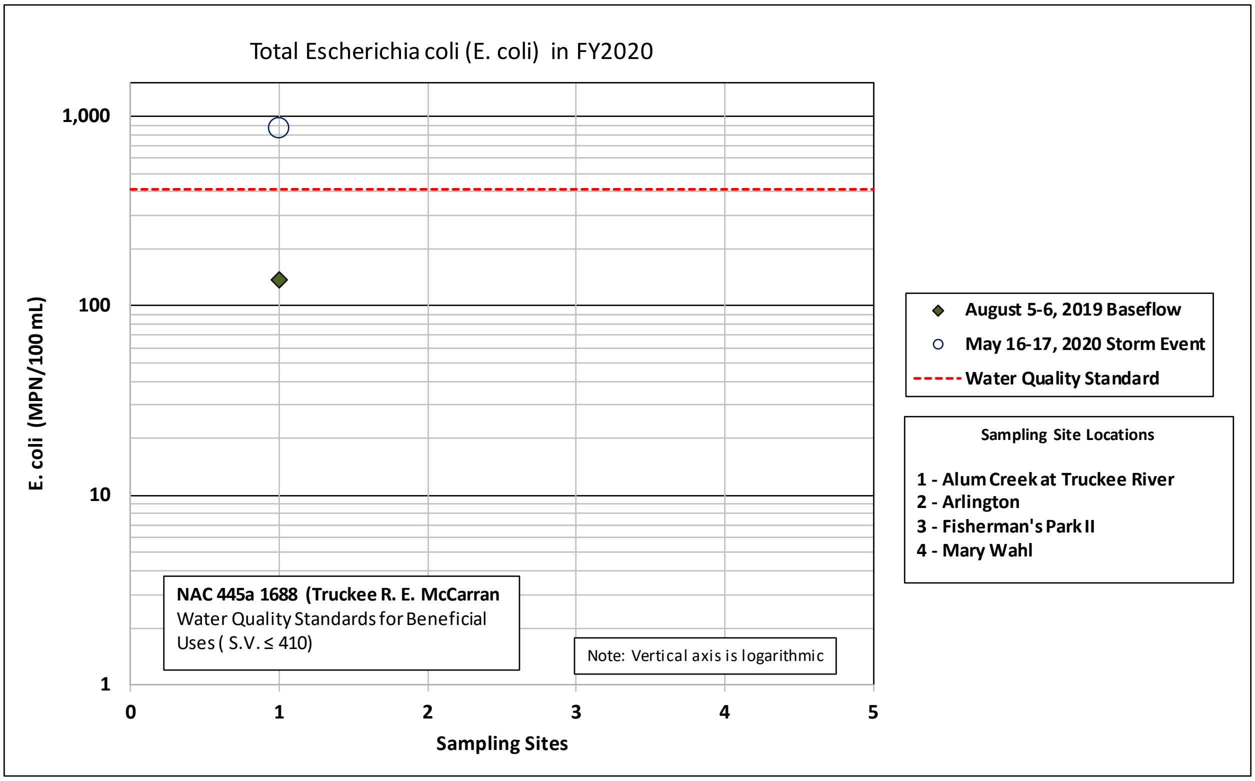


Figure 5-49 E.coli Counts for Samples Collected in Alum Creek and Urban Outfalls, FY2020

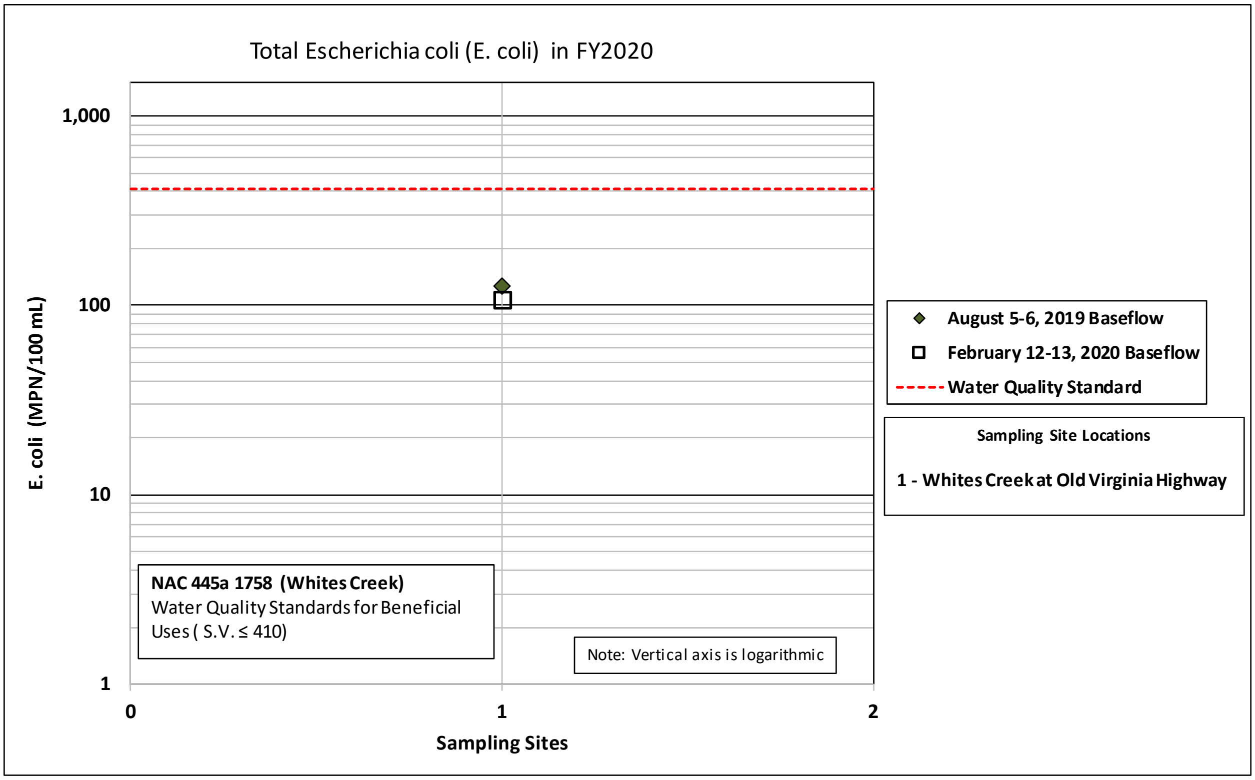


Figure 5-50 E.coli Counts for Samples Collected in Whites Creek, FY2020

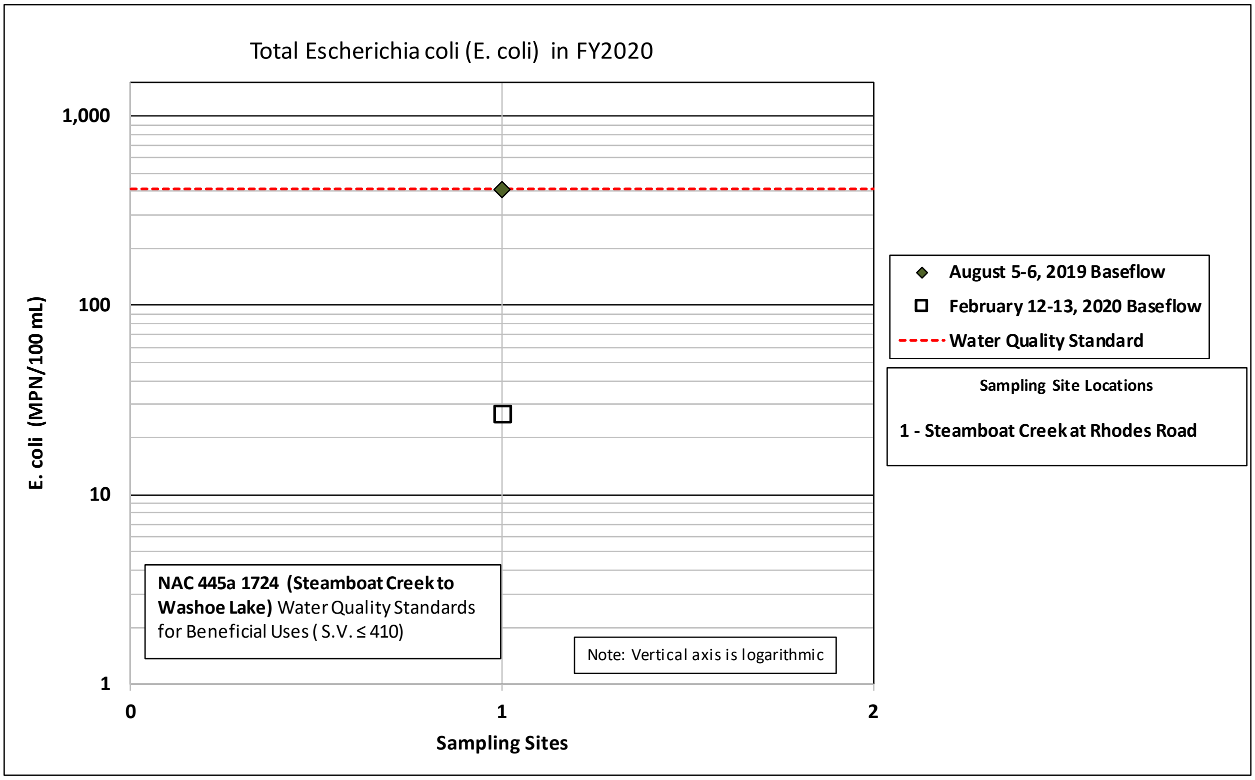


Figure 5-51 E.coli Counts for Samples Collected in Steamboat Creek, FY2020

5.4.5 PHYSICAL AND CHEMICAL PARAMETERS: DISSOLVED OXYGEN, PH, SPECIFIC CONDUCTANCE AND TURBIDITY

Physical and chemical parameters of waters sampled were measured during each site visit and when flow was present. In this section, we present results across all monitoring stations to provide greater context for water quality conditions throughout the monitoring year. NDEP (2014) recognizes that instantaneous measures of physical and chemical parameters are representative of a specific point in time and can naturally vary over a 24-hour period.

DO concentrations measured in FY2020 are shown in **Figure 5-52**, **Figure 5-53**, and **Figure 5-54**, grouped by their listed water body and specific numeric criterion for DO. In the Truckee River, WQS for DO vary depending on the time of year, and unlike other constituents, represent the lowest acceptable value.

DO concentrations ranged from 2.3 mg/L to as high as 15.6 mg/L all stations discharging to the Truckee River in FY2020 (**Figure 5-52**). DO concentrations measured across all stations discharging to the Truckee River in FY2020 met the WQS to protect beneficial uses with the exception of North Truckee Drain at Big Fish Drive during the August 2019 baseflow sampling and a June 2020 site visit. Higher DO concentrations were measured during the winter months whereas the lowest DO concentrations were measured during the summer and fall months. The highest concentrations were measured on North Truckee Drain and Alum Creek during baseflow sampling in February 2020.

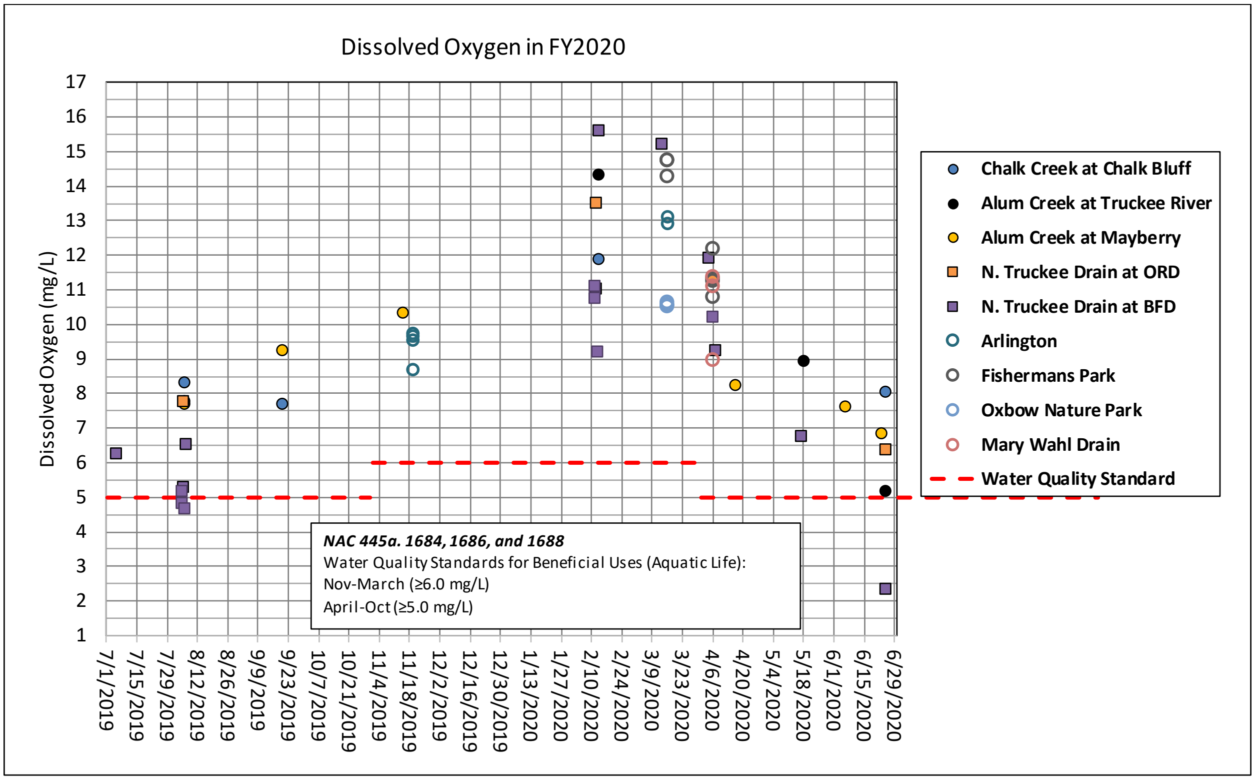


Figure 5-52 DO Concentrations for Tributaries and Stormwater Urban Outfalls to the Truckee River from Lockwood upstream to California/Nevada State Line, FY2020

DO concentrations in Steamboat Creek and tributaries downstream from Rhodes Road were between 3.2 mg/L and 16.0 mg/L (**Figure 5-53**), all above WQS established to protect beneficial uses (≥ 3 mg/L, below Rhodes Road to the Truckee River). DO measurements at Thomas Creek and Yori Drain both show consistently higher DO concentrations on average through the year, relative to the other stations. Supersaturated conditions (>100% saturation) in Yori Drain may be associated with outflows from the Yori mitigation wetlands located immediately upstream from the monitoring station. Boynton Slough has consistently shown lower values during summer low flow periods since monitoring began.

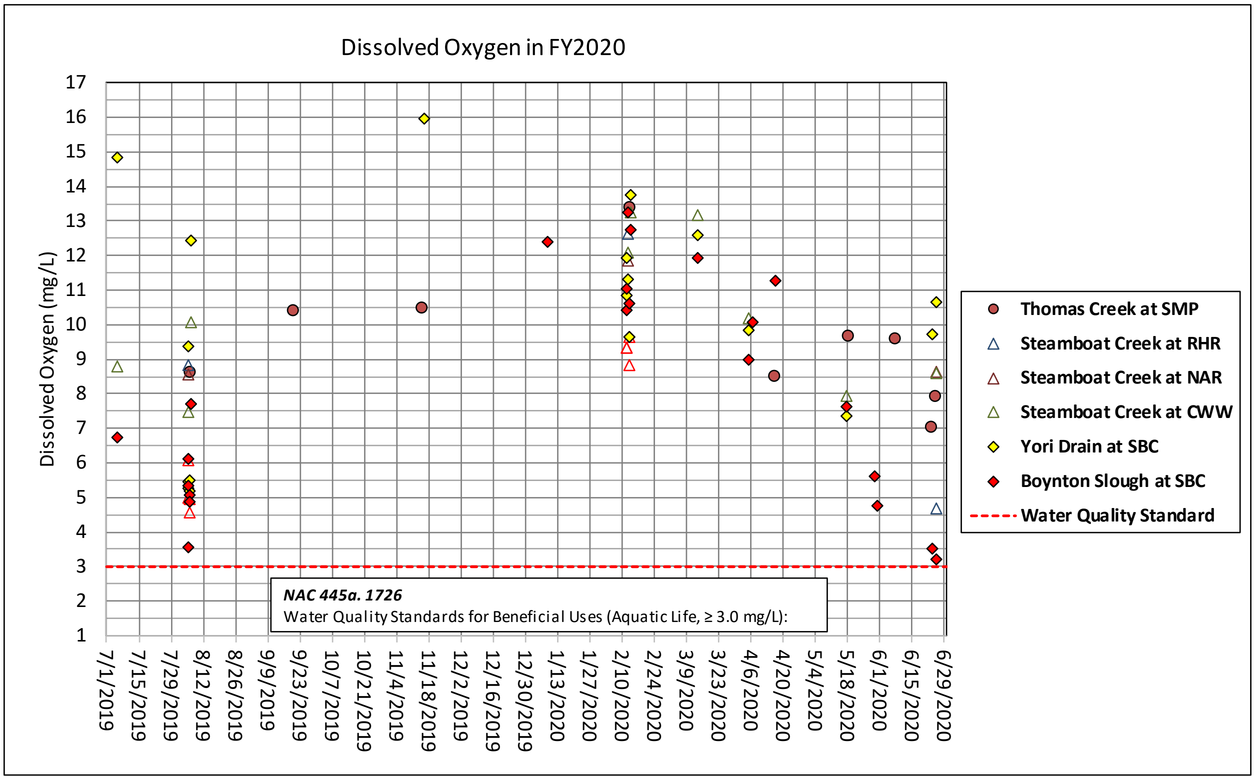


Figure 5-53 DO Concentrations for Steamboat Creek and Tributaries, FY2020

DO concentrations in Whites Creek were limited to 4 measurements and ranged from 9.2 mg/L to 13.6 mg/L (**Figure 5-54**), well above the WQS to protect beneficial uses (≥ 5.0 mg/L).

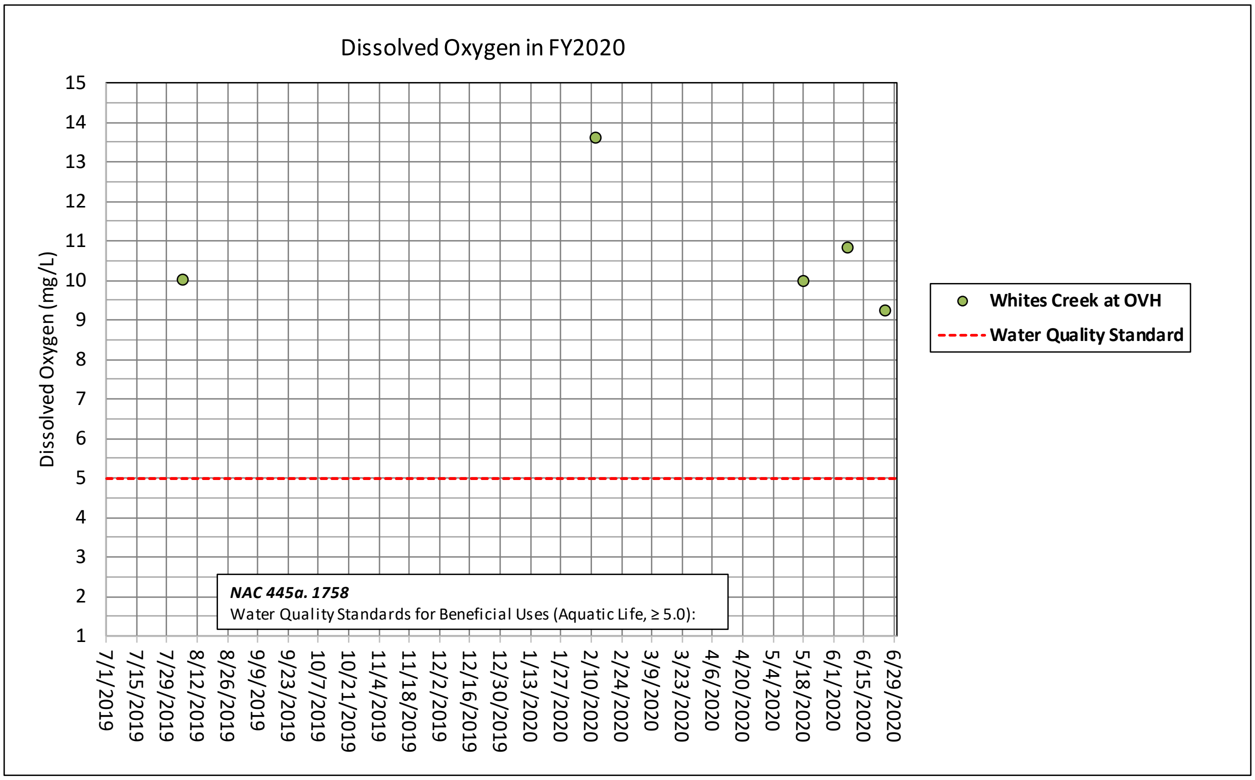


Figure 5-54 DO Concentrations for Whites Creek, FY2020

pH values measured throughout the Truckee Meadows in FY2020 during storms and baseflow are shown in **Figure 5-55**, **Figure 5-56**, **Figure 5-57**, **Figure 5-58**, and **Figure 5-59**, grouped by their listed water body and specific numeric criterion for pH.

pH ranged from 5.29 to 8.82 across two tributaries and one stormwater urban outfall discharging to the Truckee River upstream of Idlewild in FY2020 (**Figure 5-55**). All measures of pH met the WQS to protect beneficial uses, while a few measures of pH from Oxbow Nature Park urban outfall were above the requirement to maintain existing higher quality and one Chalk Creek measurement was well below the WQS.

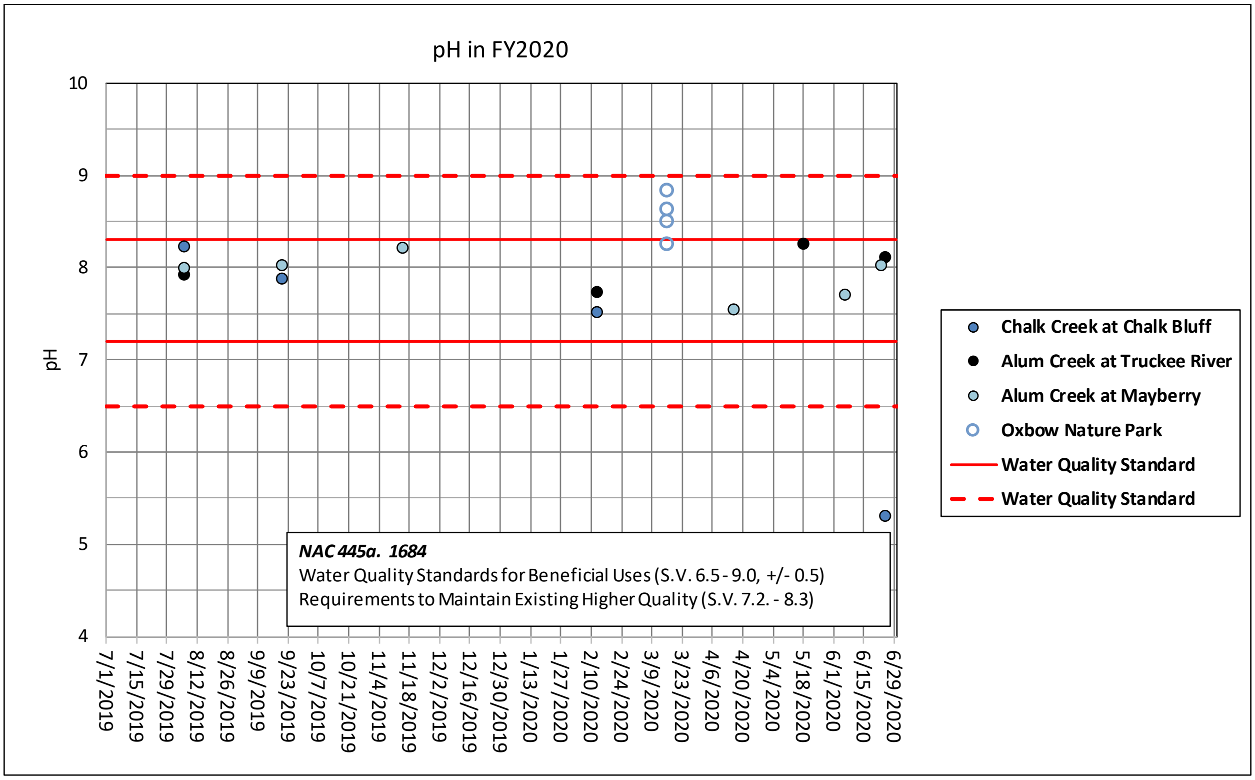


Figure 5-55 pH for Tributaries and Stormwater Urban Outfalls to the Truckee River upstream of Idlewild, FY2020

The pH ranged from 7.27 to as high as 8.94 across all three stormwater urban outfalls discharging stormwater to the Truckee River between E. McCarran and Idlewild in FY2020(**Figure 5-56**). All measurements of pH met the WQS to protect beneficial uses. pH measured from Fisherman's' Park II urban outfall fall outside the range of requirements to maintain existing higher quality.

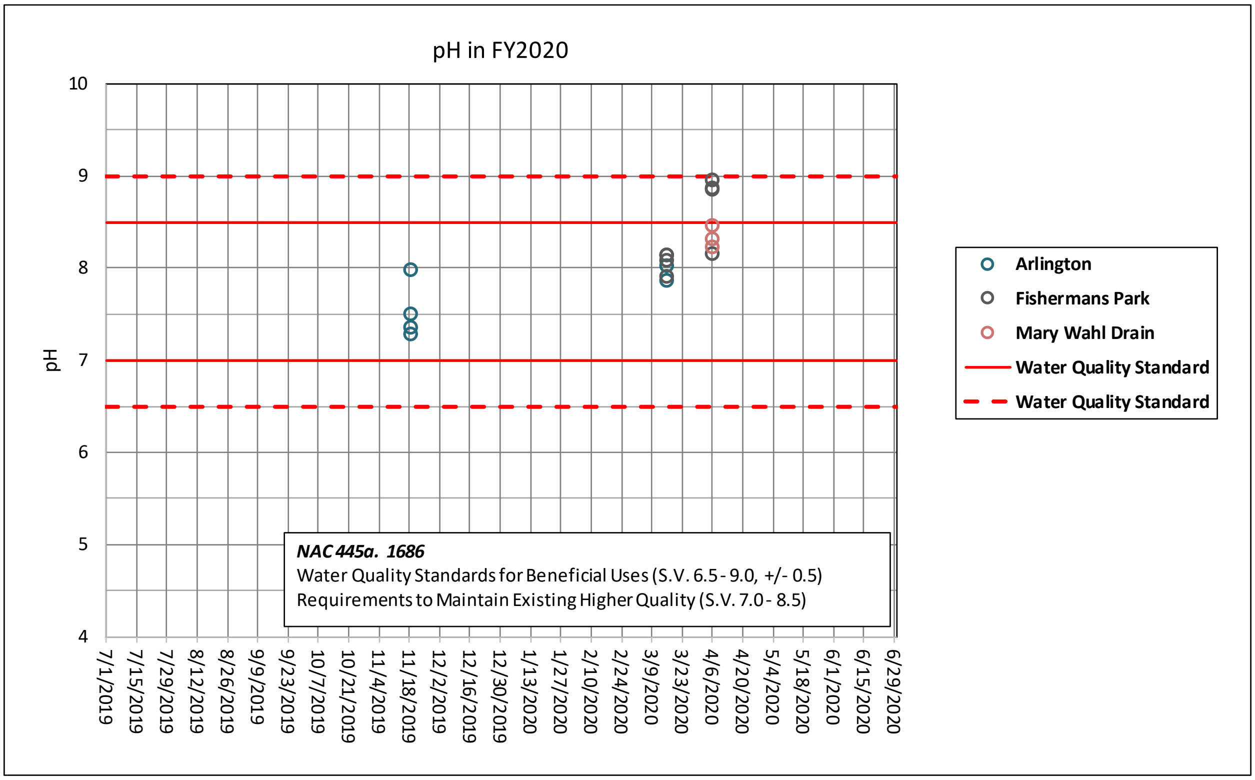


Figure 5-56 pH for Stormwater Urban Outfalls to the Truckee River from E. McCarran upstream to Idlewild, FY2020

The pH ranged from 7.69 to as high as 8.88 from two stations on North Truckee Drain in FY2020 (**Figure 5-57**). All measures met the WQS to protect beneficial uses, however multiple measurements in North Truckee Drain at Big Fish Drive exceeded the WQS to maintain higher quality, trending more basic.

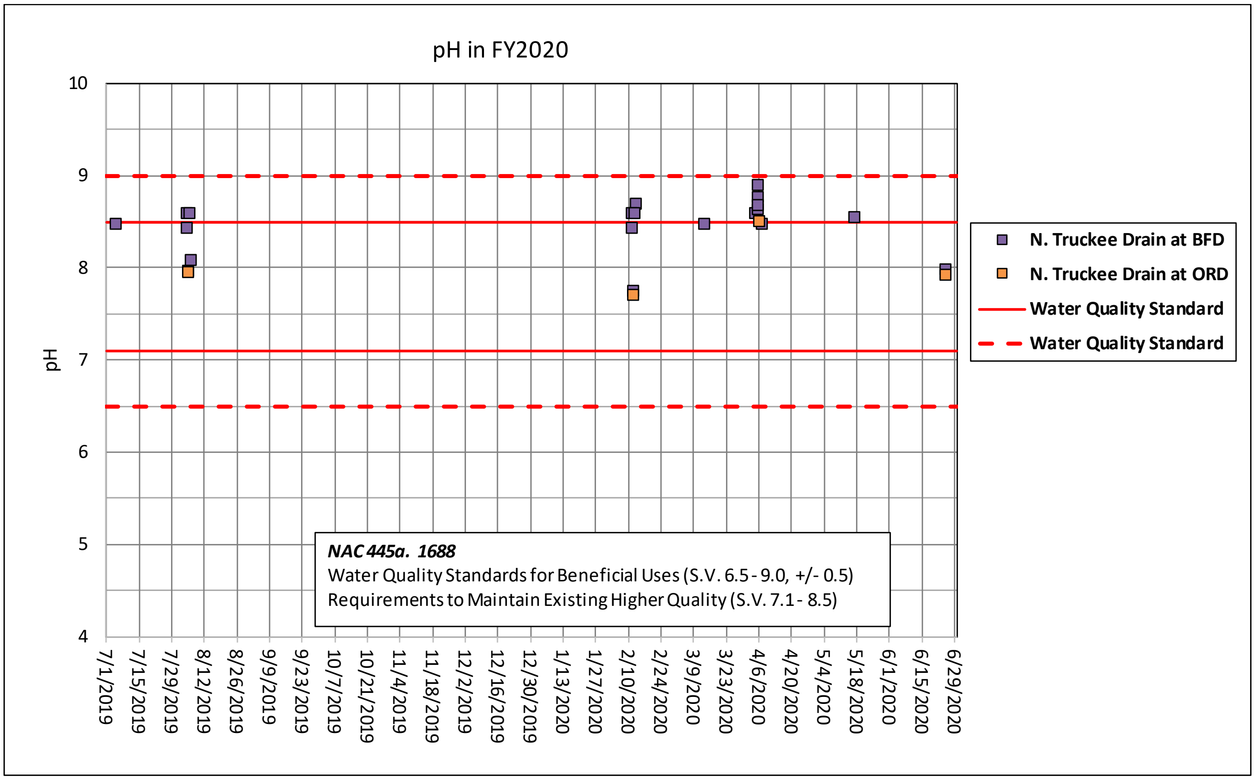


Figure 5-57 pH in the North Truckee Drain, FY2020

The pH measured in Steamboat Creek and tributaries downstream of Rhodes Road ranged between 6.20 and 9.18 (**Figure 5-58**). Most measurements of pH were within WQS established to protect beneficial uses with the exception of some measurements from Yori Drain during summer months that were consistently near or above 9.00.

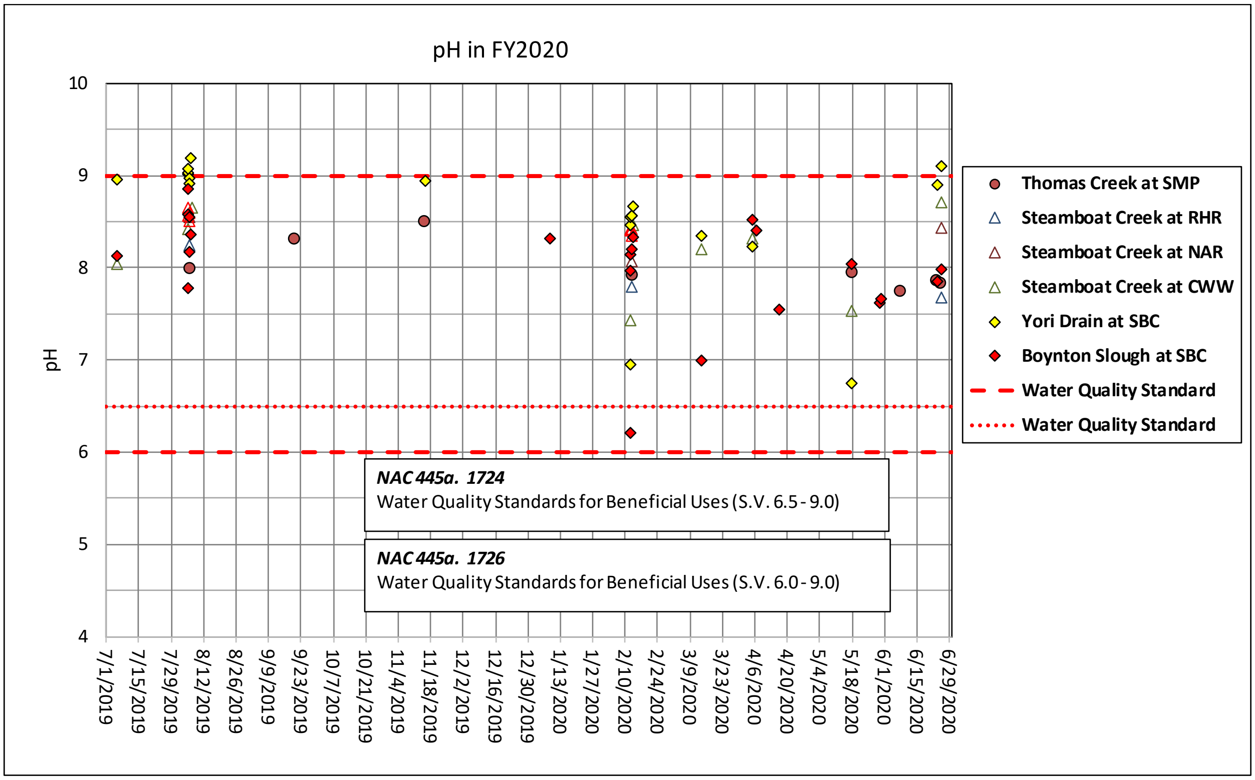


Figure 5-58 pH for Steamboat Creek and Tributaries, FY2020

The pH measured in Whites Creek ranged between 7.70 and 8.00 (**Figure 5-59**), well within WQS established to protect beneficial uses in this tributary.

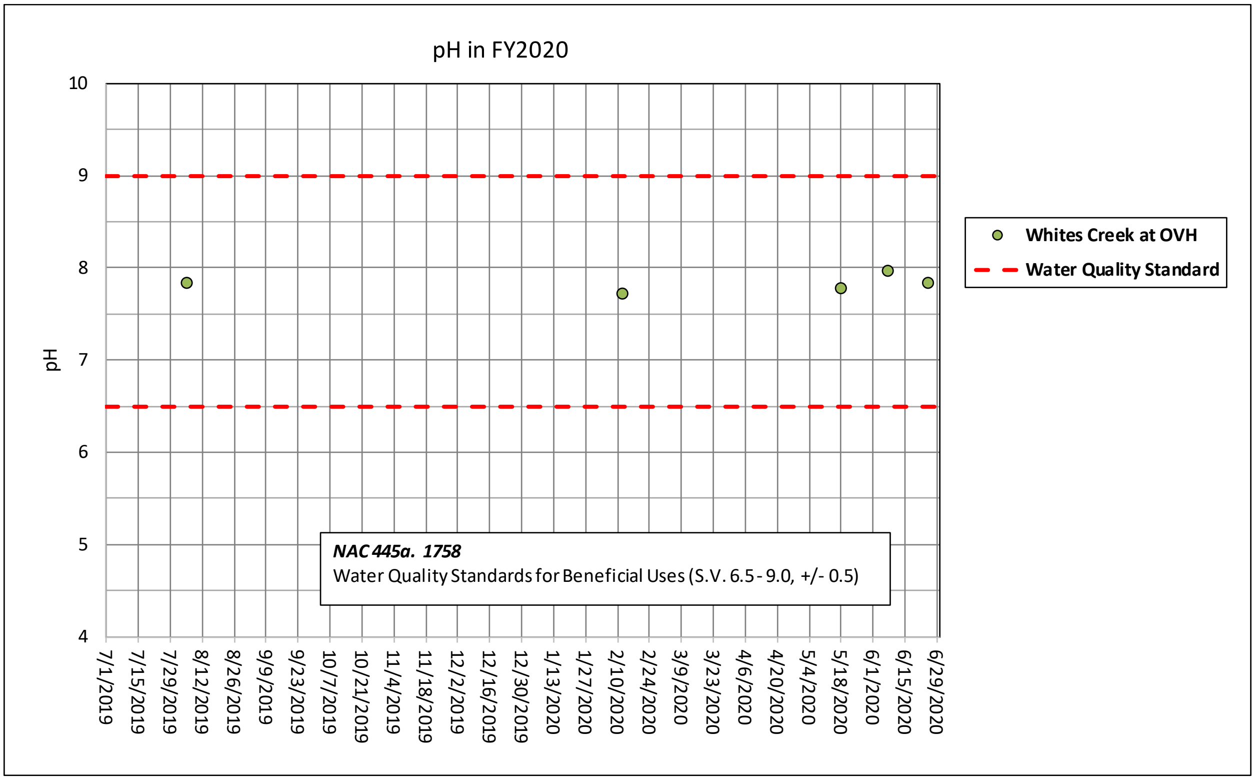


Figure 5-59 pH for Whites Creek, FY2020

Figure 5-60 compares Specific Conductance (SC), across all monitoring stations in the Truckee Meadows in FY2020. SC ranged between 66 µS (fresh water) and 3,155 µS (brackish water). Currently there are no WQS for SC in the Truckee Meadows.

Chalk Creek exhibited the highest values of SC consistently through the monitoring year and is consistent with previous years. Chalk Creek drains a watershed with geology and soils that can contribute to elevated specific conductance; therefore, elevated values are generally within the range expected for this creek from previous years data. In general, groundwater also can dissolve more ions, so higher SC values in baseflow can indicate groundwater-supported baseflow. Such may be the case in Steamboat Creek where geothermal springs are present. Alternatively, irrigation return flows from the many ditches that discharge back to tributaries (i.e., North Truckee Drain, Steamboat Creek) may contain higher amounts of dissolved ions or salts and elevate SC in discharges to the Truckee River. Conversely, Whites Creek and Thomas Creek exhibit the lowest SC values. These watersheds originate in higher elevations with snowmelt hydrology. Snowmelt runoff typically exhibits very low SC values. Stormwater urban outfalls only discharge during a storm event so SC is only measured in stormwater samples at outfall stations.

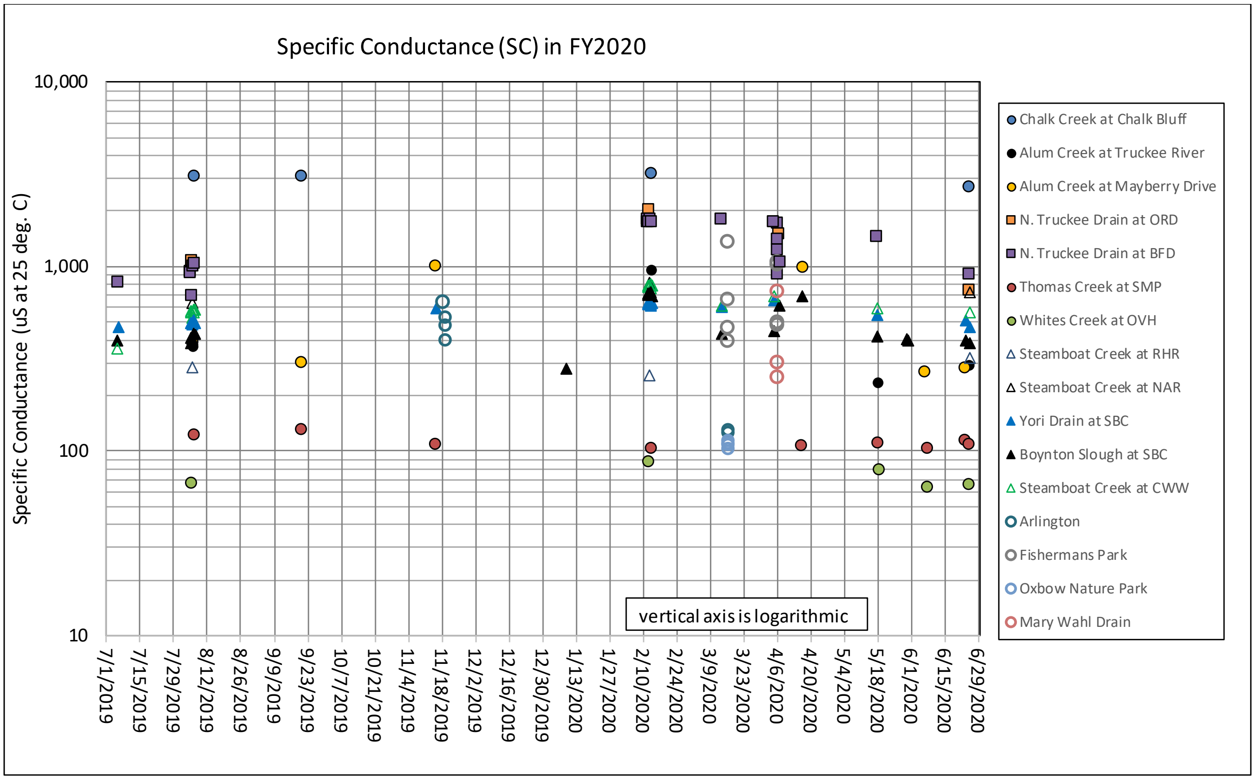


Figure 5-60 Specific Conductance (SC) Across all Stations, Truckee Meadows, FY2020

Figure 5-61 compares turbidity across all stations for samples collected in FY2020. The water quality standard for beneficial uses for the Truckee River specifies turbidity to be equal to or less than 10 NTU (S.V.), except for Steamboat Creek and Whites Creek, where no turbidity WQS exists.

In FY2020, and in general, turbidity during baseflow is typically lower than turbidity measured during storms. Turbidity ranged between 9 NTU and 39 NTU during summer baseflow conditions and 1 NTU and 59 NTU during winter baseflow conditions. Both Steamboat Creek and Yori Drain exhibited the highest values during summer baseflow, and North Truckee Drain at Big Fish Drive showed highest values during winter baseflow. During storm events, most stormwater runoff samples exhibited turbidity values above the WQS with a range between 8 NTU and 189 NTU. The highest stormwater turbidity values were measured in Fisherman's Park II in FY2020.

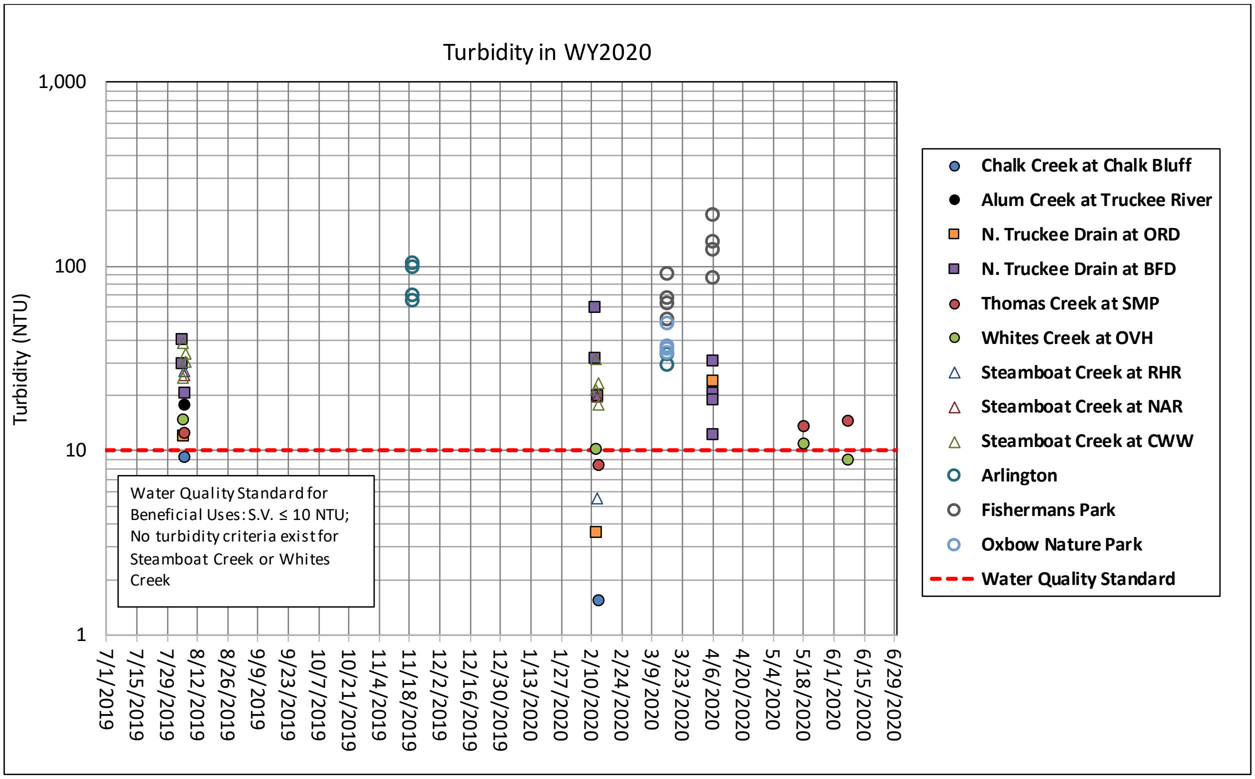


Figure 5-61 Turbidity Across all Stations, Truckee Meadows, FY2020 Stormwater and Baseflow samples

5.5 Stormwater and Baseflow Instantaneous Load

In this section, we compare instantaneous loads for a limited number of constituents (Total-N, Total-P, and TDS) across tributary stations where grab samples and instantaneous flow were measured simultaneously in both stormwater and baseflow conditions and absent of multiple, automated sample collection. Instantaneous load can be calculated using both a measure of instantaneous flow and the constituent concentration analyzed from a grab sample. While these measures are “snapshots” in time they provide additional information other than the concentration alone. For example, instantaneous load is commonly reported in lbs./day, similar to TMDLs, such that relative comparisons can be made.

Standard reporting for instantaneous load is mass per time (e.g., lbs./day). In some cases, instantaneous loading rates for some tributary stations were not calculated because constituents were not detected above laboratory detection limits.

5.5.1 TOTAL-N INSTANTANEOUS LOAD

Figure 5-62 compares instantaneous load for Total-N at all tributary stations as measured in FY2020 in both stormwater and baseflow.

Instantaneous Total-N load from stormwater sampled in North Truckee Drain ranged from 9.5 lbs./day to 76 lbs./day. Thomas Creek stormwater was calculated to be10 lbs./day while Whites Creek and Alum Creek stormwater samples were non-detect for Total-N.

Instantaneous Total-N load from baseflow samples ranged from 1.8 lbs./day to 238 lbs./day across all stations and across all baseflow samples collected at each station. Overall, the highest instantaneous Total-N load was measured during winter baseflow at Steamboat Creek at Clean Water Way.

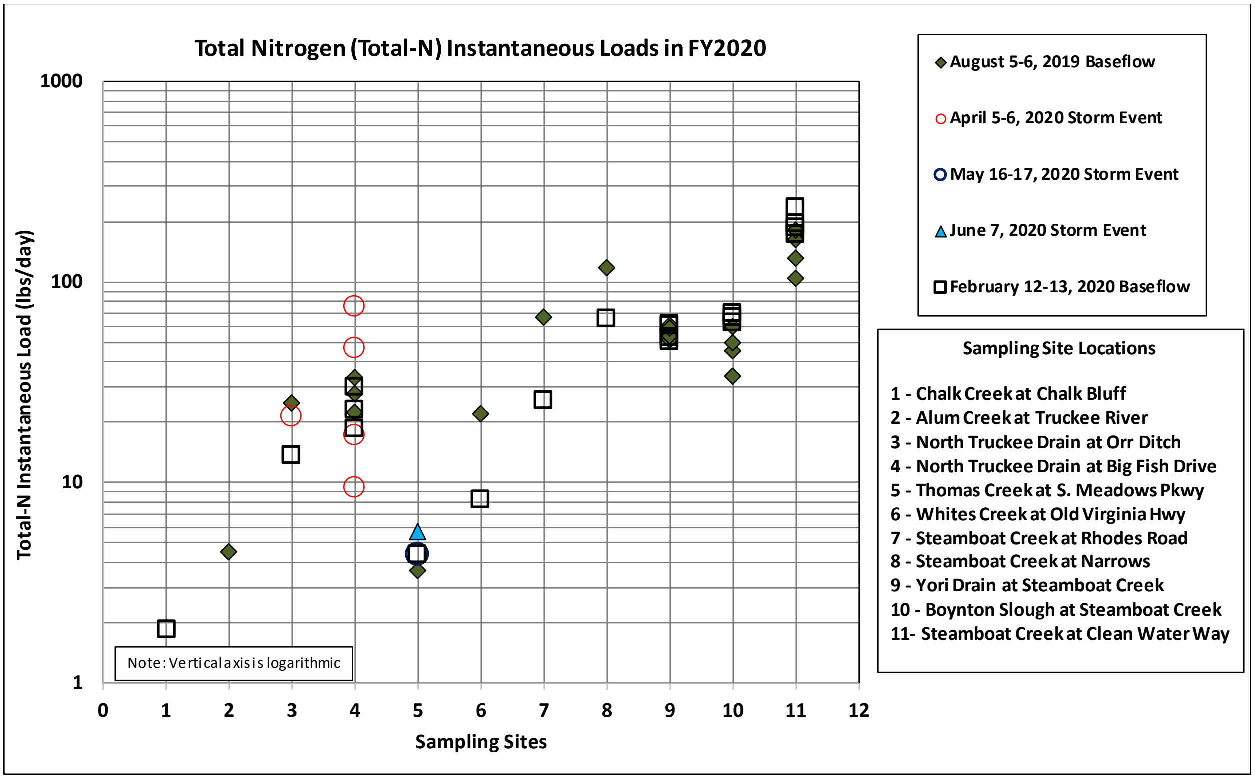


Figure 5-62 Total Nitrogen (Total-N) Instantaneous Load Across Tributary Stations in Truckee Meadows, FY2020

5.5.2 TOTAL-P INSTANTANEOUS LOAD

Figure 5-63 compares Total-P instantaneous load across all tributary stations where measured in FY2020 in both stormwater and baseflow.

Instantaneous Total-P load from stormwater ranged from 0.1 lbs./day to 1.7 lbs./day across all stations and across all storm samples collected at each station.

Instantaneous Total-P load from baseflow samples ranged from 0.48 lbs./day to 87 lbs./day across all stations and across all baseflow samples collected at each station. Similarly, to Total-N, the highest instantaneous Total-P load was measured at Steamboat Creek at Clean Water Way during summer baseflow sampling, with notable high values at the upstream Steamboat Creek stations as well.

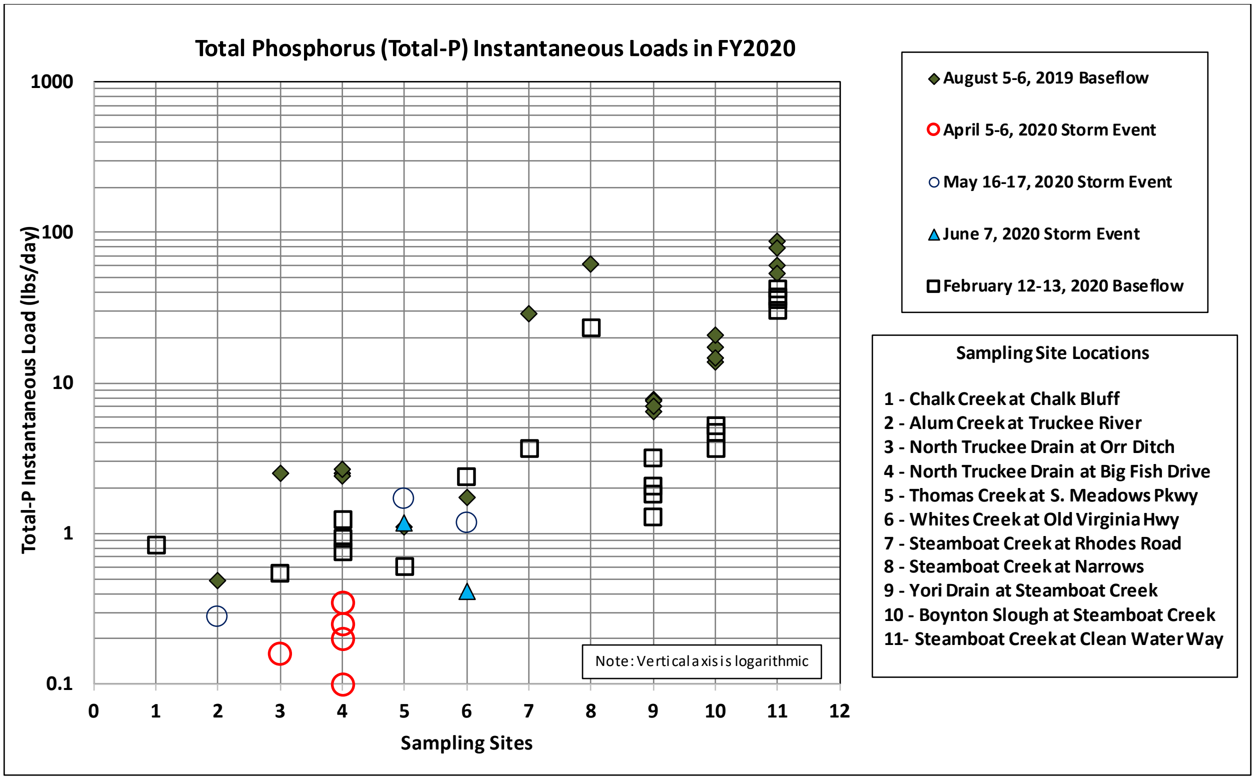


Figure 5-63 Total Phosphorus (Total-P) Instantaneous Load Across Tributary Stations in Truckee Meadows, FY2020

5.5.3 TDS INSTANTANEOUS LOAD

Figure 5-64 compares instantaneous load for TDS across tributary stations measured in FY2020 in stormwater and baseflow.

Instantaneous TDS load from storm water ranged from 802 lbs./day to 15,222 lbs./day across all stations and across all storm samples collected at each station.

Instantaneous TDS load during baseflow ranged from 683 lbs./day to 90,440 lbs./day across all stations. The highest calculated instantaneous TDS load during baseflow was measured at Steamboat Creek at Clean Water Way.

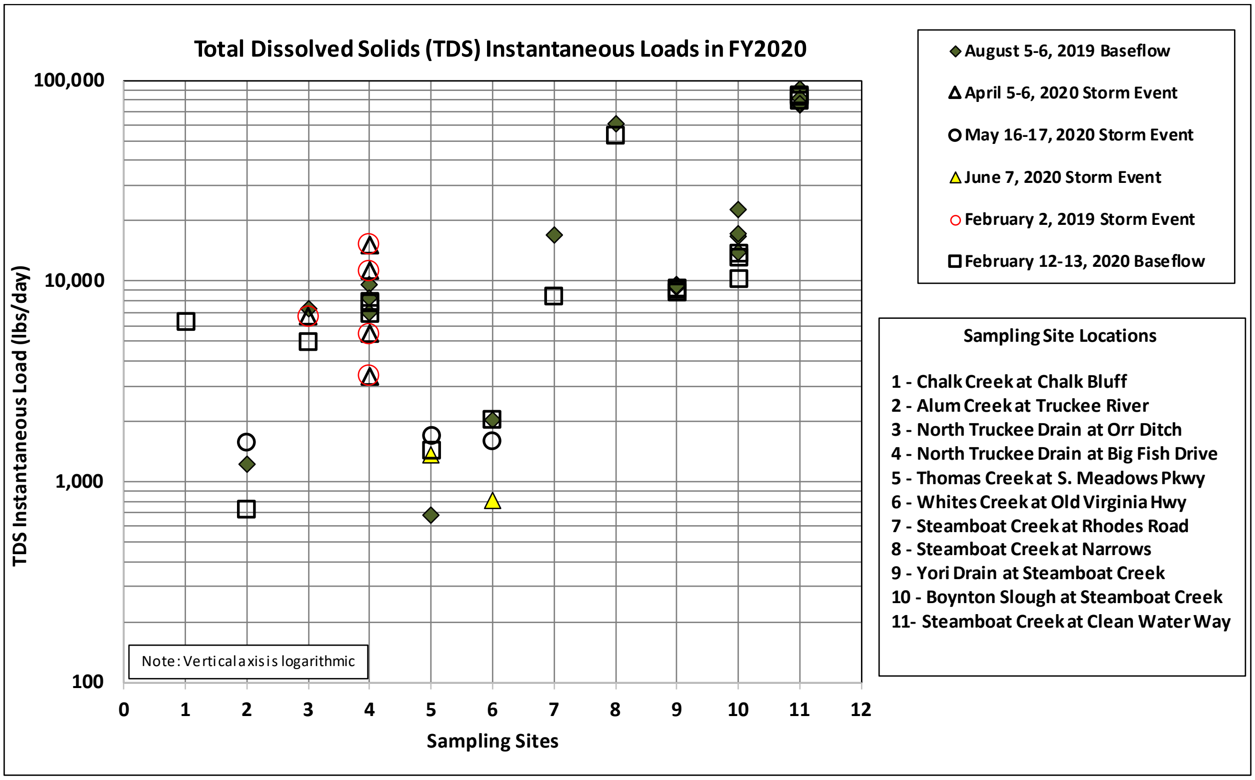


Figure 5-64 Total Dissolved Solids (TDS) Instantaneous Load Across Tributary Stations in Truckee Meadows, FY2020

5.6 Stormwater and Baseflow Constituent Load

Automated sampling of stormwater was conducted during 3 storm events and two 24-hour baseflow periods (see **Table 5-1**)

Runoff volumes and load calculations are provided for both the entire runoff event and for distinct segments of the storm hydrograph to show variability in load, directly related to variability in constituent concentrations and runoff volumes measured in each hydrograph segment. Yields reflect the storm loading normalized by watershed area and are calculated by dividing the total storm load by the station contributing area.

Total storm event runoff, load, and yields measured at one urban outfall during the November 19, 2019 storm event are presented in **Table 5-3**, This event was a small frontal storm. Total storm rainfall was 0.1 inches at the Reno-Tahoe International Airport.

Table 5-3 Constituent Load and Runoff Volumes for Arlington Urban Outfall, November 19, 2019 Storm Event

Arlington								
		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	374	0.4	0.07	0.3	0.1	0.09	26	2
Rising Limb	2,461	1.8	0.37	1.4	0.2	0.45	144	13
Peak	1,782	1.3	0.23	1.1	0.3	0.38	93	6
Falling Limb	453	0.2	0.03	0.2	0.1	0.08	17	3
Totals	**5,069**	**4**	**1**	**3**	**0.7**	**1.0**	**281**	**25**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**15,841**	**12**	**2.2**	**9**	**2.1**	**3.1**	**877**	**77**
		(lbs.)						

Notes:

Yields are estimates based on the contributing areas provided by City of Reno, City of Sparks, USGS or other entity.

Total stormwater load and yields measured from three urban outfalls during the March 15, 2020 storm event are compared in **Table 5-4**. This event was a small spring frontal storm with wide spatial variability. Only 0.03 inches of rainfall was measured at the Reno-Tahoe International Airport, but 0.24 inches of rainfall was measured at the Desert Research Institute located in North Reno. Load was higher at Fisherman's Park II compared to Oxbow Park and Arlington.

Table 5-4 Constituent Load and Runoff Volumes for Three Urban Outfalls, March 15, 2020

Oxbow Nature Park

		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	6,077	0.6	0.11	0.5	0.15	0.10	16	0
Rising Limb	1,588	0.2	0.03	0.2	0.02	0.02	6	3
Peak	1,387	0.1	0.03	0.1	0.01	0.02	6	2
Falling Limb	4,084	0.4	0.08	0.3	0.05	0.06	17	5
Totals	**13,135**	**1**	**0.3**	**1**	**0.2**	**0.2**	**45**	**9**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**36,487**	**3**	**0.7**	**3**	**0.6**	**0.6**	**124**	**26**

Fisherman's Park II

		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	13,822	5	1.04	3	0	0.29	578	40
Rising Limb	6,934	1	0.27	1	0	0.11	139	21
Peak	7,011	1	0.25	1	0	0.11	109	32
Falling Limb	19,988	3	0.64	2	0	0.30	225	20
Totals	**47,755**	***10***	***2.2***	***8***	***0.6***	***0.8***	***1,051***	***112***
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**9,364**	***2.0***	***0.4***	***1.5***	***0.1***	***0.2***	***206***	***22***

Arlington

		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	3,789	1	0.12	1	0.1	0.10	26	6
Rising Limb	4,212	1	0.16	1	0.2	0.16	29	4
Peak	--	--	--	--	--	--	--	--
Falling Limb	--	--	--	--	--	--	--	--
Totals	**8,002**	**2**	**0**	**1**	**0.3**	**0.3**	**55**	**10**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**25,005**	**6**	**0.9**	**5**	**1.0**	**0.8**	**172**	**31**
		(lbs.)						
TOTALS 3 URBAN OUTFALLS		**13**	**3**	**10**	**1**	**1.3**	**1,150**	**131**

Notes:

Loads and yields are not reported for Yori Drain due to backwatering from Steamboat Creek affecting the flow record.

Yields are estimates based on the contributing areas provided by City of Reno, City of Sparks, USGS or other entity.

Watershed area North Truckee Drain at Big Fish Drive is roughly estimated due to complexity of irrigation network and urban drainage areas

Total stormwater load and yields measured for another small frontal storm on April 5-6, 2020 are presented in **Table 5-5**, for one tributary and two urban outfalls (North Truckee Drain at Big Fish Drive, Fisherman's Park II and Mary Wahl Ditch). Total storm rainfall was 0.16 inches at the Reno-Tahoe International Airport.

Table 5-5 Constituent Load and Runoff Volumes at North Truckee Drain and two urban outfalls, April 5-6, 2020

Mary Wahl Ditch

		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	86	0.1	0.05	0.0	0.0	0.00	2.5	0.4
Rising Limb	--	--	--	--	--	--	--	--
Peak	6,142	1.4	0.31	1.0	0.1	0.05	73	54
Falling Limb	3,160	0.5	0.15	0.3	0.0	0.03	30	6
Totals	**9,387**	**2**	**0.5**	**1**	**0.1**	**0.1**	**105**	**60**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**3,755**	**1**	**0**	**1**	**0**	**0**	**42**	**24**

Fisherman's Park II

		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	5,962	1.5	0.28	1.2	0.1	0.11	216	41
Rising Limb	18,344	3.9	0.49	3.4	0.1	0.23	321	263
Peak	10,863	1.5	0.35	1.2	0.1	0.14	183	81
Falling Limb	7,901	1.1	0.43	0.6	0.0	0.07	286	21
Totals	**43,070**	***8***	***1.6***	***6***	***0.3***	***0.5***	***1,006***	***406***
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**8,445**	***1.6***	***0.3***	***1.3***	***0.1***	***0.1***	***197***	***80***
		(lbs.)						
TOTALS 2 URBAN OUTFALLS		**10**	**2**	**8**	**0**	**1**	**1111**	**467**

North Truckee Drain at Big Fish Drive

		Storm Loads						
Hydrograph	Storm Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
First Flush	8,424	1.5	0.79	0.6	0.1	0.01	521	11
Rising Limb	24,453	4.3	2.14	2.1	0.4	0.08	1,359	32
Peak	64,980	13	6.08	6.5	0.8	0.35	3,042	122
Falling Limb	95,598	17	7.16	10	2.1	0.41	3,342	263
Totals	**193,455**	**35**	**16**	**19**	**3**	**0.8**	**8,264**	**427**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**1,935**	**0.4**	**0.2**	**0.2**	**0.0**	**0.0**	**83**	**4**
		(lbs.)						
Storm Total		**45**	**18**	**27**	**4**	**1**	**9374**	**893**

Notes:

Yields are estimates based on the contributing areas provided by City of Reno, City of Sparks, USGS or other entity.

Watershed area North Truckee Drain at Big Fish Drive is roughly estimated due to complexity of irrigation network and urban drainage areas

5.6.1 BASEFLOW LOAD (24-HOURS) FROM STEAMBOAT CREEK, YORI DRAIN, BOYNTON SLOUGH AND NORTH TRUCKEE DRAIN

Baseflow constituent load and yields were evaluated in Boynton Slough, Yori Drain, Steamboat Creek at Clean Water Way, and North Truckee Drain at Big Fish Drive in the summer (August 2019) and the winter (February 2020) of FY2020. Yori Drain and Boynton Slough are tributaries to Steamboat Creek upstream of the Clean Water Way monitoring location. In the sections below, we describe results for three main constituents that have established TMDLs in the Truckee River.

Baseflow sample collection began at 12:00, August 5, 2019 and February 12, 2020, and continued hourly until 11:00 on August 6, 2019 and February 13, 2020 of those respective sampling periods. Samples were composited into 4 groups to represent: (1) afternoon (12:00 – 17:00); (2) evening (18:00 – 23:00); (3) early morning (0:00 – 5:00); and (4) late morning (6:00 – 11:00). Load was calculated for each period and at each station. Yields are also provided for each station across all constituents so that comparisons across stations with differing drainage areas can be made.

Summer baseflow load and yields for Steamboat Creek at Clean Water Way, Yori Drain, Boynton Slough and North Truckee Drain at Big Fish Drive are presented in **Table 5-6**. Steamboat Creek baseflow ranged from 44 to 52 cfs during the 24-hour period we studied. The Total-N load over the 24-hour baseflow period Steamboat Creek was measured to be 137 lbs., the Total-P load was measured to be 67 lbs., and the TDS load was measured to be 77,302 lbs.

Boynton Slough baseflow ranged from 12 to 17 cfs during the 24-hour period we sampled. The Boynton Slough Total-N load was measured to be 47 lbs., the Total-P load was measured to be 16 lbs. and the TDS load was measured to be 16,900 lbs.

Yori Drain baseflow ranged from 6.2 to 6.9 cfs during the 24-hour period we sampled. The Yori Drain Total-N load was measured to be 54 lbs., the Total-P load was measured to be 6.9 lbs. and the TDS load was measured to be 9,157 lbs.

North Truckee Drain baseflow ranged from 2 to 3 cfs during the 24-hour period we sampled. The North Truckee Drain Total-N load was measured to be 20 lbs., the Total-P load was measured to be 1.7 lbs., and the TDS load was measured to be 5,791 lbs.

Sampling Yori Drain and Boynton Slough provides for a “nested watershed” approach to be used in evaluating sources of nutrients measured at Steamboat Creek at Cleanwater Way, since these drainages are tributaries to Steamboat. Because these tributaries differ in drainage area, we compare yields, which are normalized by watershed area. Results from summer baseflow sampling suggests Yori Drain may be a major contributor in nutrients to Steamboat Creek with a Total-N yield of 13.0 lbs./sq. mi. and a Total-P yield of 1.6 lbs./sq. mi., as compared to a Total-N yield of 1.0 lbs./sq. mi and a Total-P yield of 0.3 lbs./sq. mi from the Boynton Slough watershed.

Similarly, North Truckee Drain and Steamboat Creek are both major tributaries to the Truckee River. When constituent yields are compared between these two tributaries during summer baseflow Steamboat Creek yields more Total-N (0.6 lbs./sq. mile), Total-P (0.3 lbs./sq. mile), TDS (317 lbs./sq. mile) and TSS (34 lbs./sq. mile) compared to North Truckee Drain Total-N (0.2 lbs./sq. mile), Total-P (0.02 lbs./sq. mile), TDS (57 lbs./sq. mile) and TSS (5 lbs./sq. mile).

Table 5-6 Summer Baseflow Volumes and Constituent Load for Four Tributaries to the Truckee River, August 5-6, 2019

Boynton Slough at Steamboat Creek

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	309,445	17	5.8	12	5.0	2.7	4,057	715
Evening	328,270	7.4	7.4	0.0	4.5	3.1	4,918	328
Early Morning	274,376	11	7.9	3.4	3.4	2.2	4,111	325
Late Morning	244,355	11	6.4	4.6	3.2	1.8	3,814	351
Totals	**1,156,447**	**47**	**27**	**20**	**16**	**9.8**	**16,900**	**1,719**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**23,844**	**1.0**	**0.6**	**0.4**	**0.3**	**0.2**	**348**	**35**

Yori Drain at Steamboat Creek

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	146,189	13	5.7	7.3	1.9	0.0	2,373	365
Evening	142,503	13	6.5	7.1	1.9	0.0	2,313	374
Early Morning	141,057	15	6.3	8.8	1.6	0.2	2,378	352
Late Morning	124,199	13	5.7	7.8	1.6	0.2	2,093	349
Totals	**553,948**	**54**	**24**	**31**	**6.9**	**0.4**	**9,157**	**1,440**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**131,892**	**13**	**5.8**	**7.4**	**1.6**	**0.1**	**2180**	**343**

Steamboat Creek at Clean Water Way

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	1,069,110	39	5.6	33	21	11	21,357	2,870
Evening	1,003,320	26	6.9	19	19	11	20,043	1,378
Early Morning	965,520	33	8.4	24	15	12	18,685	1,688
Late Morning	861,840	40	8.1	32	12	11	17,217	2,367
Totals	**3,899,790**	**137**	**29**	**109**	**67**	**45**	**77,302**	**8,303**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**15,983**	**0.6**	**0.1**	**0.4**	**0.3**	**0.2**	**317**	**34**

North Truckee Drain at Big Fish Drive

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	67,500	8.4	4.6	3.8	0.6	0.5	2,444	282
Evening	54,423	4.8	4.1	0.7	0.5	0.3	1,767	143
Early Morning	50,346	--	--	--	--	--	--	--
Late Morning	48,681	6.4	3.6	2.7	0.6	0.3	1,580	106
Totals	**220,950**	**20**	**12**	**7.2**	**1.7**	**1.1**	**5,791**	**531**
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	**2,210**	**0.2**	**0.1**	**0.1**	**0.02**	**0.01**	**58**	**5**

Notes:
ISCO samplers are run to collect samples every hour for 24 hours during baseflow sampling.
Each 6 hour set is composited into one composite sample totaling 4 composite samples per 24 hour period.

Winter baseflow load and yields for the four tributaries, Boynton Slough, Yori Drain, Steamboat Creek at Clean Water Way and North Truckee Drain at Big Fish Drive are presented in **Table 5-7**.

During the 24-hour baseflow period studied, Boynton Slough flow rates ranged from 4 to 6 cfs. Boynton Slough Total-N load was measured to be 53 lbs., Total-P load was measured to be 3.6 lbs., and TDS load was measured to be 9,793 lbs. The auto sampler was unable to collect samples in the early morning on February 13th due to freezing temperatures and ice-affected flows at the intake. As a result, Boynton Slough baseflow was separated into three composite samples, instead of four.

Yori Drain flow rates ranged from 2 to 3 cfs during the 24-hour period. Yori Drain Total-N load was measured to be 32 lbs., Total-P load was measured to be 1.2 lbs., and TDS load was measured to be 5,134 lbs.

Steamboat Creek baseflow ranged from 30 to 34 cfs during the 24-hour period. Steamboat Creek Total-N load was measured to be 185 lbs., Total-P load was measured to be 34 lbs., and TDS load was measured to be 76,742 lbs.

Finally, North Truckee Drain baseflow ranged from 1.1 to 1.3 cfs during the 24-hour period North Truckee Drain Total-N load was measured to be 18 lbs., Total-P load was measured to be 0.7 lbs., and TDS load was measured to be 5,695 lbs. The auto sampler at North Truckee Drain was unable to collect samples in the early morning on February 13th due to ice-affected flows. As a result, North Truckee Drain baseflow was separated into three composite samples, instead of four.

Table 5-7 Winter Baseflow Volumes and Constituent Load for Four Tributaries to the Truckee River, February 12-13, 2020

Boynton Slough at Steamboat Creek

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	105,371	*17*	*10*	*7.2*	*1.0*	*0.7*	*2,763*	*309*
Evening	126,588	*17*	*12*	*5.7*	*1.3*	*0.8*	*3,398*	*221*
Early Morning	141,921	*19*	*13*	*5.0*	*1.2*	*0.9*	*3,633*	*159*
Late Morning	121,420	--	--	--	--	--	--	--
Totals	***495,301***	***53***	***35***	***18***	***3.6***	***2.4***	***9,793***	***690***
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	***10,212***	***1.1***	***0.7***	***0.4***	***0.1***	***0.05***	***202***	***14***

Yori Drain at Steamboat Creek

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	59,904	*9.3*	*5.2*	*4.1*	*0.5*	*0.1*	*1,346*	*146*
Evening	54,920	*7.5*	*4.8*	*2.9*	*0.3*	*0.1*	*1,303*	*82*
Early Morning	55,795	*7.7*	*4.9*	*2.9*	*0.3*	*0.1*	*1,324*	*101*
Late Morning	48,947	*7.9*	*4.3*	*3.7*	*0.2*	*0.1*	*1,161*	*131*
Totals	***219,565***	***32***	***19***	***14***	***1.2***	***0.5***	***5,134***	***461***
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	***52,277***	***7.7***	***4.6***	***3.2***	***0.3***	***0.1***	***1222***	***110***

Steamboat Creek at Clean Water Way

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	678,150	*55*	*19*	*36*	*10*	*5.5*	*19,474*	*1,736*
Evening	669,600	*41*	*16*	*25*	*8.8*	*5.0*	*18,811*	*1,087*
Early Morning	707,400	*49*	*19*	*27*	*8.8*	*5.7*	*20,314*	*1,325*
Late Morning	645,840	*40*	*19*	*21*	*6.5*	*4.8*	*18,143*	*806*
Totals	***2,700,990***	***185***	***74***	***110***	***34***	***21***	***76,742***	***4,954***
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	***11,070***	***0.8***	***0.3***	***0.5***	***0.1***	***0.1***	***315***	***20***

North Truckee Drain at Big Fish Drive

		Baseflow Loads						
Hydrograph	Baseflow Runoff Volume	Total-N	NO_3	TKN	Total-P	Ortho-P	TDS	TSS
	(cubic feet)	*(lbs)*						
Afternoon	*28,800*	*7.7*	*3.4*	*4.3*	*0.2*	*0.1*	*1,978*	*158*
Evening	*27,333*	*5.5*	*2.9*	*2.4*	*0.3*	*0.1*	*1,877*	*85*
Early Morning	*26,793*	*5.0*	*2.8*	*2.2*	*0.2*	*0.1*	*1,840*	*43*
Late Morning	*24,570*	--	--	--	--	--	--	--
Totals	***107,496***	***18***	***9.2***	***8.9***	***0.7***	***0.2***	***5,695***	***287***
	(cf/sq. mi)	*(lbs./sq. mi)*						
Yields	***1,075***	***0.2***	***0.1***	***0.1***	***0.01***	***0.00***	***56.95***	***2.9***

Notes:
ISCO samplers are run to collect samples every hour for 24 hours during baseflow sampling.
Each 6 hour set is composited into one composite sample totaling 4 composite samples per 24 hour period.

5.6.2 Storm Event Load Compared to Total Maximum Daily Load Established for the Truckee River at Lockwood

In this section, we compare measured load to allocated load under established TMDLs for 3 constituents in the Truckee River at Lockwood: Total-N, Total-P, and TDS. Since the FY2020 sampled storms were each less than 24 hours in duration, we assumed the total storm load to approximate a daily load.

Table 5-8 shows daily load measured in stormwater runoff on November 19, 2019, in comparison to TMDLs established for the Truckee River at Lockwood.

Table 5-8 Approximate Daily Load Measured in Storm Event Runoff, November 19, 2019

Daily Loads: November 19, 2019 Stormwater Loads

	Constituents		
Monitoring Station	Total-N	Total-P	TDS
Urban Outfalls		*(lbs/day)*	
Arlington	*36*	*8.7*	*7,085*
Totals	***36***	***9***	***7,085***
Load Allocations, TMDL Truckee River at Lockwood	**500**	**80**	**780,360**
Daily Load, Percent of Load Allocation under TMDL	***7.2%***	***10.9%***	***0.9%***

Notes:

Load Allocation for the TMDLs represent the total expected or allowable load from non-point and background sources. TMDLs for Total-N, Total-P, and TDS established in 1994 (NDEP, 1994)

The approximate daily load from the Arlington urban outfall was calculated to be 36 lbs. of Total-N, 9 lbs. of Total-P, and 7,085 lbs. of TDS. The approximate daily load for Total-N and Total-P represent 7 and 11 percent of the load allocations under the Truckee River TMDL for these constituents. Daily load for TDS represents 0.9 percent of the load allocations under the Truckee River TMDL. Note that these measurements are from one outfall that totals roughly 0.32 square miles of watershed area, less than 0.05 percent of the larger urban Truckee Meadows watershed.

Table 5-9 shows daily load measured from stormwater runoff measured from three urban outfalls during the March 15, 2020 storm event and compared to TMDLs established for the Truckee River at Lockwood.

Table 5-9 Daily Load Measured from Storm Event Runoff, March 15, 2020

Daily Loads: March 15, 2020 Stormwater Loads

	Constituents		
Monitoring Station	Total-N	Total-P	TDS
Urban Outfalls		*(lbs/day)*	
Oxbow Nature Park	*1.2*	*0.2*	*45*
Arlington	*1.8*	*0.6*	*55*
Fisherman's II	*10*	*0.6*	*1,051*
Totals	***13***	***1.5***	***1,150***
Load Allocations, TMDL Truckee River at Lockwood	**500**	**80**	**780,360**
Daily Load, Percent of Load Allocation under TMDL	***2.6%***	***1.9%***	***0.1%***

Notes:

Load Allocation for the TMDLs represent the total expected or allowable load from non-point and background sources. TMDLs for Total-N, Total-P, and TDS established in 1994 (NDEP, 1994)

Approximate Total-N daily load from all three urban outfalls totaled 13 lbs.; Total-P daily load totaled roughly 1.5 lbs.; and TDS daily load totaled 1,150 lbs. Total-N load during this storm was 2.6 percent of the daily load allocations and Total-P was 1.9 percent of the daily load allocations at Lockwood. TDS load was approximately 0.1 percent of the daily load allocations for Lockwood. These small numbers are indicative of the size of the storm and low volume of run-off. Load calculated from these stations reflect contributions from approximately 5.78 square miles of urban watershed area.

Table 5-10 shows daily load measured in stormwater runoff from two urban outfalls and one major tributaries (North Truckee Drain) to the Truckee River during the April 5-6, 2020 storm event and compared to TMDLs established for the Truckee River at Lockwood.

Table 5-10 Daily Load Measured from Storm Event Runoff, April 5-6, 2020

Daily Loads: April 5-6, 2020 Stormwater Loads			
	Constituents		
Monitoring Station	Total-N	Total-P	TDS
Urban Outfalls		*(lbs/day)*	
Mary Wahl Ditch	*1.9*	*0.1*	*105*
Fisherman's II	*8.0*	*0.3*	*1,006*
Tributaries			
North Truckee Drain at Big Fish Drive	*35*	*3.3*	*8,264*
Totals	***45***	***3.7***	***9,374***
Load Allocations, TMDL Truckee River at Lockwood	**500**	**80**	**780,360**
Daily Load, Percent of Load Allocation under TMDL	***9.0%***	***4.7%***	***1.2%***

Notes:

Load Allocation for the TMDLs represent the total expected or allowable load from non-point and background sources. TMDLs for Total-N, Total-P, and TDS established in 1994 (NDEP, 1994)

Total rainfall during this storm event averaged 0.18 inches at five stations around the Truckee Meadows—a relatively small precipitation event. Total-N daily load from these 3 outfalls totaled roughly 45 lbs., equivalent to 9 percent of the load allocated under the TMDL for Total-N. Total-P daily load from the 3 outfalls totaled roughly 3.7 lbs., equivalent to 4.6 percent of the load allocated under the TMDL. TDS daily load from these stations totaled 9,374 lbs., roughly 1 percent of the load allocated under the TMDL.

5.6.3 BASEFLOW LOAD COMPARED TO TOTAL MAXIMUM DAILY LOAD ESTABLISHED FOR THE TRUCKEE RIVER AT LOCKWOOD

Summer baseflow load was measured on August 5-6, 2019. Daily load results are shown in comparison with the allocations under the TMDL in **Table 5-11**.

Table 5-11 Daily Load Measured from Baseflow in North Truckee Drain, Steamboat Creek, Boynton Slough and Yori Drain, August 5-6, 2019

Daily Loads: August 5-6, 2019 Baseflow Loads

	Constituents		
Monitoring Station	Total-N	Total-P	TDS
Tributaries		*(lbs/day)*	
Steamboat Creek at Clean Water Way	*137*	*67*	*77,302*
North Truckee Drain at Big Fish Drive	*20*	*1.7*	*5,791*
Yori Drain at Steamboat Creek	*54*	*6.9*	*9,157*
Boynton Slough at Steamboat Creek	*47*	*16*	*16,900*
Totals	***157***	***69***	***83,093***
Load Allocations, TMDL Truckee River at Lockwood	**500**	**80**	**780,360**
Daily Load, Percent of Load Allocation under TMDL	***31%***	***86%***	***11%***

Notes:

Load Allocation for the TMDLs represent the total expected or allowable load from non-point and background sources. TMDLs for Total-N, Total-P, and TDS established in 1994 (NDEP, 1994)

Totals are calculated using only Steamboat Creek at Clean Water Way and North Truckee Drain at Big Fish Drive, Yori Drain and Boynton Slough discharge into Steamboat Creek upstream of the Clean Water Way monitoring station.

Total load shown herein are calculated from Steamboat Creek at Clean Water Way and North Truckee Drain only. Boynton Slough and Yori Drain discharge into Steamboat Creek upstream of the Clean Water Way monitoring location and these loads are included in Clean Water Way load. The Total-N summer baseflow daily load from Steamboat Creek and North Truckee Drain totaled 157 lbs., equivalent to 31 percent of the load allocated under the TMDL for Total-N. The Total-P daily baseflow load totaled roughly 69 lbs., roughly 86 percent of the load allocated under the TMDL for Total-P. TDS daily baseflow load totaled 83,093 lbs., approximately 11 percent of the load allocated under the TMDL for TDS.

Daily winter baseflow load was measured from North Truckee Drain and Steamboat Creek as well as two main tributaries that discharge into Steamboat Creek, Boynton Slough and Yori Drain. The measurements are compared with TMDLs is presented in **Table 5-12** for a 24-hour period sampled February 12-13, 2020.

Table 5-12 Daily Load Measured from Baseflow in North Truckee Drain, Steamboat Creek, Boynton Slough and Yori Drain, February 12-13, 2020

Daily Loads: February 12-13, 2020 Baseflow Loads

	Constituents		
Monitoring Station	Total-N	Total-P	TDS
Tributaries		*(lbs/day)*	
Steamboat Creek at Clean Water Way	*185*	*34*	*76,742*
North Truckee Drain at Big Fish Drive	*18*	*0.7*	*5,695*
Yori Drain at Steamboat Creek	*32*	*1.2*	*5,134*
Boynton Slough at Steamboat Creek	*53*	*3.6*	*9,793*
Totals	***203***	***35***	***82,436***
Load Allocations, TMDL Truckee River at Lockwood	**500**	**80**	**780,360**
Daily Load, Percent of Load Allocation under TMDL	***41%***	***43%***	***11%***

Notes:

Load Allocation for the TMDLs represent the total expected or allowable load from non-point and background sources

TMDLs for Total-N, Total-P, and TDS established in 1994 (NDEP, 1994)

Totals are calculated using only Steamboat Creek at Clean Water Way and North Truckee Drain at Big Fish Drive,
Yori Drain and Boynton Slough discharge into Steamboat Creek upstream of the Clean Water Way monitoring station.

Totals are calculated using Steamboat Creek at Clean Water Way and North Truckee Drain only. Boynton Slough and Yori Drain discharge into Steamboat Creek upstream of the Clean Water Way monitoring location and these loads are captured in Clean Water Way load. Total-N daily baseflow load from Steamboat Creek and North Truckee Drain totaled 203 lbs., equivalent to 41 percent of the load allocated under the TMDL for Total-N. Of this daily Total-N load from Steamboat Creek, approximately 46 percent originated from Boynton Slough and Yori Drain. Total-P daily baseflow load totaled roughly 35 lbs., roughly 43 percent of the load allocated under the TMDL for Total-P. Of this daily Total-P load from Steamboat Creek, approximately 14 percent originated from Boynton Slough and Yori Drain. TDS daily baseflow load totaled about 82,436 lbs., 11 percent of the load allocated under the TMDL for TDS. Of this daily TDS load from Steamboat Creek, approximately 19 percent originated from Boynton Slough and Yori Drain. Other non-point and background sources of load can originate from other smaller tributaries in the Truckee Meadows and illicit discharges to the storm drain network.

5.7 Additional Bacteria Sampling

A separate round of bacteria sampling and analysis was requested by the City of Reno at the end of the 2020 fiscal year. Several tributaries in the Truckee Meadows are on the 303d list for excess *E.coli*. A sampling plan was designed and implemented on June 25, 2020 to target upstream and downstream locations on the main tributaries in the Truckee Meadows. Locations and results are summarized in **Table 5-13.**

Table 5-13 Selected Tributaries to the Truckee River for *E.coli* Bacteria Sampling and Analysis, June 25, 2020

Stream/Waterway	Reach (Listed as Impaired for e. coli)	Sampling Locations	Time of Sample	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Streamflow	Streamflow Source	e. coli	Remarks
				(°C)	*(µmhos/cm)*	*(at 25 °C)*	*(%)*	*(mg/L)*		*(cfs)*	*(R/E)*	*(MPN/100 mL))*	
Dry Creek	Origin to confluence with Boynton Slough	(1) Holcomb Ranch Rd.	13:45	24.8	121	122	67	4.8	7.84	*0.3*	E	**866**	
		(2) South Virginia Street	11:30	21	259	280	65	5.01	7.87	*2.0*	E	**517**	
S. Evans Creek	Origin to Highway 395	(1) Evans Creek Drive	10:49	20.5	162	177	60	4.63	7.58	*0.1*	E	44	
		(2) Kietzke Lane	11:10	19.6	139	155	61	4.9	7.71	*2.6*	E	**461**	Duplicate collected EC@Anderson Park
Steamboat Creek	Little Washoe Lake to Rhodes Road	(1) Below Little Washoe Lake (Old US HWY 395)	8:10	21.5	396	425	51	3.83	7.82	*4.0*	E	128	Water brown; very low flow
		(2) Rhodes Road	8:30	17.4	272	318	57	4.69	7.67	1.3	R	**461**	Water brown
Steamboat Creek	Rhodes Road to confluence with Truckee River	(1) Clean Water Way	12:20	26.1	580	568	122	8.6	8.70	31	R	21	
		(2) Short Lane	10:00	23.2	705	731	118	8.64	8.43	14.7	R	25	Water clear; big fish in channel
Thomas Creek	USFS boundary to Steamboat Ditch	(1) Timberland Drive	12:50	14.7	82	102	95	7.96	8.31	*3.0*	E	21	
		(2) Ventana Parkway	13:22	18.5	95	109	90	7.25	8.27	*3.0*	E	261	
		(3) Veterans Parkway	9:50	22.7	635	664	110	8.15	8.39	*2*	E	78	Water clear
		(4) South Meadows Parkway	9:30	17.0	92	108	96	7.98	7.81	1.4	R	**602**	Water slightly brown
Whites Creek	North Fork to Steamboat Creek	(1) Timberland Drive	12:40	12.6	54	70	92	8.01	7.95	*10*	E	12	
		(2) Old Virginia Way	9:12	14.4	52	65	105	9.22	7.82	3.0	R	276	Water clear
Whites Creek	Middle Fork to Steamboat Creek	(1) Sage Hill Road	8:55	16.7	189	225	46	3.84	7.07	*1.5*	E	328	Water clear; algae in channel; cows in pasture
Alum Creek		(1) Caughlin Parkway	10:07	12.4	639	843	32	2.92	4.38	*0.1*	E	1	Sample collected at Whispering Pine Way
		(2) Caughlin Park (at Truckee River)	9:38	19.6	260	290	64	5.13	8.10	*1.0*	E	84	
Chalk Creek		(1) Avenida De Landa	8:40	16.7	3490	4142	62	5.04	8.06	*0.3*	E	24	
		(2) Chalk Bluff	9:18	16.9	2245	2656	63	5.29	8.18	*1.0*	E	**602**	
North Truckee Drain		(1) above Ord Ditch	11:15	20.1	671	741	82	6.35	7.9	2.2	R	128	Water clear
		(2) Big Fish Drive	10:50	20.3	821	901	30	2.31	7.96	2.6	R	**1046**	Water brown; low flow
Yori Drain		(1) confluence with Truckee River	11:45	25.6	475	470	152	10.67	9.1	5.4	R	32	Water brown; algae upstream of culvert
Boynton Slough		(1) confluence with Truckee River	10:25	23.2	369	382	43	3.2	7.97	13.2	R	57	Water brown; big fish

Notes:

Streamflows in Italics are estimated (E)

Streamflows labled (R) were recorded by USGS, Balance Hydrologics or TMWA

Bold results exceeded WQS of S.V ≤ 410 (NAC 445a 1758, NAC 445a 1724, NAC 445a 1688

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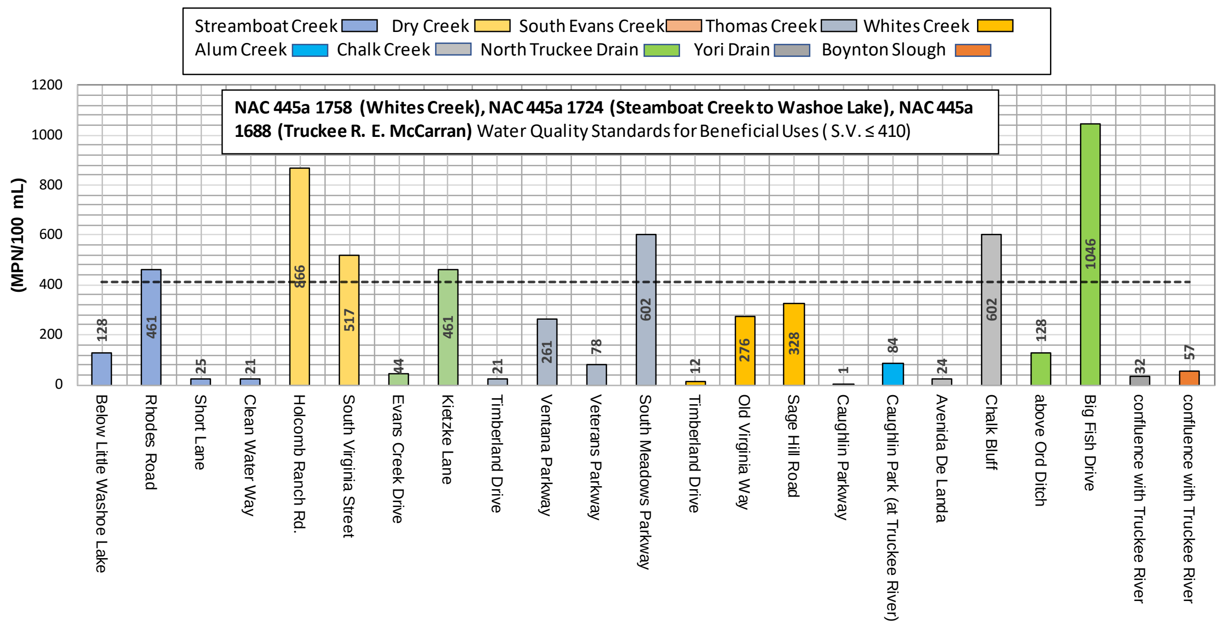
E.coli water quality standards for beneficial uses (S.V. ≤ 410 MPN/100 mL) are established on Whites Creek (NAC 445a 1758), Steamboat Creek to Washoe Lake (NAC 445a 1724) and Truckee River at East McCarran (NAC 445a 1688). Other smaller tributaries fall under these requirements, including Alum Creek and Evans Creek due to the tributary rule. Results for all samples collected and comparison to the Nevada water quality standards are shown in **Figure 5-65.** Sample locations are listed upstream to downstream for each tributary. Results show wide variability across the tributaries in the Truckee Meadows. Notably, concentrations increase upstream to downstream with the exception of Dry Creek and Steamboat Creek. Both Dry Creek samples exceeded the water quality standard for *E.coli* as did a sample collected at the Steamboat Creek at Rhodes Rd. station.

Results from this sampling campaign show only a “snapshot” of the *E.coli* concentrations in these tributaries. Further monitoring studies would help evaluate changes in concentration levels over time.



NAC 445a 1758 (Whites Creek), NAC 445a 1724 (Steamboat Creek to Washoe Lake), NAC 445a 1688 (Truckee R. E. McCarran) Water Quality Standards for Beneficial Uses (S.V. ≤ 410)

Note: Not all tributaries are subject to WQS

Figure 5-65 ***E.coli* samples from selected tributaries in the Truckee Meadows, June 25, 2020**

6 SUMMARY

This report presents results from the FY2020 monitoring year and summarizes both stormwater and baseflow conditions for selected stations in the Truckee Meadows Permit Area. Data are representative of the storm characteristics and baseflow conditions sampled and may not be characteristic of other periods that were not sampled. Furthermore, this report does not provide an analysis of trends over time, but instead captures conditions and water quality measured in FY2020.

Total annual precipitation in the Truckee Meadows in FY2020, as measured at the Reno-Tahoe International Airport, was 4.11 inches, roughly 45 percent below the long-term average of 7.40 inches. The lack of precipitation generated by storms and the amount of precipitation that fell as snow in FY2020 precluded the ability to meet the stormwater sampling goal of 2 samples per station. In FY2020 storms were uncharacteristic of the Truckee Meadows with mostly small frontal storm systems that resulted in snowfall. February, which is typically the wettest month, recorded a total of 0.04 inches at the Reno Tahoe Airport.

Total-N concentrations mostly exceeded WQS in sampled stormwater, where WQS are established. Total-N concentrations in tributary baseflow mostly exceeded WQS where WQS are established. The highest Total-N concentrations in stormwater runoff were measured at urban outfalls. The highest Total-N concentrations in baseflow were measured in the North Truckee Drain.

Total-P can be a limiting nutrient in surface waters when in excess. Single value WQS do not exist for Total-P in most of the waters monitored; however, annual averages are typically provided and suggest concentrations should not exceed between 0.05 mg/L and 0.10 mg/L over the long-term. Across all storms sampled at all stations, Total-P concentrations ranged between 0.03 mg/L and 4.2 mg/L. The highest storm event Total-P concentrations were measured at the Arlington urban outfall. Total-P concentrations in tributary baseflow ranged between 0.07 mg/L to as high as 0.43 mg/L.

TDS concentrations measured during storm events exceeded WQS in roughly half of the samples collected. Baseflow TDS concentrations exceeded WQS in samples from both North Truckee Drain stations, Chalk Creek and Alum Creek, all others were below WQS. In some cases, TDS concentrations in baseflow exceeded storm event concentrations which may suggest that irrigation returns, illicit discharges, or other sources can occur during non-precipitation runoff.

Physical and chemical parameters measured from both stormwater and baseflow also suggest that turbidity, DO, and pH can exceed WQS. DO measurements at North Truckee Drain at Big Fish Drive were low during summer baseflow conditions but all other samples were found to be within an acceptable range, including a few very high readings during winter baseflow. Also, Yori Drain has consistently exhibited very high dissolved oxygen measurements since monitoring began at that location under this program. A few pH results exceeded WQS, but the majority of pH measurements collected throughout the year were within the WQS.

Stormwater and baseflow load measured in FY2020 suggest that both stormwater urban outfalls and tributaries can contribute significant nutrient loading to receiving waters. Although few storms were sampled, load measured in FY2020 suggest that spatial scales are important, with tributaries that drain large areas typically contributing the highest load. In comparing yields, however, it becomes clear that areas with more urban land-uses typically contribute higher load from a given watershed area. For example, Industrial land use is typically found to discharge higher levels of TDS than residential or commercial land use. Yields from Yori Drain and Boynton Slough, both with predominantly urban drainage areas that discharge into Steamboat Creek, were large contributors to the overall Total-N and TDS load measured downstream in Steamboat Creek in both summer and winter baseflow samples.

7 RECOMMENDATIONS

In previous years, we recommended that this program continue to adapt to new findings and modify the program such that a nesting approach to sampling can be used to target source areas of stormwater pollution. This approach began in the Steamboat Creek Watershed. In FY2020, an additional monitoring station was installed on South Evans Creek, a tributary to Steamboat Creek (via Dry creek and Boynton Slough). We will begin sampling water quality at this station in FY2021 and suggest that the Committee begin to consider additional nested monitoring stations in the Boynton Slough watershed for future monitoring years. Separately, this could also be achieved under a Special Study.

Quantification and comparison of load and yields can assist co-permittees in the Truckee Meadows in relating these findings to areas of concern, so that appropriate management practices to improve stormwater and baseflow quality can be developed or ordinances for new development enforced.

Numerous agricultural ditch tailouts, visible on Fig. 3.1, can influence baseflow water quality in many of the tributaries monitored under this program. Improving our understanding of agricultural water ditch operations, practices, and timing of releases, would help inform water quality and water quantity seen in receiving waters. In addition, monitoring ditch water could be used to assess if the elevated load measured in baseflow originate from ditch irrigation returns.

Balance completed a special sampling campaign that evaluated bacteria samples form upstream and downstream locations at several tributaries in the Truckee Meadows. Fecal bacteria (i.e., *E.coli*, total coliform) is identified as a constituent limiting water quality in some of the stations monitored. However, holding times (6 hours) required to perform the necessary analytical methods limit when samples can be collected. In many cases, storm samples are collected at times that do not facilitate immediate delivery to the lab and analysis (i.e., weekends, evenings). As a result, bacteria are not often quantified. If additional data is desired on this constituent, we suggest a special study building on the designed and implemented sample campaign to facilitate a robust data set of bacteria counts in both storm event and baseflow samples over different time scales. The design would target storms or times that allow for the analytical holding times to be met and would be reported separately from the programmatic stormwater sampling included in this report.

8 LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice in surface-water hydrology in Nevada for projects of similar scale at the time the investigations were performed. No other warranties, expressed or implied, are made. As is customary, we note that readers should recognize that the interpretation and evaluation of factors affecting the hydrologic context of any site is a difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive or extended studies can reduce the inherent uncertainties associated with such studies.

Findings, interpretations and recommendations contained in this report are intended for the exclusive use of The Truckee Meadows Stormwater Permit Coordinating Committee, NDOT, and Western Regional Water Commission, under the conditions presently prevailing except where noted otherwise. This report and its contents have been developed solely to evaluate water quality at discrete locations in the Truckee Meadows for the sole purposes and in the context described above. Data, interpretations and analyses developed for this report may not be directly applicable to other uses. Balance Hydrologics should be consulted prior to applying the contents of this report to stormwater BMP design, drainage or flooding management or for any other purposes not specifically cited in this report.

Finally, we ask that readers who have additional pertinent information, who observed changed conditions, or who may note material errors should contact us with their findings at the earliest possible date, so that timely changes can be incorporated if deemed necessary.

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APPENDICES

APPENDIX A

Station Observer Logs

Station Observer Log:
Arlington Street (H-19)

Site Conditions				Pipe or Streamflow			Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Stage (feet)	Hydrograph (R/F/S/B)	Flow (cfs)	Streamflow Source (M, R, E)	Estimated Accuracy (e/g/f/p)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	Samples collected? (yes/no)	
2019-07-05 9:40	bt	0.13	B	--	--	--	--	--	--	--	--	--	--	no	Trickle of water coming out of culvert; diagnostic check and maintenance; first distributor arm test failed; rechecked parts and watched as second test performed--ok; all other checks ok; filled with 24 bottles and capped
2019-11-19 9:15	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	No flow in culvert; iced ISCO and set to sample anticipating 0.12 inches of rain (lowest level for the rain to runoff curve) every 43 cf >0.15 inches
2019-11-20 9:32	bt,jj	--	--	--	--	--	--	--	--	--	--	--	--	yes	Program finished-all 24 bottles sampled; download of sample events showed close sampling times and some bottles are not full while others are over full; no indication of contamination between sample bottles; all samples collected during first flush, rising limb and peak; collected falling limb (H-19 (4))on site but could be from second pulse of storm; H-19 (1) T 4.2°C, C 381, SC 633, DO 84% 9.56 mg/L, pH 7.97; H-19 (2) T 4.0°C, C 315, SC 528, DO 87% 9.74 mg/L, pH 7.49; H-19 (3) T 4.0°C, C 288, SC 481, DO 85% 9.65 mg/L, pH 7.27; H-19 (4) T 9.2°C, C 280, SC 402, DO 87% 8.69 mg/L, pH 7.35
2020-03-13 16:20	bt,jj	dry	--	--	--	--	--	--	--	--	--	--	--	no	Loaded ISCO with bottles in anticipation of weekend storm; culvert dry
2020-03-14 16:22	bt	dry	--	--	--	--	--	--	--	--	--	--	--	no	Iced ISCO; set for 0.15 inches of precipitation, 205.84 cf per sample starting >0.15; culvert is still dry
2020-03-16 14:50	bt,jj	dry	--	--	--	--	--	--	--	--	--	--	33.18, 28.91	yes	4 sample bottles collected-composited into two bottles based on hydrograph which was a small peak in flow; H-19(1) (rising limb and peak) T 2.7°C, C 75.4, SC 131.0, DO 112% 13.10, pH 8.02; H-19 (2) T 2.9°C, C 72.9, SC 126.0, DO 110% 12.92, pH 7.86

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level recorded by ISCO

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R], or estimated E

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Mary Wahl Ditch (SDOE 008936)

Site Conditions				***Pipe or Streamflow***			***Water Quality Observations***								***Remarks***
Date/Time (observer time)	Observer	Stage *(feet)*	Hydrograph *(R/F/S/B)*	Flow *(cfs)*	Streamflow Source *(M, R, E)*	Estimated Accuracy *(e/g/f/p)*	Water Temperature *(oC)*	Field Specific Conductance *(µmhos/cm)*	Adjusted Specific Conductance *(at 25 oC)*	Dissolved Oxygen *(%)*	Dissolved Oxygen *(mg/L)*	pH	Turbidity *(NTU)*	Samples collected? *(yes/no)*	
2019-07-05 10:55	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	Ran diagnostic checks and maintenance; all checks ok; filled with 24 bottles and capped
2019-11-19 10:10	bt	0.12	b	--	--	--	--	--	--	--	--	--	--	no	ISCO level readings were inconsistent with actual water depth; reset water depth on ISCO; probe was clear of debris; water clear; changed battery; reset clock for DLS; iced and set ISCO to sample every 2588 cf anticipating 0.07 inches of rain starting at >0.25
2019-11-20 8:45	bt,jj	0.15	--	--	--	--	--	--	--	--	--	--	--	no	Only one sample bottle full; light drizzle continuing but no more measurable precipitation expected; intake is covered with plastic bags; flows very low; capped bottles and dumped ice; turned ISCO off; download shows negative velocity readings-possibly related to low flows, trash or backwater
2019-03-13 13:30	bt,jj	--	--	--	--	--	--	--	--	--	--	--	--	no	Filled ISCO with bottles in anticipation of a storm over weekend; intake was covered in sediment; adjusted the intake arm to uncover probe; very low flow in culvert and intake on top of sediment and dry; set ISCO level at 0.0
2020-03-14 17:01	bt	0.03	--	--	--	--	--	--	--	--	--	--	--	no	Set ISCO to sample every 4237 cf starting >0.15ft with anticipation of 0.15 inches of precipitation run-off (possibly snow run-off)
2020-03-16 16:36	bt,jj	--	--	--	--	--	--	--	--	--	--	--	--	no	No samples collected; ground/dirt is dry around JOBOX; capped bottles and turned off ISCO
2020-04-04 15:42	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	Outfall clean of garbage and probe is sitting on top of sediment-some low flow in culvert but probe is dry; set ISCO to sample 5896 cf/ sample > 0.15 ft depth for forecast of 0.25 inches of rain
2020-04-06 12:00	bt,jj	--	--	--	--	--	--	--	--	--	--	--	--	yes	2 bottles collected; downloaded data showed a storm hydrograph; grab sample collected for falling limb; low flow and grab sample took four tries to fill bottle with ISCO; split into 3 composite bottles and only filled the 1 liter bottle; SDOE008936 (1) T 3.4°C, C 442, SC 732, DO 96% 11.1 mg/l, pH 8.21; SDOE008936 (2) T 3.0°C, C 175, SC 301, DO 97% 11.38 mg/l, pH 8.45; SDOE008936 (3) T 8.2°C, C 169, SC 249, DO 87% 8.98 mg/l, pH 8.31; capped bottles and cleared ice
2020-05-17 8:58	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	Forecast is calling for 0.2 of rain; set ISCO to sample flow pacing every 5100cf/sample >0.15 ft; intake is dry and there is some standing water in the culvert
2020-05-29 16:30	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	No flow in culvert; set ISCO to sample flow paced 4100cf/sample estimated for <0.20 inches of rain; thunderstorms and showers forecast overnight
2020-05-30 14:03	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	No samples collected; capped bottles and turned off ISCO

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level recorded by ISCO

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), baseflow (B), or backwater (BW)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R], or estimated E

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log: Fishermans Park II (D-16)

Site Conditions				Pipe or Streamflow			Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Stage	Hydrograph	Flow	Streamflow Source	Estimated Accuracy	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	(R/F/S/B)	(cfs)	(M, R, E)	(e/g/f/p)	(oC)	(µmhos/cm)	(at 25 oC)	(%)	(mg/L)		(NTU)	(yes/no)	
2019-07-05 10:27	bt	0.06	B	--	--	--	--	--	--	--	--	--	--	no	Diagnostic checks and maintenance; all checks ok; visual inspection of intake and probe ok; filled with 24 bottles and capped
2019-11-19 9:45	bt	--	B	--	--	--	--	--	--	--	--	--	--	no	No flow in outfall; iced and set ISCO to sample every 1440 cf starting at >0.15 inches anticipating 0.07 inches of rain; replaced battery and rest clock for DLS.
2019-11-20 9:07	bt,jj	--	B	--	--	--	--	--	--	--	--	--	--	no	Only one sample bottle collected; capped bottles and dumped ice; trickle of flow out of outfall; discarded only sample bottle; download showed only negative velocity; contacted Nick Brothers City of Reno re: ordering new velocity probe
2020-03-13 10:30	bt,jj	--	dry	--	--	--	--	--	--	--	--	--	--	no	Removed ISCO stage/velocity probe and replaced with new probe; reinstalled the metal plate and intake hose; filled the ISCO with bottles anticipating storm over the weekend; battery is 12.7V; set new probe at 0.0; trickle of water in the culvert
2020-03-14 16:45	bt	--	dry	--	--	--	--	--	--	--	--	--	--	no	Set ISCO flow paced for 0.15 inches of precipitation, 3400 cf per sample starting >0.15 ft.
2020-03-16 15:34	bt,jj	--	trickle	--	--	--	--	--	--	--	--	--	62.94, 67.73, 90.27, 51.46	yes	15 sample bottles collected; D-16 (1) T 2.4°C, C 772, SC 1355, DO 125% 14.73 mg/l, pH 7.90; D-16 (2) T 2.4°C, C 378, SC 665, DO 124% 14.73 mg/l; D-16 (3) T 2.5°C, C 266, SC 466, DO 124% 14.75 mg/l, pH 8.13; D-16 (4) T 2.8°C, C 227, SC 394, DO 121% 14.28 mg/l, pH 8.07
2020-04-04 14:45	bt,jj	0.03	S	--	--	--	--	--	--	--	--	--	--	no	Installed new intake guard on intake tube; very low water flow (trickle); set ISCO to sample every 5864 cf starting >0.15 depth for forecast of 0.25 inches of precipitation
2020-04-06 10:53	bt,jj	0.09	S	0.10	R	g/f	--	--	--	--	--	--	123.2, 189.0, 136.2, 85.83	yes	7 samples collected; grab sample for falling limb; water still flowing steady at low level; processed samples into 4 composite bottles: D-16 (1) T 2.6°C, C 599, SC 1051, DO 103% 12.17 mg/l, pH 8.84; D-16 (2) T 3.2°C, C 290, SC 496, DO 97% 11.26 mg/l, pH 8.94; D-16 (3) T 3.2°C, C 279, SC 478, DO 98% 11.34 mg/l, pH 8.86; D-16 (4) T 5.4°C, C 640, SC 1021, DO 98% 10.77 mg/l, pH 8.15

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level recorded by ISCO

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R], or estimated E

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Oxbow Nature Park (C-24)

Site Conditions				Pipe or Streamflow			Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Stage	Hydrograph	Flow	Streamflow Source	Estimated Accuracy	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, R, E)*	*(e/g/f/p)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-07-05 9:15	bt	0.19	B	0.35	R	--	--	--	--	--	--	--	--	--	Diagnostic check and maintenance; all tests ok; visual inspection of the intake and probe ok; replaced battery; filled with 24 bottles and capped; light flow in culvert
2019-11-19 8:59	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	Gate has new lock and City of Reno lock has been removed; contacted Nick Brothers for City of Reno to get access
2019-11-19 11:08	bt	0.12	B	--	--	--	--	--	--	--	--	--	--	no	Iced ISCO and set to sample every 254 cf starting at >0.22 ft with forecast of 0.07 inches of rain; visual inspection of instrument verifies clear of debris
2019-11-20 10:55	bt, jj	--	--	--	--	--	--	--	--	--	--	--	--	no	Nuisance flow increased stage to starting threshold but sampler could not pull water and tried to sample all 24 bottles; storm hydrograph was not sampled due to this error
2020-03-13 16:59	bt, jj	--	--	--	--	--	--	--	--	--	--	--	--	no	Loaded ISCO with bottles in anticipation of storm; new fence installed and is very hard to open; trickle of water in culvert; set ISCO level to 0.05
2020-03-14 15:51	bt	0.05	B	--	--	--	--	--	--	--	--	--	--	no	Set ISCO to sample for 0.15 inches of precipitation-this estimate is based on information from NWS regarding the amount of potential run-off prior to snow; 714 cf per sample starting >0.15 ft
2020-03-16 13:44	bt,jj	--	--	--	--	--	--	--	--	--	--	--	37.06, 48.85, 35.44, 34.15	yes	24 samples collected; processed 4 through 15 for composites based on hydrograph; C-24 (1) T 2.2°C, C 65.3, SC 115, DO 90% 10.55 mg/l, pH 8.82; C-24 (2) T 2.5°C 61.7, SC 108.2, DO 89% 10.5 mg/l, pH 8.63; C-24 (3) T 2.7°C, C 59.8, SC 103.7, DO 90% 10.54 mg/l, pH 8.50; C-24 (4) T 3.0°C, C 63.9, SC 110.3, DO 91% 10.65 mg/l, pH 8.25
2020-04-04 14:00	bt,jj	0.05	S	--	--	--	--	--	--	--	--	--	--	no	Set ISCO to sample for 0.25 inches of precipitation-this estimate is based on information from NWS; 1607 cf per sample starting >0.15 ft
2020-04-06 10:20	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	Did not sample; capped bottles and turned off ISCO
2020-05-17 8:23	bt	0.18	S	0.25	R	f	--	--	--	--	--	--	--	no	Forecast is projecting 0.2 inches of precipitation between 11:00 5/17 and 11:00 5/18; set ISCO to sample flow paced collecting every 1165cf/sample >0.25 ft.; visual inspection-low flow over intake
2020-05-18 15:00	jj	--	--	--	--	--	--	--	--	--	--	--	--	no	No samples collected; turned off ISCO
2020-05-29 15:58	bt	0.12	S	--	--	--	--	--	--	--	--	--	--	no	Forecast for thunderstorms and possible showers overnight; set flow paced estimated 950cf/sample for >0.2 inches of rain
2020-05-30 13:39	bt	--	--	--	--	--	--	--	--	--	--	--	--	no	No samples collected; no rain in Reno overnight; very few scattered thunderstorms; no measured precipitation at most gages-Wolf Creek 0.03 inches

Observer Key: (bt) is Ben Trustman, (jj) is jack Jacquet

Stage: Water level recorded by ISCO

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R], or estimated E

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Thomas Creek at South Meadows Pkwy (TC@SMP)

Site Conditions					Streamflow					Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Old Stage	New Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(feet)*	*(R/F/S/B)*	*(cfs)*	*(M, R)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-08-06 10:54	bt		4.34	S	1.6	M	g	--	--	16.9	103	122	103	8.6	7.97	12.27	yes	Ambient water quality sample collected at 11:18; lots of vegetation around and in channel; water is slightly brown; fines on the channel bed
2019-09-20 12:50	bt,lg		5.02	S	7.4	M	g/f	--	--	11.5	96	129	108	10.4	8.29	--	no	Water turbid-could not see probe when collecting measurement; high flow; lots of vegetation in the channel
2019-11-15 10:44	bt,lg		4.80	S	1.0	M	g	--	--	6.4	70	108	99	10.5	8.49	--	no	Large trout in stream; slow velocity with lots of vegetation in channel; overgrown with grasses at edge of channel; no leaf dams
2020-01-08 11:26	bt		4.99	S	3.7	M	g	--	--	--	--	--	--	--	--	--	no	Water clear and cold; vegetation on bank is dead; beaver dam still intact downstream; In-Situ data check ok
2020-02-13 10:57	bt		4.36	S	3.0	M	g	--	--	-0.4	56	103	103	13.4	7.90	8.24	yes	Water clear; ice in channel; vegetation is dead; beaver dam downstream of gage has been removed and the channel is clear of debris; water only flowing out of the left culvert upstream; ambient baseflow sample collected at 11:20; duplicate sample processed and named TC@WEN 11:45
2020-04-16 11:20	bt		4.26	S	2.0	M	g	--	--	7.8	71	105	81	8.5	5.59	--	no	Water clear; no debris in channel; downstream channel clear of beaver dams; used a pH strip to verify pH-strip indicated water was in the 4-6 pH range
2020-05-18 11:27	bt.jj		4.39	F	--	--	--	--	--	--	--	--	--	--	--	--	no	Arrived at gage with light intermittent rain; downloaded logger to look at hydrograph before deciding to sample
2020-05-18 12:00	bt.jj		4.35	F	3.2	M	g	--	--	9.2	76	109	99	9.7	7.93	13.35	yes	Water clear; small amount of precipitation in upper watershed; 0.03 inches at Thomas Creek at Foothill Rd and 0.1 inches at Galena
2020-06-07 21:50	bt		4.20	F	--	--	--	--	--	9.1	71	103	96	9.6	7.73	14.23	yes	Rained in upper watershed earlier; rained at gage at 20:30; water is clear; no indication of increased flow; streets are wet but no visible runoff; sample collected at 21:55
2020-06-23 13:56	bt		4.06	S	1.4	M	g	--	--	23.1	110	113	94	7.0	7.84	--	no	Vegetation is lush; no grasses in the channel; water is slightly brown
2020-06-25 9:22	bt		4.07	S	1.4	R	g	--	--	17.0	92	108	96	7.9	7.81	--	yes	Bacteria sample collected at 9:30; water slightly brown

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet, (lg) is Lynell Garfield

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Alum Creek at Truckee River (AC@TR)

Site Conditions				*Streamflow*					*Water Quality Observations*								*Remarks*
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, R)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-08-06 8:16	bt	1.33	S	0.90	M	g	--	--	17.8	316	366	92	7.8	7.90	17.44	yes	Ambient sample collected at 8:45; Baseflow conditions; water clear; lots of fine sediment on the channel bed
2020-01-26 7:30	bt	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry run for storm; projected radar showed cell possibly going over Reno
2020-02-13 9:35	bt	0.42	B	0.19	M	f	--	--	-0.40	489	952	111	14.3	7.72	0.16	yes	Leaf dam at the top of gaging pool; cleared before measuring flow; water clear; creek is frozen upstream of gage; broke layer of ice to measure flow; ambient baseflow sample collected at 10:10
2020-05-18 10:19	bt,jj	0.51	F	1.84	M	g/f	--	--	11.2	170	231	99	8.9	8.24	13.31	yes	Water clear; very little precipitation in at gage but some in upper watershed; Hunter Creek showed ≈4 cfs rise; sample collected at 10:10
2020-06-25 9:38	bt	0.50	B	1.00	E	p	--	--	19.6	260	290	64	5.1	8.10	--	yes	Bacteria sample collected

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Alum Creek at Mayberry Drive (AC@MAB)

Alum Creek at Mayberry Drive

Site Conditions				***Streamflow***					***Water Quality Observations***								***Remarks***
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, R)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(μmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-08-06 9:08	bt	4.240	S	0.98	M	g	--	--	18.5	335	382	96	7.7	7.97	--	Yes	Water turbid; close to baseflow; lots of debris build up in the trees from high flows; vegetation is green; ambient sample collected at AC@TR
2019-09-20 15:38	bt	4.33	S	1.41	M	g	--	--	16.2	237	297	105	9.21	8	--	no	Water is milky; moderate flow compared to baseflow; vegetation is still green
2019-11-15 9:15	bt,lg	4.1	B	0.14	M	g	--	--	6.4	642	994	97	10.29	8.19	--	no	Clear water; heavy leaf matter in stream, but no leaf dam; low flow; no rain since September
2020-01-08 14:13	bt	4.14	B	0.30	M	g	--	--	--	--	--	--	--	--	--	no	Water clear; no debris in channel; baseflow; In-Situ data check ok
2020-04-16 14:14	bt	4.16	B	0.23	M	g	--	--	17.5	839	980	98	8.2	7.52	--	no	Water clear; baseflow conditions; willows just starting to bud; installed barometer from Chalk Creek site on top of staff plate with separate piece of PVC and cap and lock (2007 key)-note did not restart the barometer so it still has the CC@CB Baro name in WinSitu program
2020-06-06 13:32	bt	4.31	S	1.15	M	g	--	--	18.5	231.5	264.6	95	7.58	7.68	--	no	Water brown; can barely see channel bed; vegetation leafed out and grasses are green; downloaded logger and renamed Baro logger Alum Creek Baro
2020-06-23 15:44	bt	4.36	S	1.52	M	g	--	--	24.6	277	280	94	6.83	8.01	--	no	Water is brown; vegetation lush; no debris in channel

Observer Key: (bt) is Ben Trustman (jj) is Jack Jacquet, (lg) is Lynell Garfield

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Chalk Creek at Chalk Bluff (CC@CB)

Site Conditions				*Streamflow*					*Water Quality Observations*								*Remarks*
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, E)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-08-06 9:50	bt	4.16	B	--	M	f	--	--	16.4	2535	3034	100	8.3	8.21	9.1	yes	Ambient water quality sample collected at 10:15; Overgrown vegetation in channel; difficult measurement due to abundance of vegetation; water clear; fines on channel bed in gage pool; beaver dam built up in pool just upstream of gage
2019-09-20 16:41	bt	5.20	B	--	--	--	--	--	14.1	2421	3060	85	7.7	7.86	--	no	Beaver dam moved to the downstream end of the gage pool; Evidence of hi flow on flood plain; flow from recent events have created side channel around the dam onto the banks downstream of pool; gage pool is over a foot deeper than previous visit in August; some discharge at the bottom of the Beaver dam and a trickle over the top; gage pool is expanding into the grasses
2020-02-13 8:40	bt	--	B	0.49	M	f/p	--	--	2.7	1811	3155	101	11.9	7.50	1.5	yes	Beaver dam intact; water diverted around in several channels; beaver dam upstream of gage has sent water to the right side of the gage pool and that water is flowing into the stream ; measured flow in the small section of channel downstream of the beaver dam' difficult to measure flow; right edge of water was flow from right bank channel from upstream beaver dam estimated <0.1cfs; water clear; ambient baseflow sample collected at 9:10
2020-06-25 9:18	jj	--	B	1.00	E	p	--	--	16.9	2245	2656	63	8.0	5.29	--	yes	Bacteria sample collected

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or weir equation [E]; V-notch weir equation used: Q = ; Rectangular weir equation = Q = 3.33LH^1.5

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Evans Creek@Kietzke Lane (EC@KL)

Site Conditions				***Streamflow***					***Water Quality Observations***								***Remarks***
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, E)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2020-05-11 12:39	bt,jj	4.26	S	2.61	M	g/f	--	--	18.1	171	197	102	8.2	5.95	--	no	Installed new gage; logger started at 12:45; water slightly brown but can see channel bed; some woody debris in channel but not affecting flow; low pH was verified using pH strip (5-6 range)
2020-06-06 12:00	bt	4.19	S	1.74	M	g	--	--	17.3	151	171	78	6.4	7.78	--	no	Water slightly brown; grasses on banks are growing in
2020-06-23 14:49	bt	4.12	S	1.26	M	g	--	--	24.4	232	235	82	5.9	7.72	--	no	Water slightly brown; grasses and vegetation are lush downstream of gage; gage is shaded
2020-06-25 11:10	jj	4.26	S	*2.60*	E	p	--	--	19.6	139	155	61	4.9	7.71	--	yes	Bacteria sample collected

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or weir equation [E]; V-notch weir equation used: Q = ; Rectangular weir equation = Q = 3.33LH^1.5

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Whites Creek at Old Virginia Hwy (WC@OVH)

Site Conditions				*Streamflow*					*Water Quality Observations*								*Remarks*
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(meters)	*(R/F/S/B)*	*(cfs)*	*(M, R)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-08-05 11:25	bt	--	--	--	--	--	--	--	12.6	50.5	66.6	109.0	10.0	7.8	14.6	yes	Ambient water quality sample collected at 11:30; water is slightly brown; moderate flow
2020-02-12 12:32	bt	0.97 (TROA)	R	5.7	R	g	--	--	0	46.0	87.0	106.0	13.6	7.7	10.0	yes	Water is slightly cloudy; low flow; no debris in weir or at culvert at highway; ambient baseflow sample collected at 12:40
2020-05-18 12:35	bt	0.77 (TROA)	R	4.0	R	g	--	--	8.5	54.0	78.7	100.0	10.0	7.8	10.8	yes	Rain in upper watershed last 24 hours; storm water sample collected at 12:35
2020-06-07 22:20	bt	0.55 (TROA)	R	2.4	R	f	--	--	6.2	40.0	63.0	101.0	10.8	8.0	8.8	yes	Rain in upper watershed and at gage at 21:00; water clear and does not look elevated; measured flow at culvert 0.987 cfs
2020-06-25 9:08	bt	0.63 (TROA)	R	3.0	R	g	--	--	14.4	52.0	65.0	105.0	9.2	7.8	--	yes	Bacteria sample collected at 9:12; water clear

Observer Key: (bt) is Ben Trustman

Stage: Water level recorded by TROA

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Steamboat Creek at Rhodes Road (SBC@RR)

Site Conditions				Streamflow					Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, R)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*	
2019-08-05 11:00	bt	1.13	B	18.8	USGS	p	--	--	17.2	243	286	107	8.8	8.24	27	yes	Ambient water quality sample collected at 11:05; water brown; moderate flow; big tall white top on bank
2020-02-12 12:03	bt	0.88	B	9.3	USGS	p	--	--	4.1	155	259	110	12.6	7.79	6	yes	Water slightly cloudy; adjacent field and vegetation cleared and new fence has been installed with a gate; ambient baseflow sample collected at 12:15
2020-06-25 8:30	bt	0.49	B	1.3	USGS	p	--	--	17.4	272	318	57	4.69	7.67	--	yes	Bacteria sample collected; water brown

Observer Key: (bt) is Ben Trustman

Stage: Water level recorded by USGS

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Steamboat Creek at the Narrows (SBC@NAR)

Site Conditions				*Streamflow*					*Water Quality Observations*									*Remarks*
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?		
		(feet)	*(R/F/S/B)*	*(cfs)*	*(M, R)*	*(e/g/f/p)*	*(feet)*	*(M/D/YY)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(%)*	*(mg/L)*		*(NTU)*	*(yes/no)*		
2019-08-05 11:56	bt	0.04	B	30.5	USGS	p	--	--	26.1	652	638	123	8.6	8.55	26	yes		Water brown; 7 inch bullfrog floated by while sampling; mix of green and dry vegetation on bank in restoration zone
2020-02-12 13:32	bt	-0.18	B	20.1	USGS	p	--	--	11.0	598	817	122	11.8	8.07	20	yes		Water is brown; some foamy bubbles in the center culvert; ambient baseflow sample collected at 13:40
2020-06-25 10:00	bt	-0.24	B	14.7	USGS	p	--	--	23.2	705	731	118	8.6	8.43	--	yes		Bacteria sample collected; water clear; big fish in channel

Observer Key: (bt) is Ben Trustman

Stage: Water level recorded by USGS

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Steamboat Creek at Clean Water Way (SBC@CWW)

Site Conditions				Streamflow					Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Stage	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	(R/F/S/B)	(cfs)	(M, R)	(e/g/f/p)	(feet)	(M/D/YY)	(oC)	(µmhos/cm)	(at 25 oC)	(%)	(mg/L)		(NTU)	(yes/no)	
2019-07-05 11:17	bt	5.5	B	119	USGS	p	--	--	19.1	320	361	108	8.8	8.03	--	no	NDOT WQ: T 19.16°C, SC 394, DO 100% 7.77 mg/l, pH 8.24, Turb 25.1 NTU; ran diagnostics and maintenance; all checks ok; hundreds of birds in nests under the bridge
2019-08-05 9:25	bt	4.77	B	53	USGS	p	--	--	20.4	483	529	96	7.49	8.42	--	no	Set ISCO to sample every hour starting at 12:00 450ml/sample
2019-08-06 14:50	bt	4.69	B	48.1	USGS	p	--	--	25.1	589	587	142	10.08	8.64	38.41, 25.06, 30.37, 33.64	yes	Process 24 samples for ambient sampling; SBC@CWW (1) T 24.8°C, C 571, SC 574, DO 68% 6.06 mg/l, pH 8.56, SBC@CWW (2) T 25.3°C, C 572, SC 569, DO 7871% 5.00 mg/l, pH 8.64, SBC@CWW (3) T 25.8°C, C 574, SC 565, DO 71% 4.97 mg/l, pH 8.59, SBC@CWW (4) T 27.8°C C 612, SC 581, DO 67% 4.56 mg/l, pH 8.50;
2020-02-12 9:50	bt	4.47	B	32.5	USGS	p	--	--	4.2	478	793	104	12.1	7.43	--	no	NDOT WQ: T 4.1°C, SC 773, DO 104% 11.77mg/l, pH 8.41, NTU 9.87; water is low and cloudy; set ISCO for baseflow ambient sampling to start at 12:00 480ml/hr.
2020-02-13 14:15	bt	4.5	B	34.1	USGS	p	--	--	7.9	528	784	127	13.3	8.46	31.18, 21.38, 23.09, 17.92	yes	16 samples collected; error for bottles 17 through 23 possibly due to ice; sample bottle 24 was full indicating pump errors; ice on top of the collected samples; SBC@CWW (1) T 2.8°C, C 457, SC 788, DO 83% 9.33 mg/l, pH 8.40, SBC@CWW (2) T 4.5°C, C 471, SC 773, DO 83% 9.35 mg/l, pH 8.41, SBC@CWW (3) T 3.8°C, C 478, SC 801, DO 85% 9.65 mg/l, pH 8.41, SBC@CWW (4) T 9.0°C C 535, SC 769, DO 88% 8.82 mg/l, pH 8.34; SBC@CWW (4) is just bottle 24 sampled at 11:00; NDOT WQ: T 8.2°C, SC 754, DO 132% 13.38mg/l, pH 8.48, NTU 10.1
2020-03-13 15:34	bt,jj	4.59	B	37.8	USGS	p	--	--	13.6	477	609	145	13.2	8.19	12.54 (NDOT)	no	Loaded ISCO with bottles; NDOT WQ sonde T14.12°C, SC 691, DO 121% 10.72 mg/l, pH 8.28
2020-04-04 17:00	bt	4.55	B	35.6	USGS	p	--	--	9.6	486	690	102	10.2	8.31	--	no	Iced ISCO and set to sample every hour starting 4/5/20 at 15:00; NDOT WQ sonde T10.0°C, SC 699, DO 93% 9.09 mg/l, pH 8.26
2020-04-05 12:30	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-- Reset ISCO to start sampling at 20:00
2020-04-05 17:40	bt	4.51	B	33.50	USGS	p	--	--	--	--	--	--	--	--	--	--	Call to NWS Reno confirms precipitation will likely come through region later as snow; reset sampler to start at 2:00 4/6/20
2020-05-17 9:53	bt	4.79	S	53.70	USGS	p	--	--	14.1	466	589	92	7.9	7.52	--	no	NDOT water quality not working; set ISCO manually to start at 1:00 on 5/18/20 sampling every hour; water is brown
2020-05-18 8:58	bt	4.83	S	56.20	USGS	p	--	--	--	--	--	--	--	--	--	no	No measurable rain in Reno; rain shadow kept front from spilling over; turned off ISCO and capped bottles
2020-05-29 16:46	bt	4.79	S	53.70	USGS	p	--	--	--	--	--	--	--	--	--	no	Iced and uncapped bottles to sample every hour starting at 06:00 on 5/30/20
2020-05-30 14:15	bt	4.80	S	54.30	USGS	p	--	--	--	--	--	--	--	--	--	no	Dumped samples due to no storm response; capped and closed ISCO
2020-06-25 12:15	bt	4.46	S	31.00	USGS	p	--	--	26.1	580	568	122	8.6	8.70	--	yes	Bacteria sample only collected at 12:20; duplicate sample collected and labeled SBC@TR 12:30; water is brown; NDOT sonde is not working

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level recorded by USGS

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
North Truckee Drain at Big Fish Dr (NTD@BFD); USGS 10348295

Site Conditions				*Streamflow*					*Water Quality Observations*								*Remarks*
Date/Time (observer time)	Observer	Stage *(feet)*	Hydrograph *(R/F/S/B)*	Streamflow *(cfs)*	Streamflow Source *(M, R)*	Estimated Accuracy *(e/g/f/p)*	High-water Mark *(feet)*	HWM date? *(M/D/YY)*	Water Temperature *(oC)*	Field Specific Conductance *(µmhos/cm)*	Adjusted Specific Conductance *(at 25 oC)*	Dissolved Oxygen *(%)*	Dissolved Oxygen *(mg/L)*	pH	Turbidity *(NTU)*	Samples collected? *(yes/no)*	
2019-07-05 12:50	bt	3.19	B	2.70	USGS	p	--	--	21.3	753	810	80	6.3	8.46	--	no	Tested pump-ok; left charged battery in box
2019-08-05 9:51	bt	2.65	B	3.07	USGS	p	--	--	19.0	609	689	66	5.3	7.95	--	no	Set ISCO to sample every hour starting at 12:00 400ml/sample; lots of vegetation on bank water is brown; USGS staff plate is dry
2019-08-06 15:38	bt	2.62	B	2.82	USGS	p	--	--	24.8	1031	1035	77	6.5	8.07	39.65, 29.47, 20.39	yes	Ambient samples collected every hour for 24 hours (NTD@BFD(1)): T 24.7°C, C 970, SC 983, DO 68% 4.81 mg/L , pH 8.41; (NTD@BFD (2)): T 26.3°C, C 946, SC 921, DO 74% 5.16 mg/L, pH 8.40; (NTD@BFD(4)): T 26.9°C, C 1031, SC 995, DO 62% 4.66 mg/L, pH 8.19; Bottles from 23:00 to 05:00 did not have a water sample possibly due to low stage; intake tube is at lowest setting
2020-02-12 10:30	bt	2.91	B	1.29	USGS	p	--	--	2.5	1013	1721	92	11.0	7.73	--	no	Debris is racked up on our intake assembly; USGS staff plate is dry; water is brown and very low flow; water looks stagnant with film on top; algae on grasses in channel; set ISCO for baseline ambient sampling to start at 12:00 400 ml/hr.
2020-02-13 15:15	bt	2.93	B	1.36	USGS	p	--	--	6.5	1124	1738	145	15.6	8.68	59.66, 31.43, 19.63	yes	18 sample bottles collected; errors possibly due to ice; battery checked and was at 12.2V; NTD@BFD(1): T 5.9°C, C 1111, SC 1738, DO 103% 11.07 mg/L , pH 8.42; NTD@BFD (2): T 6.5°C, C 1162, SC 1799, DO 100% 10.72 mg/L, pH 8.57; NTD@BFD (3): T 7.1°C, C 1182, SC 1796, DO 88% 9.17 mg/L, pH 8.58; film on the surface of the water with algae
2020-03-13 16:04	bt	2.87	B	0.72	USGS	p	--	--	12.3	1345	1778	164	15.2	8.46	--	no	Loaded ISCO with bottles; very low flow; water brown
2020-04-04 16:00	bt	2.75	B	0.45	USGS	p	--	--	10.0	1249	1742	123	11.9	8.58	--	no	Water is brown; dead cattails in channel; loaded ISCO with bottles and iced; set to sample every 40 minutes starting at 12:00 on 4/5/20
2020-04-05 11:35	bt	2.78	B	0.51	USGS	p	--	--	--	--	--	--	--	--	--	--	Raining through Reno-just starting to rain at gage; reset ISCO to start sampling at 13:00
2020-04-05 12:30	bt	2.77	B	0.49	USGS	p	--	--	--	--	--	--	--	--	--	--	Rain has stopped and forecast has adjusted spillover time; reset ISCO to start at 16:00
2020-04-05 17:40	bt	2.76	B	0.47	USGS	p	--	--	--	--	--	--	--	--	--	--	Call to NWS Reno confirms precipitation will likely come through region later and as snow; reset sampler to start at midnight
2020-04-07 10:15	jj	3.49	B	3.71	USGS	p	3.65	2020-04-06	8.8	728	1056	90	9.2	8.45	20.49, 12.16, 18.58, 30.33	yes	24 samples collected, 22 samples used to process composites:NTD@BFD (1) T 6.4°C, C 1100, SC 1708, DO 95% 10.17 mg/l, pH 8.88; NTD@BFD (2) T 6.6°C, C 906, SC 1396, DO 95% 10.21 mg/l, pH 8.75; NTD@BFD (3) T 6.8°C, C 794, SC 1217, DO 97% 10.31 mg/l, pH 8.61; NTD@BFD (4) T 7.8°C, C 608, SC 907, DO 94% 9.87 mg/l, pH 8.66; water is turbid; significant debris downstream of gage; still visual flow; ISCO turned off
2020-05-17 11:26	bt	2.55	B	0.23	USGS	p	--	--	16.5	1205	1439	82	6.7	8.53	--	no	Iced ISCO and set to sample starting at 23:00 collecting every hour; forecast is calling for 0.2 inches of precipitation in next 24 hours
2020-05-18 8:16	bt	2.54	B	0.22	USGS	p	--	--	--	--	--	--	--	--	--	no	No measurable rain in Reno; rain shadow kept front from spilling over; turned off ISCO and capped bottles
2020-05-29 17:20	bt	3.53	B	9.80	USGS	p	--	--	--	--	--	--	--	--	--	no	Set ISCO to sample every hour starting at 04:00 on 5/30/20; USGS staff plate is wet; increased flow is not due to precipitation
2020-05-30 14:49	bt	3.48	B	9.12	USGS	p	--	--	--	--	--	--	--	--	--	no	Dumped bottles due to no storm; turned off ISCO
2020-06-25 10:44	bt	2.74	B	2.58	USGS	p	--	--	20.3	821	901	30	2.3	7.96	--	yes	Bacteria sample collected at 10:50; low flow; water brown; USGS staff plate is dry

Observer Key: (bt) is Ben Trustman, (jj) is Jack jacquet

Stage: Water level recorded by USGS

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
North Truckee Drain at Orr Ditch (NTD@ORD); USGS 10348245

Site Conditions					Streamflow					Water Quality Observations									Remarks
Date/Time (observer time)	Observer	Stage	Hydrograph	Rainfall	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	(R/F/S/B)	(in.)	(cfs)	(M, R)	(e/g/f/p)	(feet)	(M/D/YY)	(oC)	(µmhos/cm)	(at 25 oC)	(%)	(mg/L)		(NTU)	(yes/no)	
2019-08-05 10:20	bt	1.69	B	--	2.2	USGS	p	--	--	17.4	904	1057	94	7.7	7.93	12	yes	Ambient water quality sample collected at 10:25; water is slightly brown; low flow; lots of vegetation in channel
2020-02-12 11:05	bt	1.54	B	--	0.8	USGS	p	--	--	3.5	1200	2023	113	13.5	7.69	4	yes	Water clear; some garbage and plant debris in the channel; ambient baseflow sample collected at 11:15
2020-04-06 13:25	bt,jj	1.62	F	--	1.6	USGS	p	3.13	2020-04-06	10.2	1066	1486	116	11.3	8.48	24	yes	Falling limb sample collected at 13:30; water is brown but can see channel bed; stream responded to precipitation just after midnight
2020-06-25 11:06	bt	1.70	B	--	2.2	USGS	p	--	--	20.1	671	741	82	6.4	7.90	--	yes	Bacteria sample collected at 11:15; water clear

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level recorded by USGS

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Preliminary and subject to revision

Station Observer Log:
Boynton Slough at Steamboat Creek (BS@SBC)

Site Conditions					Streamflow					Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Original Stage	New Stage (pillar)	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	(feet)	(R/F/S/B)	(cfs)	(M, R)	(e/g/f/p)	(feet)	(M/D/YY)	(oC)	(µmhos/cm)	(at 25 oC)	(%)	(mg/L)		(NTU)	(yes/no)	
2019-07-05 11:45	bt	--	4.22	B	--	--	--	--	--	23.2	386	399	88	6.8	8.12	--	no	NDOT WQ: T23.5°C, SC 420, DO 85% 6.12mg/l, pH 8.56, Turb 6.09 NTU; stage reading from NDOT logger; staff plate is dirty at water level could not accurately read; ran diagnostics and maintenance; all checks ok; WQ at bankside by gage: T 23.9°C, C 388, SC 397, DO 61% 4.5 mg/l, pH 7.97; second water quality measure at middle of bridge-values appear in obs log(left)
2019-08-05 8:24	bt	--	4.24	B	--	--	--	--	--	21.0	375	406	46	3.6	7.77	--	no	Set ISCO to sample every hour starting at 12:00 450ml/sample; water brown
2019-08-06 12:03	bt	--	4.24	B	14.2	M	g/e	--	--	24.6	428	432	107	7.7	8.36	25.88, 5.22, 6.88, 8.98	yes	24 ambient samples collected; separated into four composite bottles; BS@SBC (1) T 20.2°C, C 350.6, SC 386, DO 78% 6.13 mg/l, pH 8.57; BS@SBC (2) T 21.6°C, C 387, SC 414 , DO 71% 5.34 mg/l, pH 8.85; BS@SBC (3) T 22.5°C, C 408, SC 429, DO 68% 5.06 mg/l, pH 8.55; BS@SBC (4) T 24.4°C, C 427, SC 432, DO 68% 4.89 mg/l, pH 8.17; low flow/baseflow; big carp in water; muddy bottom on right bank
2020-01-08 12:30	bt	--	4.20	B	9.7	M	g	--	--	4.2	--	280	113	12.4	8.31	5.02	no	Water quality is NDOT sonde readings; water slightly cloudy; cold; low flow; some tumbleweed in the channel
2020-02-12 8:45	bt	--	4.13	B	--	--	--	--	--	4.8	446	725	120	13.3	6.20	--	no	NDOT WQ-T4.9°C, SC 701, DO 104% 11.52mg/l, pH 8.54, NTU 4.84; water slightly milky; low flow; lots of tumbleweed debris in channel; set ISCO for baseline sampling starting at 12:00 450/ml per hour
2020-02-13 12:02	bt	--	4.15	B	--	--	--	--	--	7.6	463	694	121	12.7	8.33	33.28, 23.85, 12.09	yes	15 ambient samples collected; overnight samples were not collected with ISCO indicating pump problem; sample bottle 24 was collected and discarded due to low volume; possible problem due to cold temperatures and ice in the intake tube; bottles 14 and 15 were full indicating pump and collection issues; ice layer on the top of collected samples inside the ISCO; processed the collected samples; BS@SBC (1) T 2.9°C, C 420, SC 697, DO 97% 11.02 mg/l, pH 7.96; BS@SBC (2) T 3.3°C, C 421, SC 715 , DO 91% 10.43 mg/l, pH 8.13; BS@SBC (3) T 3.8°C, C 435, SC 729 DO 93% 10.63 mg/l, pH 8.19; NDOT WQ: T 8.1°C, SC 676, DO 125% 12.69mg/l, pH 8.61, NTU 5.81; lots of goose fecal mater in the channel-this was not evident on the previous day site visit for setup
2020-03-13 14:56	bt,jj	--	4.21	B	--	--	--	--	--	13.7	338	431	133	11.9	6.99	8.19 (NDOT)	no	Loaded ISCO with bottles in anticipation of storm over weekend; NDOT WQ sonde: T 14.4°C, SC 431, DO 120% 10.46 mg/l, pH 8.4; water brown and lots of tumbleweeds in channel; low flow
2020-04-04 16:36	bt	--	4.16	B	--	--	--	--	--	10.7	327	449	93	9.0	8.51	--	no	Loaded ISCO with bottles in anticipation of storm set to sample every hour starting at 12:00 4/5/20; NDOT WQ sonde: T 11.3°C, SC 451, DO 112% 10.6 mg/l, pH 8.61; water hazy ; low flow
2020-04-05 11:35	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Reset ISCO to sample at 13:00
2020-04-05 12:30	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Reset ISCO to sample at 16:00
2020-04-05 17:40	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Call to NWS Reno confirms precipitation will likely come through region later and as snow; reset sampler to start at midnight 4/6/20
2020-04-06 14:00	bt,jj	--	4.20	--	--	--	--	--	--	10.0	441	617	102	10.1	8.40	--	no	ISCO did not sample; Campbell telemetry error; Boynton had limited response and no visible changes in streamflow or channel were observed at site visit
2020-04-16 12:31	bt	--	4.14	B	7.5	M	g	--	--	15.8	566	687	130	11.3	7.54	--	no	Water brown; lots of tumble weeds; large carp; low velocity; NDOT WQ T 16.8°C, SC 670.8, DO 131% 10.96 mg/l, pH 8.63
2020-05-17 11:00	bt	--	4.14	B	--	--	--	--	--	15.5	344	420	90	7.6	8.04	11.63 (NDOT)	no	Set ISCO to sample every hour starting at 23:00; forecast is for 0.2 inches of rain in next 24 hours; NDOT WQ T 16.5°C, SC 419; DO 94% 7.95 mg/l, pH 8.16
2020-05-18 8:33	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	no	No measurable rain in Reno; rain shadow kept front from spilling over; turned off ISCO and capped bottles
2020-05-29 17:00	bt	--	4.23	B	--	--	--	--	--	25.5	--	404	52	5.6	7.62	--	no	Water quality is NDOT sonde; set ISCO to sample manually every hour starting 04:00 on 5/30/20
2020-05-30 14:33	bt	--	4.22	B	--	--	--	--	--	21.5	--	400	62	4.8	7.66	6.97	no	WQ is NDOT sonde; dumped 10 bottles with no storm response
2020-06-23 12:28	bt	--	4.22	B	11.8	M	g	--	--	27.0	411	396	49	3.5	7.84	4.2 (NDOT)	no	NDOT WQ: T 27.4, SC 392, DO 50% 3.44 mg/L, pH 7.62; water brown; big carp in channel; low flow; 1.5 to 2 feet of freeboard at downstream control section near Steamboat Creek

Station Observer Log:
Boynton Slough at Steamboat Creek (BS@SBC)

Site Conditions					Streamflow					Water Quality Observations								Remarks
Date/Time (observer time)	Observer	Original Stage	New Stage (pillar)	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	(feet)	(R/F/S/B)	(cfs)	(M, R)	(e/g/f/p)	(feet)	(M/D/YY)	(oC)	(µmhos/cm)	(at 25 oC)	(%)	(mg/L)		(NTU)	(yes/no)	
2020-06-25 10:20	bt	--	4.23	B	--	--	--	--	--	23.2	369	382	43	3.2	7.97	2.27 (NDOT)	yes	Bacteria sample collected at 10:25; water brown; big fish in channel; crews clearing vegetation upstream of gage on right bank; NDOT WQ: T 24.1°C, SC 397, DO 41% 3.01; pH 7.56

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

Station Observer Log:
Yori Drain at Steamboat Creek (YD@SBC)

Site Conditions				Streamflow					Water Quality Observations								Remarks
Date/Time (observer time)	Observer	ISCO depth	Hydrograph	Streamflow	Streamflow Source	Estimated Accuracy	High-water Mark	HWM date?	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Dissolved Oxygen	Dissolved Oxygen	pH	Turbidity	Samples collected?	
		(feet)	(R/F/S/B)	(cfs)	(M, R)	(e/g/f/p)	(feet)	(M/D/YY)	(oC)	(µmhos/cm)	(at 25 oC)	(%)	(mg/L)		(NTU)	(yes/no)	
2019-07-05 12:27	bt	0.50	S	6.0	R	g/f	--	--	24.4	467	472	200	14.9	8.95	--	no	Ran diagnostics and maintenance; all checks ok; visual inspection ok; battery 12.9
2019-08-05 8:55	bt	0.52	S	6.2	R	g/f	--	--	20.9	446	484	121	9.4	9.07	--	no	Set ISCO to sample every hour starting at 12:00 450ml/sample; water is brown
2019-08-06 13:40	bt	0.51	S	6.6	R	g/f	--	--	26.1	508	497	176	12.5	9.18	36.21, 33.63, 31.36, 26.51	yes	24 ambient samples collected; separated into four composite bottles; YD@SBC (1) T 24.6°C, C 490, SC 493, DO 74% 5.27mg/l, pH 9.01; YD@SBC (2) T 26.1°C, C 503, SC 492, DO 79% 5.44mg/l, pH 9.02; YD@SBC (3) T 27.7°C, C 527, SC 501, DO 82% 5.50mg/l, pH 8.96; YD@SBC (4) T 28.9°C, C 545, SC 507, DO 78% 5.19mg/l, pH 8.91;
2019-11-15 13:28	bt	0.37	S	4.0	R	g/f	--	--	11.8	445	594	171	16.0	8.94	--	no	Site visit to download ISCO and backup logger; restarted backup logger to record every 15 minutes
2020-01-08 13:11	bt	0.36	S	4.1	R	g/f	--	--	--	--	--	--	--	--	--	no	Discharge clear out of culvert; no debris in upstream channel; downloaded ISCO
2020-02-12 9:23	bt	0.28	S	2.8	R	g/f	--	--	4.7	401	654	100	11.3	6.94	--	no	Set up ISCO for ambient baseflow sampling starting at 12:00 480ml/hr.; water cloudy upstream of culvert; some debris racked up at the upstream alternate sampling location
2020-02-13 13:08	bt	0.29	S	2.9	R	g/f	--	--	8.4	431	632	134	13.8	8.66	44.82, 25.40, 28.48	yes	24 ambient samples collected; separated into four composite bottles; YD@SBC (1) T 3.6°C, C 377, SC 637, DO 103% 11.93mg/l, pH 8.45; YD@SBC (2) T 5.8°C, C 395, SC 622, DO 91% 10.86mg/l, pH 8.55; YD@SBC (3) T 7.6°C, C 412, SC 618, DO 92% 9.66mg/l, pH 8.56; YD@SBC (4) T 9.1°C, C 436, SC 626, DO 95% 9.64mg/l, pH 8.56;
2020-03-13 15:18	bt,jj	0.32	S	3.2	R	g/f	--	--	14.9	484	601	144	12.6	8.34	--	no	Loaded ISCO with bottles; beaver dam located upstream of culvert at the upstream sampling site
2020-04-04 17:17	bt	0.44	S	4.7	R	g/f	--	--	9.5	462	655	99	9.8	8.23	--	no	Iced ISCO; set to sample every hour starting at level >0.55; beaver dam has been removed from upstream sampling location; City of Reno lock removed from gate on Pembroke
2020-04-06 12:58	bt,jj	--	--	--	--	--	--	--	--	--	--	--	--	--	--	no	No samples collected; capped bottles and cleared ice
2020-05-17 9:30	bt	0.45	S	5.3	R	g/f	--	--	14.0	429	544	84	7.4	6.74	--	no	Set ISCO to sample every hour enabled when level is >0.50 ft; forecast is for 0.2 inches of rain in next 24 hours; water is brown; no beaver dam upstream; pH verified using strip (6-7 range)
2020-05-18 9:19	bt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	no	No measurable rain in Reno; rain shadow kept front from spilling over; left ISCO program running incase spillover happens later--program will sample when stage rises 0.1 ft
2020-06-23 11:28	bt	0.49	S	5.6	R	g/f	--	--	27.0	530	511	138	9.7	8.89	--	no	MMB velocity check 0.45ft depth 5.30 ft/s-ISCO reading 5.14 ft/s (probe is on the bottom of the culvert); water is brown; some visible algae upstream of the culvert; download was unsuccessful and needs to be redone
2020-06-25 11:40	bt	0.47	S	5.5	R	g/f	--	--	25.6	475	470	152	10.7	9.10	--	yes	Bacteria sample collected at 11:45; water brown; some algae upstream of culvert; downloaded ISCO and backup logger

Observer Key: (bt) is Ben Trustman, (jj) is Jack Jacquet

Stage: Water level observed on staff plate,

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Streamflow Source: measured by a hydrologist (M), obtained from an existing rating curve or gaging station [R]

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Turbidity values are reported from the sample using a desktop turbidimeter and do not reflect laboratory analysis and results

APPENDIX B

Equipment Calibration Logs

CALIBRATION SHEET

DATE/TIME 2019-09-05
NAME Ben Trustman
SERIAL NUMBER 1692

	Buffer Standard Used	**Pre-Calibration**	**Post-Calibration**	**Cell Constant**		**Notes**	**Pass?**
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)					Acceptable cell const. 4.0-6.0	☐
	500 (µs/cm)	534	500			Acceptable cell const. 4.0-6.0	
	1000 (µs/cm)	894	1000			Acceptable cell const. 4.0-6.0	
	circle one			**mV Value**	**Slope**		
pH Point #1	4.00 [✓ 7.00] 10.00	7.06	7.01	-3.43	98.23	pH 7 mV value = 0 +/- 50	
						pH 4 mV value = +165 to +180 from 7 buffer mV value	
pH Point #2	[✓ 4.00] 7.00 10.00	4.07	4	170.9		pH 10 mV value = -165 to -180 from 7 buffer mV value	
						Ideal slope is between 55 and 60	
pH Point #3	4.00 7.00 [✓ 10.00]	10.03	10.01	-169.71			
				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA			
DISSOLVED OXYGEN (% sat)	n/a	94.6	100				
DISSOLVED OXYGEN (% sat)	n/a						

Comments or Notes

Values were not stored on YSI-calculated from written logs; pH slope (((mV ph4- mVpH 7)/3)/59.16)*100= 85 to 105 then calibration is good

CALIBRATION SHEET

DATE/TIME 2019-09-20

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	502	500		Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	966	1000		Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.13	7.01	-7.43	104.31	pH 7 mV value = 0 +/- 50
						pH 4 mV value = +165 to +180 from 7 buffer mV value
pH Point #2	[✓ 4.00] 7.00 10.00	4.02	4	177.7		pH 10 mV value = -165 to -180 from 7 buffer mV value
						Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	10.18	10.01	-174.28		

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)	n/a	95	100	
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

Values were not stored on YSI-calculated from written logs; pH slope (((mV ph4- mVpH 7)/3)/59.16)*100= 85 to 105 then calibration is good

CALIBRATION SHEET

DATE/TIME 2020-01-08
NAME Ben Trustman
SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	520	500		Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	933	1000	4.87	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.12	7.02	-41.2	56.03	pH 7 mV value = 0 +/- 50
						pH 4 mV value = +165 to +180 from 7 buffer mV value
pH Point #2	[✓ 4.00] 7.00 10.00	4.18	4	162.3		pH 10 mV value = -165 to -180 from 7 buffer mV value
						Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	10.28	10.05	-171.3		

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)	n/a			
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

4 ph low mV value but slope ok

CALIBRATION SHEET

DATE/TIME 2020-02-12
NAME Brian hastings
SERIAL NUMBER 1692

	Buffer Standard Used	**Pre-Calibration**	**Post-Calibration**	**Cell Constant**	**Notes**	**Pass?**
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	520	500	4.68	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	940	1000	4.98	Acceptable cell const. 4.0-6.0	y

	circle one			**mV Value**	**Slope**	
pH Point #1	4.00 [✓ 7.00] 10.00	7.07	7.02	-46.79	57.78	pH 7 mV value = 0 +/- 50
						pH 4 mV value = +165 to +180 from 7 buffer mV value
pH Point #2	[✓ 4.00] 7.00 10.00	4.04	4	-166.8		pH 10 mV value = -165 to -180 from 7 buffer mV value
						Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	10.11	10.06	166.59		

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)	n/a		100	2.44
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

Low DO uA

CALIBRATION SHEET

DATE/TIME 2020-02-18

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant		Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)					Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	514	500	4.78		Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	1012	1000	4.92		Acceptable cell const. 4.0-6.0	y
	circle one			mV Value	Slope		
pH Point #1	4.00 [✓ 7.00] 10.00	7.13	7.02	-52.4	55.98	pH 7 mV value = 0 +/- 50	
pH Point #2	[✓ 4.00] 7.00 10.00	4.01	4	172.0		pH 4 mV value = +165 to +180 from 7 buffer mV value pH 10 mV value = -165 to -180 from 7 buffer mV value	
pH Point #3	4.00 7.00 [✓ 10.00]	10.07	10.07	-161.2		Ideal slope is between 55 and 60	
				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA			
DISSOLVED OXYGEN (% sat)	n/a						
DISSOLVED OXYGEN (% sat)	n/a						

Comments or Notes

pH mV off on 10 but slope OK.

CALIBRATION SHEET

DATE/TIME 2020-03-12

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	548	500		Acceptable cell const. 4.0-6.0	
	1000 (µs/cm)	975	1000	4.9	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.02	7.01	-48.59	55.87	pH 7 mV value = 0 +/- 50
pH Point #2	[✓ 4.00] 7.00 10.00	3.99	4	167.4		pH 4 mV value = +165 to +180 from 7 buffer mV value pH 10 mV value = -165 to -180 from 7 buffer mV value
pH Point #3	4.00 7.00 [✓ 10.00]	10.03	10.05	-165.6		Ideal slope is between 55 and 60

				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA
DISSOLVED OXYGEN (% sat)	n/a	82	100	3.16
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

Low DO uA

CALIBRATION SHEET

DATE/TIME 2020-03-18
NAME Ben Trustman
SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	548	500	4.47	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	910	1000	4.91	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.02	7.02	-48.09	55.43	pH 7 mV value = 0 +/- 50
pH Point #2	[✓ 4.00] 7.00 10.00	4.03	4	164.5		pH 4 mV value = +165 to +180 from 7 buffer mV value
						pH 10 mV value = -165 to -180 from 7 buffer mV value
pH Point #3	4.00 7.00 [✓ 10.00]	10.04	10.06	-165.6		Ideal slope is between 55 and 60

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)	n/a			
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

pH mV off on 4 but slope OK.

CALIBRATION SHEET

DATE/TIME 2020-04-03

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	520	500	4.74	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	994	1000	4.93	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.08	7.04	-50.9	55.37	pH 7 mV value = 0 +/- 50
pH Point #2	[✓ 4.00] 7.00 10.00	3.97	4	166.8		pH 4 mV value = +165 to +180 from 7 buffer mV value
						pH 10 mV value = -165 to -180 from 7 buffer mV value
pH Point #3	4.00 7.00 [✓ 10.00]	10.01	10.11	-160.99		Ideal slope is between 55 and 60

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)	n/a			
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

pH mV off on 4 but slope OK.

CALIBRATION SHEET

DATE/TIME 2020-04-16

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	**Pre-Calibration**	**Post-Calibration**	**Cell Constant**		**Notes**	**Pass?**
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)					Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	481	500	4.92		Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	992	1000	4.96		Acceptable cell const. 4.0-6.0	y
	circle one			**mV Value**	**Slope**		
pH Point #1	4.00 [✓ 7.00] 10.00	7.19	7.04	-55.59	54.25	pH 7 mV value = 0 +/- 50	
pH Point #2	[✓ 4.00] 7.00 10.00	4.15	4	162.5		pH 4 mV value = +165 to +180 from 7 buffer mV value	
						pH 10 mV value = -165 to -180 from 7 buffer mV value	
pH Point #3	4.00 7.00 [✓ 10.00]	10.12	10.06	-158.6		Ideal slope is between 55 and 60	
				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA			
DISSOLVED OXYGEN (% sat)	n/a		100	3.48			
DISSOLVED OXYGEN (% sat)	n/a						

Comments or Notes

pH 4 and 10 mV value low and 7 mv value is high--ordered a new pH probe; DO uA low

CALIBRATION SHEET

DATE/TIME 2020-05-08

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	557	500	4.45	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	910	1000	4.82	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00					pH 7 mV value = 0 +/- 50
pH Point #2	[✓ 4.00] 7.00 10.00					pH 4 mV value = +165 to +180 from 7 buffer mV value pH 10 mV value = -165 to -180 from 7 buffer mV value
pH Point #3	4.00 7.00 [✓ 10.00]					Ideal slope is between 55 and 60

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)	n/a			
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

pH 4 mV value low

CALIBRATION SHEET

DATE/TIME 2020-06-15

NAME Xylem Factory

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant		Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)					Acceptable cell const. 4.0-6.0	
	500 (µs/cm)					Acceptable cell const. 4.0-6.0	
	1000 (µs/cm)	977	1000	5.03		Acceptable cell const. 4.0-6.0	y
	circle one			mV Value	Slope		
pH Point #1	4.00 [✓ 7.00] 10.00		7.01	-1.1	56.31	pH 7 mV value = 0 +/- 50	
pH Point #2	[✓ 4.00] 7.00 10.00		4	159.6		pH 4 mV value = +165 to +180 from 7 buffer mV value	
						pH 10 mV value = -165 to -180 from 7 buffer mV value	
pH Point #3	4.00 7.00 [✓ 10.00]		10.02	-176.79		Ideal slope is between 55 and 60	
				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA			
DISSOLVED OXYGEN (% sat)	n/a		100	6.14			
DISSOLVED OXYGEN (% sat)	n/a						

Comments or Notes

pH 4 mV value low; factory test

CALIBRATION SHEET

DATE/TIME 2020-06-15

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	537	500	4.68	Acceptable cell const. 4.0-6.0	
	1000 (µs/cm)	921	1000	5.08	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.05	7	-9.1	56.56	pH 7 mV value = 0 +/- 50
pH Point #2	[✓ 4.00] 7.00 10.00	3.85	4	180.4		pH 4 mV value = +165 to +180 from 7 buffer mV value
						pH 10 mV value = -165 to -180 from 7 buffer mV value
pH Point #3	4.00 7.00 [✓ 10.00]	9.86	10.01	-157.79		Ideal slope is between 55 and 60

				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA
DISSOLVED OXYGEN (% sat)	n/a	97	100	4.86
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

pH 10 and 4 slighlty out of mV range but slope ok

CALIBRATION SHEET

DATE/TIME 2020-07-16

NAME Ben Trustman

SERIAL NUMBER 1692

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	500	500	4.85	Acceptable cell const. 4.0-6.0	
	1000 (µs/cm)	1041	1000	4.85	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.09	6.99	-6.4	56.04	pH 7 mV value = 0 +/- 50
pH Point #2	[✓ 4.00] 7.00 10.00	3.97	4	177.6		pH 4 mV value = +165 to +180 from 7 buffer mV value
						pH 10 mV value = -165 to -180 from 7 buffer mV value
pH Point #3	4.00 7.00 [✓ 10.00]	9.89	9.98	-158.9		Ideal slope is between 55 and 60

				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA
DISSOLVED OXYGEN (% sat)	n/a	97	100	4.86
DISSOLVED OXYGEN (% sat)	n/a			

Comments or Notes

pH 10 out of mV range but slope ok

CALIBRATION SHEET

DATE/TIME 2019-08-05

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	☐
	500 (µs/cm)	511	500		Acceptable cell const. 4.0-6.0	
	1000 (µs/cm)	964	1000		Acceptable cell const. 4.0-6.0	

	circle one			mV Value	Slope
pH Point #1	4.00 7.00 10.00	6.47	7	30.2	85.08
pH Point #2	4.00 7.00 10.00	3.3	4	181.23	
pH Point #3	4.00 7.00 10.00	9.71	10.06	-185.06	

pH 7 mV value = 0 +/- 50

pH 4 mV value = +165 to +180 from 7 buffer mV value

pH 10 mV value = -165 to -180 from 7 buffer mV value

Ideal slope is between 55 and 60

1.25 mil yellow membrane

Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

Values were not stored on YSI-calculated from written logs; pH slope (((mV ph4- mVpH 7)/3)/59.16)*100= 85 to 105 then calibration is good

-183.26

CALIBRATION SHEET

DATE/TIME 2020-08-07

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (μs/cm)	100 (μs/cm)				Acceptable cell const. 4.0-6.0	
	500 (μs/cm)	491	500		Acceptable cell const. 4.0-6.0	
	1000 (μs/cm)	1024	1000		Acceptable cell const. 4.0-6.0	

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.07	7	-4	97.87	pH 7 mV value = 0 +/- 50
						pH 4 mV value = +165 to +180 from 7 buffer mV value
	circle one					
pH Point #2	[✓ 4.00] 7.00 10.00	4.1	4	169.7		pH 10 mV value = -165 to -180 from 7 buffer mV value
						Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	10.12	10	-174.29		

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

Values were not stored on YSI-calculated from written logs; pH slope (((mV ph4- mVpH 7)/3)/59.16)*100= 85 to 105 then calibration is good

-172.49

CALIBRATION SHEET

DATE/TIME 2020-01-26

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (μs/cm)	100 (μs/cm)				Acceptable cell const. 4.0-6.0	
	500 (μs/cm)	496	500	4.57	Acceptable cell const. 4.0-6.0	y
	1000 (μs/cm)	1087	1000		Acceptable cell const. 4.0-6.0	

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	6.7	7.02	-24.2	52.99	pH 7 mV value = 0 +/- 50 pH 4 mV value = +165 to +180 from 7 buffer mV value
pH Point #2	[✓ 4.00] 7.00 10.00	4.21	4	154.39		pH 10 mV value = -165 to -180 from 7 buffer mV value Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	9.27	10.04	-160.6		

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

pH slope low

-158.8

CALIBRATION SHEET

DATE/TIME 2020-03-12

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	523	500	4.36	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	894	1000	4.88	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	7.33	7.01	-42.4	53.47	pH 7 mV value = 0 +/- 50
	circle one					pH 4 mV value = +165 to +180 from 7 buffer mV value
pH Point #2	[✓ 4.00] 7.00 10.00	4.29	4	158.9		pH 10 mV value = -165 to -180 from 7 buffer mV value
						Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	10.41	10.05	-159.8		
				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA		
DISSOLVED OXYGEN (% sat)		99	100	3.85		

Comments or Notes

pH slope low; DO uA low

-157.999

CALIBRATION SHEET

DATE/TIME 2020-05-11

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	461	500	4.6	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	930	1000	4.95	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope
pH Point #1	4.00 [✓ 7.00] 10.00	7.49	7.02	-44.29	53.08
pH Point #2	[✓ 4.00] 7.00 10.00	4.3	4	166.48	
pH Point #3	4.00 7.00 [✓ 10.00]	10.33	10.07	-150.4	

pH 7 mV value = 0 +/- 50

pH 4 mV value = +165 to +180 from 7 buffer mV value

pH 10 mV value = -165 to -180 from 7 buffer mV value

Ideal slope is between 55 and 60

1.25 mil yellow membrane

Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

pH slope is low

-148.6

CALIBRATION SHEET

DATE/TIME 2020-05-17

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	**Pre-Calibration**	**Post-Calibration**	**Cell Constant**		**Notes**	**Pass?**
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)					Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	538	500	4.6		Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	939	1000	4.9		Acceptable cell const. 4.0-6.0	y
	circle one			**mV Value**	**Slope**		
pH Point #1	4.00 [✓ 7.00] 10.00	7.11	7.03	-42	53.27	pH 7 mV value = 0 +/- 50	
						pH 4 mV value = +165 to +180 from 7 buffer mV value	
	circle one						
pH Point #2	[✓ 4.00] 7.00 10.00	3.89	4	166.09		pH 10 mV value = -165 to -180 from 7 buffer mV value	
						Ideal slope is between 55 and 60	
pH Point #3	4.00 7.00 [✓ 10.00]	10	10.1	-149.19			
				1.25 mil yellow membrane Acceptable: 4.31 to 8.00 uA			
DISSOLVED OXYGEN (% sat)			100	3.57			

Comments or Notes

pH slope low; DO uA low

-147.39

CALIBRATION SHEET

DATE/TIME 2020-05-29

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	544	500	4.5	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	914	1000	4.93	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope
pH Point #1	4.00 [✓ 7.00] 10.00	7.4	7.01	-54.59	52.7
pH Point #2	[✓ 4.00] 7.00 10.00	4.27	4	164.78	
pH Point #3	4.00 7.00 [✓ 10.00]	10.23	10.03	-149.8	

pH 7 mV value = 0 +/- 50

pH 4 mV value = +165 to +180 from 7 buffer mV value

pH 10 mV value = -165 to -180 from 7 buffer mV value

Ideal slope is between 55 and 60

1.25 mil yellow membrane

Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

pH 10 mV is low and slope is low

Changed DO probe

-148

CALIBRATION SHEET

DATE/TIME 2020-06-06

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	531	500	4.64	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	944	1000	4.91	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope
pH Point #1	4.00 [✓ 7.00] 10.00	7	7.02	-48.7	52.61
pH Point #2	[✓ 4.00] 7.00 10.00	3.97	4	157.7	
pH Point #3	4.00 7.00 [✓ 10.00]	10.01	10.06	-156.19	

pH 7 mV value = 0 +/- 50

pH 4 mV value = +165 to +180 from 7 buffer mV value

pH 10 mV value = -165 to -180 from 7 buffer mV value

Ideal slope is between 55 and 60

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

pH 10 and pH 4 mV is low and slope is low

Changed DO probe

-154.39

CALIBRATION SHEET

DATE/TIME 2020-06-24

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	521	500	4.68	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	1007	1000	4.88	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope
pH Point #1	4.00 [✓ 7.00] 10.00	7.72	7.02	-84.9	
pH Point #2	[✓ 4.00] 7.00 10.00	4.54	4	166.2	
pH Point #3	4.00 7.00 [✓ 10.00]	10.35	10.06	-137.4	

pH 7 mV value = 0 +/- 50

pH 4 mV value = +165 to +180 from 7 buffer mV value

pH 10 mV value = -165 to -180 from 7 buffer mV value

Ideal slope is between 55 and 60

1.25 mil yellow membrane

Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)		100	4.4

Comments or Notes

pH was out of range and did not calibrate

-135.6

CALIBRATION SHEET

DATE/TIME 2020-07-22

NAME Ben Trustman

SERIAL NUMBER 1693

	Buffer Standard Used	Pre-Calibration	Post-Calibration	Cell Constant	Notes	Pass?
SPECIFIC CONDUCTANCE (µs/cm)	100 (µs/cm)				Acceptable cell const. 4.0-6.0	
	500 (µs/cm)	517	500	4.54	Acceptable cell const. 4.0-6.0	y
	1000 (µs/cm)	1007	1000	4.86	Acceptable cell const. 4.0-6.0	y

	circle one			mV Value	Slope	
pH Point #1	4.00 [✓ 7.00] 10.00	6.66	7	-29.2	55.84	pH 7 mV value = 0 +/- 50
						pH 4 mV value = +165 to +180 from 7 buffer mV value
	circle one					
pH Point #2	[✓ 4.00] 7.00 10.00	3.3	4	176.3		pH 10 mV value = -165 to -180 from 7 buffer mV value
						Ideal slope is between 55 and 60
pH Point #3	4.00 7.00 [✓ 10.00]	9.67	10.01	-157.69		

1.25 mil yellow membrane
Acceptable: 4.31 to 8.00 uA

DISSOLVED OXYGEN (% sat)			

Comments or Notes

pH 10 mV low but slope ok; stored probe in pH 4 for 3 days to fix pH probe

-155.89

APPENDIX C

Constituent Concentrations

Nitrate as N

Lachat Method EPA 353.2 Nitrite +Nitrate (results in red)

Site Name	Sample ID	August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	0.74				0.49																
Alum Creek @ Truckee River	AC@TR		0.90			0.2											nd	1.84				
North Truckee Drain @ Orr Ditch	NTD@ORD	1.50	2.10	16.990	2.60	0.77	10.798							1.60	1.33	11.478						
North Truckee Drain at Big Fish Drive	NTD@BFD (1)	1.10	3.08	18.274	1.90	1.31	13.425							1.50	0.63	5.097						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	1.20	2.95	19.093	1.70	1.34	12.287							1.40	1.14	8.608						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25		1.70	1.16	10.636							1.50	2.79	22.572						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	1.20	2.47	15.987		1.30								1.20	5.04	32.621						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	0.04	1.57	0.295		3.04											nd	3.16		nd	2.30	
Whites Creek @ Old Virginia Hwy	WC@OVH		5.10			5.70											nd	4.00		nd	2.40	
Steamboat Creek @ Rhodes Road	SBC@RHR	0.07	18.60	7.022	0.19	9.25	9.479															
Steamboat Creek @ Narrows	SBC@NAR		30.70	0.000	0.09	20.50	9.398															
Yori drain @ Steamboat Creek	YD@SBC(1)	0.63	6.81	23.127	1.40	4.56	34.455															
Yori drain @ Steamboat Creek	YD@SBC(2)	0.73	6.68	26.290	1.40	4.48	33.851															
Yori drain @ Steamboat Creek	YD@SBC(3)	0.71	6.63	25.389	1.40	4.31	32.530															
Yori drain @ Steamboat Creek	YD@SBC(4)	0.74	6.48	25.863	1.40	4.46	33.678															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	0.30	12.35	19.978	1.50	4.54	36.759															
Boynton Slough @ Steamboat Creek	BS@SBC (2)	0.36	17.49	33.964	1.50	5.69	46.026															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	0.46	12.84	31.851	1.50	6.26	50.634															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	0.42	12.84	29.080		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	0.08	52.40	23.741	0.45	34.00	82.522															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	0.11	47.50	28.182	0.39	33.00	69.416															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	0.14	45.20	34.131	0.43	33.50	77.695															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	0.15	44.60	36.083	0.48	35.10	90.872															
Arlington (south)	H-19 (1)							3.10	1.247	20.850	0.52	4.068	11.409									
Arlington (south)	H-19 (2)							2.4	1.312	16.983	0.59	3.904	12.423									
Arlington (south)	H-19 (3)							2.10	1.837	20.807												
Arlington (south)	H-19 (4)							0.98	0.82	4.334												
Fisherman's Park II	D-16 (1)										1.20	1.1	7.120	0.76	0.118	0.484						
Fisherman's Park II	D-16 (2)										0.62	1.509	5.046	0.43	2.56	5.937						
Fisherman's Park II	D-16 (3)										0.56	3.279	9.904	0.51	4.471	12.299						
Fisherman's Park II	D-16 (4)										0.51	1.772	4.874	0.87	0.452	2.121						
Oxbow Nature Park	C-24 (1)										0.30	0.41	0.663									
Oxbow Nature Park	C-24 (2)										0.31	0.934	1.562									
Oxbow Nature Park	C-24 (3)										0.35	0.508	0.959									
Oxbow Nature Park	C-24 (4)										0.32	1.126	1.943									
Mary Wahl Ditch	SDOE-008936 (1)													9.80	0.106	5.603						
Mary Wahl Ditch	SDOE-008936 (2)													0.80	1.091	4.708						
Mary Wahl Ditch	SDOE-008936 (3)													0.77	0.016	0.066						
Mary Wahl Ditch	SDOE-008936 (4)																					

Ortho P

Site Name	Sample ID	August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	0.39			0.32	0.49	0.846															
Alum Creek @ Truckee River	AC@TR	0.035	0.90	0.170		0.2	0.000										0.03	1.8	0.308			
North Truckee Drain @ Orr Ditch	NTD@ORD	0.15	2.10	1.699	0.09	0.77	0.382							0.14	1.33	1.004						
North Truckee Drain at Big Fish Drive	NTD@BFD (1)	0.11	3.08	1.827	0.05	1.31	0.318							0.03	0.63	0.095						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	0.10	2.95	1.591	0.05	1.34	0.361							0.05	1.14	0.314						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25	0.000	0.04	1.16	0.225							0.09	2.79	1.294						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	0.11	2.47	1.465		1.30	0.000							0.07	5.04	1.848						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	0.069	1.57	0.582	0.04	3.04	0.590										0.09	3.16	1.517	0.07	2.30	0.844
Whites Creek @ Old Virginia Hwy	WC@OVH	0.03	5.10	0.743	0.06	5.70	1.845										0.02	4.00	0.518	0.03	2.40	0.337
Steamboat Creek @ Rhodes Road	SBC@RHR	0.21	18.60	21.067	0.05	9.25	2.395															
Steamboat Creek @ Narrows	SBC@NAR	0.28	30.70	46.363	0.14	20.50	15.480															
Yori drain @ Steamboat Creek	YD@SBC(1)		6.81		0.03	4.56	0.788															
Yori drain @ Steamboat Creek	YD@SBC(2)		6.68		0.03	4.48	0.750															
Yori drain @ Steamboat Creek	YD@SBC(3)	0.023	6.63	0.822	0.04	4.31	0.929															
Yori drain @ Steamboat Creek	YD@SBC(4)	0.029	6.48	1.014	0.05	4.46	1.107															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	0.14	12.35	9.323	0.11	4.54	2.696															
Boynton Slough @ Steamboat Creek	BS@SBC (2)	0.15	17.49	14.152	0.10	5.69	3.068															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	0.13	12.84	9.001	0.10	6.26	3.342															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	0.12	12.84	8.309		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	0.16	52.40	45.220	0.13	34.00	23.840															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	0.18	47.50	46.115	0.12	33.00	21.359															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	0.20	45.20	48.758	0.13	33.50	23.489															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	0.21	44.60	50.517	0.12	35.10	22.718															
Arlington (south)	H-19 (1)							3.80	1.247	25.558	0.43	4.07	9.435									
Arlington (south)	H-19 (2)							2.9	1.312	20.522	0.62	3.90	13.055									
Arlington (south)	H-19 (3)							3.40	1.837	33.687												
Arlington (south)	H-19 (4)							2.80	0.82	12.384												
Fisherman's Park II	D-16 (1)										0.34	1.1	2.017	0.29	0.118	0.185						
Fisherman's Park II	D-16 (2)										0.25	1.509	2.035	0.20	2.56	2.762						
Fisherman's Park II	D-16 (3)										0.25	3.279	4.421	0.20	4.471	4.823						
Fisherman's Park II	D-16 (4)										0.24	1.772	2.294	0.15	0.452	0.366						
Oxbow Nature Park	C-24 (1)										0.27	0.41	0.597									
Oxbow Nature Park	C-24 (2)										0.25	0.934	1.259									
Oxbow Nature Park	C-24 (3)										0.27	0.508	0.740									
Oxbow Nature Park	C-24 (4)										0.24	1.126	1.458									
Mary Wahl Ditch	SDOE-008936 (1)													0.12	0.106	0.069						
Mary Wahl Ditch	SDOE-008936 (2)													0.28	1.091	1.648						
Mary Wahl Ditch	SDOE-008936 (3)													0.19	0.016	0.016						
Mary Wahl Ditch	SDOE-008936 (4)																					

TKN

Site Name	Sample ID	August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	0.60			0.71	0.49	1.876															
Alum Creek @ Truckee River	AC@TR	0.90	0.9	4.369		0.2											nd	1.8				
North Truckee Drain @ Orr Ditch	NTD@ORD	0.70	2.10	7.929	0.71	0.77	2.949							1.50	1.33	10.760						
North Truckee Drain at Big Fish Drive	NTD@BFD (1)	0.90	3.08	14.951	2.40	1.31	16.958							1.20	0.63	4.078						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	0.20	2.95	3.182	1.40	1.34	10.118							1.40	1.14	8.608						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25		1.30	1.16	8.134							1.60	2.79	24.077						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	0.90	2.47	11.990		1.30								1.60	5.04	43.494						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	0.40	1.57	3.376	0.27	3.04	4.427										0.25	3.16	4.261	0.44	2.30	5.462
Whites Creek @ Old Virginia Hwy	WC@OVH	0.80	5.10	22.006	0.26	5.70	7.993										nd	4.00		nd	2.40	
Steamboat Creek @ Rhodes Road	SBC@RHR	0.60	18.60	60.193	0.33	9.25	16.464															
Steamboat Creek @ Narrows	SBC@NAR	0.70	30.70	115.909	0.51	20.50	56.390															
Yori drain @ Steamboat Creek	YD@SBC(1)	0.80	6.81	29.367	1.10	4.56	27.072															
Yori drain @ Steamboat Creek	YD@SBC(2)	0.80	6.68	28.811	0.85	4.48	20.553															
Yori drain @ Steamboat Creek	YD@SBC(3)	1.00	6.63	35.760	0.82	4.31	19.053															
Yori drain @ Steamboat Creek	YD@SBC(4)	1.00	6.48	34.951	1.20	4.46	28.867															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	0.60	12.35	39.957	1.10	4.54	26.956															
Boynton Slough @ Steamboat Creek	BS@SBC (2)		17.49		0.72	5.69	22.093															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	0.20	12.84	13.848	0.56	6.26	18.903															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	0.30	12.84	20.772		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	0.50	52.40	141.313	0.86	34.00	157.709															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	0.30	47.50	76.859	0.59	33.00	105.014															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	0.40	45.20	97.517	0.62	33.50	112.025															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	0.60	44.60	144.333	0.53	35.10	100.337															
Arlington (south)	H-19 (1)							12.00	1.247	80.710	2.70	4.07	59.241									
Arlington (south)	H-19 (2)							9.00	1.312	63.688	3.20	3.90	67.381									
Arlington (south)	H-19 (3)							10.00	1.837	99.081												
Arlington (south)	H-19 (4)							7.00	0.82	30.959												
Fisherman's Park II	D-16 (1)										3.90	1.1	23.139	3.30	0.118	2.100						
Fisherman's Park II	D-16 (2)										2.30	1.509	18.720	3.00	2.56	41.423						
Fisherman's Park II	D-16 (3)										2.40	3.279	42.446	1.70	4.471	40.995						
Fisherman's Park II	D-16 (4)										1.80	1.772	17.203	1.30	0.452	3.169						
Oxbow Nature Park	C-24 (1)										1.20	0.41	2.654									
Oxbow Nature Park	C-24 (2)										1.60	0.934	8.060									
Oxbow Nature Park	C-24 (3)										1.10	0.508	3.014									
Oxbow Nature Park	C-24 (4)										1.10	1.126	6.681									
Mary Wahl Ditch	SDOE-008936 (1)													2.50	0.106	1.429						
Mary Wahl Ditch	SDOE-008936 (2)													2.70	1.091	15.888						
Mary Wahl Ditch	SDOE-008936 (3)													1.70	0.016	0.147						
Mary Wahl Ditch	SDOE-008936 (4)																					

Total N

Site Name	Sample ID	August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	1.30			0.71	0.49	1.876															
Alum Creek @ Truckee River	AC@TR	0.93	0.9	4.514	nd	0.2											nd	1.8				
North Truckee Drain @ Orr Ditch	NTD@ORD	2.20	2.10	24.918	3.30	0.77	13.705							3.00	1.33	21.521						
North Truckee Drain at Big Fish Drive	NTD@BFD (1)	2.00	3.08	33.225	4.30	1.31	30.382							2.80	0.63	9.514						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	1.40	2.95	22.276	3.20	1.34	23.128							2.80	1.14	17.216						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25		3.00	1.16	18.770							3.10	2.79	46.649						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	2.10	2.47	27.977		1.30	0.000							2.80	5.04	76.115						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	0.43	1.57	3.630	0.27	3.04	4.427										0.26	3.16	4.431	0.46	2.30	5.711
Whites Creek @ Old Virginia Hwy	WC@OVH	0.80	5.10	22.006	0.27	5.70	8.301										nd	4.00		nd	2.40	
Steamboat Creek @ Rhodes Road	SBC@RHR	0.67	18.60	67.215	0.52	9.25	25.943															
Steamboat Creek @ Narrows	SBC@NAR	0.71	30.70	117.565	0.60	20.50	66.341															
Yori drain @ Steamboat Creek	YD@SBC(1)	1.40	6.81	51.393	2.50	4.56	61.528															
Yori drain @ Steamboat Creek	YD@SBC(2)	1.50	6.68	54.020	2.20	4.48	53.195															
Yori drain @ Steamboat Creek	YD@SBC(3)	1.70	6.63	60.791	2.2	4.31	51.119															
Yori drain @ Steamboat Creek	YD@SBC(4)	1.70	6.48	59.416	2.60	4.46	62.544															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	0.90	12.35	59.935	2.60	4.54	63.715															
Boynton Slough @ Steamboat Creek	BS@SBC (2)	0.36	17.49	33.964	2.20	5.69	67.506															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	0.66	12.84	45.699	2.10	6.26	70.887															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	0.72	12.84	49.852		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	0.58	52.40	163.923	1.30	34.00	238.398															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	0.41	47.50	105.041	0.98	33.00	174.429															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	0.54	45.20	131.647	1.10	33.50	198.755															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	0.75	44.60	180.416	1.00	35.10	189.316															
Arlington (south)	H-19 (1)							15.00	1.247	100.888	3.30	4.07	72.406									
Arlington (south)	H-19 (2)							12.00	1.312	84.917	3.80	3.90	80.015									
Arlington (south)	H-19 (3)							12.00	1.837	118.897												
Arlington (south)	H-19 (4)							8.30	0.82	36.709												
Fisherman's Park II	D-16 (1)										5.30	1.1	31.445	4.1	0.118	2.609						
Fisherman's Park II	D-16 (2)										2.90	1.509	23.603	3.40	2.56	46.946						
Fisherman's Park II	D-16 (3)										3.00	3.279	53.057	2.20	4.471	53.053						
Fisherman's Park II	D-16 (4)										2.40	1.772	22.938	2.20	0.452	5.363						
Oxbow Nature Park	C-24 (1)										1.50	0.41	3.317									
Oxbow Nature Park	C-24 (2)										1.90	0.934	9.572									
Oxbow Nature Park	C-24 (3)										1.50	0.508	4.110									
Oxbow Nature Park	C-24 (4)										1.40	1.126	8.502									
Mary Wahl Ditch	SDOE-008936 (1)													12.00	0.106	6.861						
Mary Wahl Ditch	SDOE-008936 (2)													3.60	1.091	21.184						
Mary Wahl Ditch	SDOE-008936 (3)													2.50	0.016	0.216						
Mary Wahl Ditch	SDOE-008936 (4)																					

Total P

Site Name	Sample ID	August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	0.43			0.32	0.49	0.846															
Alum Creek @ Truckee River	AC@TR	0.10	0.9	0.485	nd	0.2											0.03	1.8	0.278			
North Truckee Drain @ Orr Ditch	NTD@ORD	0.22	2.10	2.492	0.13	0.77	0.540							0.16	1.33	1.148						
North Truckee Drain at Big Fish Drive	NTD@BFD(1)	0.15	3.08	2.492	0.13	1.31	0.919							0.10	0.63	0.340						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	0.15	2.95	2.387	0.17	1.34	1.229							0.25	1.14	1.537						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25		0.12	1.16	0.751							0.20	2.79	3.010						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	0.20	2.47	2.664		1.30								0.35	5.04	9.514						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	0.13	1.57	1.097	0.04	3.04	0.607										0.10	3.16	1.704	0.09	2.30	1.167
Whites Creek @ Old Virginia Hwy	WC@OVH	0.06	5.10	1.733	0.08	5.70	2.367										0.06	4.00	1.187	0.03	2.40	0.414
Steamboat Creek @ Rhodes Road	SBC@RHR	0.29	18.60	29.093	0.07	9.25	3.692															
Steamboat Creek @ Narrows	SBC@NAR	0.37	30.70	61.266	0.21	20.50	23.220															
Yori drain @ Steamboat Creek	YD@SBC(1)	0.21	6.81	7.709	0.13	4.56	3.199															
Yori drain @ Steamboat Creek	YD@SBC(2)	0.21	6.68	7.563	0.09	4.48	2.079															
Yori drain @ Steamboat Creek	YD@SBC(3)	0.18	6.63	6.437	0.08	4.31	1.812															
Yori drain @ Steamboat Creek	YD@SBC(4)	0.20	6.48	6.990	0.05	4.46	1.299															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	0.26	12.35	17.315	0.15	4.54	3.676															
Boynton Slough @ Steamboat Creek	BS@SBC (2)	0.22	17.49	20.756	0.17	5.69	5.216															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	0.20	12.84	13.848	0.14	6.26	4.726															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	0.21	12.84	14.540		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	0.31	52.40	87.614	0.23	34.00	42.178															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	0.31	47.50	79.421	0.21	33.00	37.378															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	0.25	45.20	60.948	0.20	33.50	36.137															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	0.22	44.60	52.922	0.16	35.10	30.291															
Arlington (south)	H-19 (1)							4.20	1.247	28.249	0.49	4.07	10.751									
Arlington (south)	H-19 (2)							1.00	1.312	7.076	0.74	3.90	15.582									
Arlington (south)	H-19 (3)							2.90	1.837	28.733												
Arlington (south)	H-19 (4)							3.30	0.82	14.595												
Fisherman's Park II	D-16 (1)										0.24	1.1	1.424	0.20	0.118	0.127						
Fisherman's Park II	D-16 (2)										0.16	1.509	1.302	0.11	2.56	1.519						
Fisherman's Park II	D-16 (3)										0.33	3.279	5.836	0.09	4.471	2.267						
Fisherman's Park II	D-16 (4)										0.18	1.772	1.720	0.10	0.452	0.236						
Oxbow Nature Park	C-24 (1)										0.4	0.41	0.885									
Oxbow Nature Park	C-24 (2)										0.19	0.934	0.957									
Oxbow Nature Park	C-24 (3)										0.11	0.508	0.301									
Oxbow Nature Park	C-24 (4)										0.21	1.126	1.275									
Mary Wahl Ditch	SDOE-008936 (1)													0.20	0.106	0.114						
Mary Wahl Ditch	SDOE-008936 (2)													0.14	1.091	0.824						
Mary Wahl Ditch	SDOE-008936 (3)													0.13	0.016	0.011						
Mary Wahl Ditch	SDOE-008936 (4)																					

Total Dissolved Solids

Site Name	Sample ID	August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	2400.00			2400.00	0.49	6342.889															
Alum Creek @ Truckee River	AC@TR	250.00	0.9	1213.563	710.00	0.2	727.598										160.00	1.8	1587.880			
North Truckee Drain @ Orr Ditch	NTD@ORD	640.00	2.10	7249.016	1200.00	0.77	4983.698							930.00	1.33	6671.360						
North Truckee Drain at Big Fish Drive	NTD@BFD(1)	580.00	3.08	9635.150	1100.00	1.31	7772.196							990.00	0.63	3363.996						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	520.00	2.95	8273.802	1100.00	1.34	7950.186							890.00	1.14	5472.360						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25		1100.00	1.16	6882.250							750.00	2.79	11286.135						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	520.00	2.47	6927.557		1.30								560.00	5.04	15222.933						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	81.00	1.57	683.721	88.00	3.04	1442.899										100.00	3.16	1704.382	110.00	2.30	1365.608
Whites Creek @ Old Virginia Hwy	WC@OVH	74.00	5.10	2035.550	67.00	5.70	2059.821										74.00	4.00	1596.509	62.00	2.40	802.570
Steamboat Creek @ Rhodes Road	SBC@RHR	170.00	18.60	17054.604	170.00	9.25	8481.456															
Steamboat Creek @ Narrows	SBC@NAR	370.00	30.70	61266.050	480.00	20.50	53073.152															
Yori drain @ Steamboat Creek	YD@SBC(1)	260.00	6.81	9544.322	360.00	4.56	8859.980															
Yori drain @ Steamboat Creek	YD@SBC(2)	260.00	6.68	9363.420	380.00	4.48	9188.236															
Yori drain @ Steamboat Creek	YD@SBC(3)	270.00	6.63	9655.107	380.00	4.31	8829.560															
Yori drain @ Steamboat Creek	YD@SBC(4)	270.00	6.48	9436.665	380.00	4.46	9141.095															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	210.00	12.35	13984.812	420.00	4.54	10292.441															
Boynton Slough @ Steamboat Creek	BS@SBC (2)	240.00	17.49	22642.427	430.00	5.69	13194.259															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	240.00	12.84	16617.727	410.00	6.26	13839.937															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	250.00	12.84	17309.592		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	320.00	52.40	90440.103	460.00	34.00	84356.108															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	320.00	47.50	81982.918	450.00	33.00	80095.153															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	310.00	45.20	75575.306	460.00	33.50	83115.577															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	320.00	44.60	76977.645	450.00	35.10	85192.118															
Arlington (south)	H-19 (1)							1100.00	1.247	7398.419	110.00	4.07	2413.534									
Arlington (south)	H-19 (2)							940.00	1.312	6651.835	110.00	3.90	2316.233									
Arlington (south)	H-19 (3)							840.00	1.837	8322.776												
Arlington (south)	H-19 (4)							610.00	0.82	2697.885												
Fisherman's Park II	D-16 (1)										670.00	1.1	3975.093	580.00	0.118	369.139						
Fisherman's Park II	D-16 (2)										320.00	1.509	2604.468	280.00	2.56	3866.142						
Fisherman's Park II	D-16 (3)										250.00	3.279	4421.414	270.00	4.471	6511.008						
Fisherman's Park II	D-16 (4)										180.00	1.772	1720.347	580.00	0.452	1413.990						
Oxbow Nature Park	C-24 (1)										41.00	0.41	90.667									
Oxbow Nature Park	C-24 (2)										60.00	0.934	302.258									
Oxbow Nature Park	C-24 (3)										66.00	0.508	180.837									
Oxbow Nature Park	C-24 (4)										68.00	1.126	412.978									
Mary Wahl Ditch	SDOE-008936 (1)													460.00	0.106	262.993						
Mary Wahl Ditch	SDOE-008936 (2)													190.00	1.091	1118.042						
Mary Wahl Ditch	SDOE-008936 (3)													150.00	0.016	12.945						
Mary Wahl Ditch	SDOE-008936 (4)																					

TSS																						
Site Name	Sample ID																					
		August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB	17.00			nd	0.49																
Alum Creek @ Truckee River	AC@TR	20.00	0.9	97.085	nd	0.2											11.00	1.8	109.167			
North Truckee Drain @ Orr Ditch	NTD@ORD	28.00	2.1	317.144	nd	0.77								20.00	1.33	143.470						
North Truckee Drain at Big Fish Drive	NTD@BFD(1)	67.00	3.08	1113.026	88.00	1.31	621.776							20.00	0.63	67.960						
North Truckee Drain at Big Fish Drive	NTD@BFD(2)	42.00	2.95	668.269	50.00	1.34	361.372							21.00	1.14	129.123						
North Truckee Drain at Big Fish Drive	NTD@BFD(3)		2.25		26.00	1.16	162.671							30.00	2.79	451.445						
North Truckee Drain at Big Fish Drive	NTD@BFD(4)	35.00	2.47	466.278		1.30								44.00	5.04	1196.088						
Thomas Creek @ S. Meadows Pkwy	TC@SMP	17.00	1.57	143.497	nd	3.04											nd	3.16		nd	2.30	
Whites Creek @ Old Virginia Hwy	WC@OVH	18.00	5.10	495.134	25.00	5.70	768.590										nd	4.00		nd	2.40	
Steamboat Creek @ Rhodes Road	SBC@RHR	20.00	18.60	2006.424	nd	9.25																
Steamboat Creek @ Narrows	SBC@NAR	31.00	30.70	5133.102	21.00	20.50	2321.950															
Yori drain @ Steamboat Creek	YD@SBC(1)	40.00	6.81	1468.357	39.00	4.56	959.831															
Yori drain @ Steamboat Creek	YD@SBC(2)	42.00	6.68	1512.552	24.00	4.48	580.310															
Yori drain @ Steamboat Creek	YD@SBC(3)	40.00	6.63	1430.386	29.00	4.31	673.835															
Yori drain @ Steamboat Creek	YD@SBC(4)	45.00	6.48	1572.778	43.00	4.46	1034.387															
Boynton Slough @ Steamboat Creek	BS@SBC (1)	37.00	12.35	2463.991	47.00	4.54	1151.773															
Boynton Slough @ Steamboat Creek	BS@SBC (2)	16.00	17.49	1509.495	28.00	5.69	859.161															
Boynton Slough @ Steamboat Creek	BS@SBC (3)	19.00	12.84	1315.570	18.00	6.26	607.607															
Boynton Slough @ Steamboat Creek	BS@SBC (4)	23.00	12.84	1592.482		6.72																
Steamboat Creek @ Clean Water Way	SBC@CWW(1)	43.00	52.40	12152.889	41.00	34	7518.697															
Steamboat Creek @ Clean Water Way	SBC@CWW(2)	22.00	47.50	5636.326	26.00	33	4627.720															
Steamboat Creek @ Clean Water Way	SBC@CWW(3)	28.00	45.20	6826.157	30.00	33.5	5420.581															
Steamboat Creek @ Clean Water Way	SBC@CWW(4)	44.00	44.60	10584.426	20.00	35.1	3786.316															
Arlington (south)	H-19 (1)							100.00	1.247	672.584	26.00	4.07	570.472									
Arlington (south)	H-19 (2)							82.00	1.312	580.266	14.00	3.90	294.793									
Arlington (south)	H-19 (3)							56.00	1.837	554.852												
Arlington (south)	H-19 (4)							120.00	0.82	530.732												
Fisherman's Park II	D-16 (1)										46.00	1.1	272.917	110.00	0.118	70.009						
Fisherman's Park II	D-16 (2)										48.00	1.509	390.670	230.00	2.56	3175.759						
Fisherman's Park II	D-16 (3)										72.00	3.279	1273.367	120.00	4.471	2893.781						
Fisherman's Park II	D-16 (4)										16.00	1.772	152.920	42.00	0.452	102.392						
Oxbow Nature Park	C-24 (1)										nd	0.41										
Oxbow Nature Park	C-24 (2)										28.00	0.934	141.054									
Oxbow Nature Park	C-24 (3)										18.00	0.508	49.319									
Oxbow Nature Park	C-24 (4)										20.00	1.126	121.464									
Mary Wahl Ditch	SDOE-008936 (1)													76.00	0.106	43.451						
Mary Wahl Ditch	SDOE-008936 (2)													140.00	1.091	823.820						
Mary Wahl Ditch	SDOE-008936 (3)													31.00	0.016	2.675						
Mary Wahl Ditch	SDOE-008936 (4)																					

E. coli																						
Site Name	Sample ID	Results (MPN/100 mL)																				
		August 5-6, 2019 Baseflow			February 12-13, 2020 Baseflow			November 19, 2019			March 15, 2020			April 5-6, 2020			May 16-17, 2020			June 7,2020		
		concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)	concentration (mg/L)	Flow (cfs)	Instantaneous Load (lbs)
Chalk Creek @ Chalk Bluff	CC@CB																					
Alum Creek @ Truckee River	AC@TR	137.4	0.9	666.974	nd	0.19											866.4	1.8	8598.368			
North Truckee Drain @ Orr Ditch	NTD@ORD																					
North Truckee Drain @ Kleppe Ln	NTD@KLP (1)																					
North Truckee Drain @ Kleppe Ln	NTD@KLP (2)																					
North Truckee Drain @ Kleppe Ln	NTD@KLP (3)																					
North Truckee Drain @ Kleppe Ln	NTD@KLP (4)																					
Thomas Creek @ S. Meadows Pkwy	TC@SMP																					
Whites Creek @ Old Virginia Hwy	WC@OVH	127.4	5.1	3504.446	107.1	5.7	3292.639															
Steamboat Creek @ Rhodes Road	SBC@RHR	410.6	18.6	41191.886	26.6	9.25	1327.098															
Steamboat Creek @ Narrows	SBC@NAR																					
Steamboat Creek @ Clean Water Way	SBC@CWW(1)																					
Steamboat Creek @ Clean Water Way	SBC@CWW(2)																					
Steamboat Creek @ Clean Water Way	SBC@CWW(3)																					
Steamboat Creek @ Clean Water Way	SBC@CWW(4)																					
Arlington (south)	H-19 (1)																					
Arlington (south)	H-19 (2)																					
Arlington (south)	H-19 (3)																					
Arlington (south)	H-19 (4)																					
Fisherman's Park II	D-16 (1)																					
Fisherman's Park II	D-16 (2)																					
Fisherman's Park II	D-16 (3)																					
Fisherman's Park II	D-16 (4)																					
Oxbow Nature Park	C-24 (1)																					
Oxbow Nature Park	C-24 (2)																					
Oxbow Nature Park	C-24 (3)																					
Oxbow Nature Park	C-24 (4)																					
Mary Wahl Ditch	SDOE-008936 (1)																					
Mary Wahl Ditch	SDOE-008936 (2)																					
Mary Wahl Ditch	SDOE-008936 (3)																					
Mary Wahl Ditch	SDOE-008936 (4)																					

APPENDIX D

Laboratory Reports

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY
www.WETLaboratory.com
Specializing in Soil, Hazardous Waste and Water Analysis

4/24/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20040141*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 4/6/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jennifer Delaney
QA Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20040141

Specific Report Comments

The result for Orthophosphate on samples 20040141-001, 002, 003, 004, 006, and 007 is higher than expected, especially when compared to the Total Phosphorus result. The Total Phosphorus was reanalyzed with results that confirm less than Orthophosphate. The Orthopohosphate was not reanalyzed due the EPA recommended holding time being expired. It is thought that particulate matter contained in the sample (based on Total Suspended Solids results) may have interfered with the Orthophosphate result by deflecting the light used in the spectrophotometric method. The chemical irregularity may also be due to an underlying sample matrix interference that cannot be determind at this time. We apologize for any inconveniece this may have caused.

Report Legend

B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank

D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.

HT -- Sample analyzed beyond the accepted holding time

J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.

K -- The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.

L -- The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.

M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.

NC -- Not calculated due to matrix interference

QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.

QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits

SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered

U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax

Date Printed: 4/24/2020
OrderID: *20040141*

Customer Sample ID: D-16 (1)
WETLAB Sample ID: 20040141-001

Collect Date/Time: 4/6/2020 02:41
Receive Date: 4/6/2020 14:47

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.29	mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.20	mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	110	mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	4.1	mg/L	1	0.30	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	580	mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.76	mg/L	2	0.060	4/6/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.061	mg/L	2	0.040	4/6/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	3.3	mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: D-16 (2)
WETLAB Sample ID: 20040141-002

Collect Date/Time: 4/6/2020 04:37
Receive Date: 4/6/2020 14:47

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.20	mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.11	mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	230	mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	3.4	mg/L	1	0.25	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	280	mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.43	mg/L	1	0.030	4/6/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.033	mg/L	1	0.020	4/6/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	3.0	mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID:	D-16 (3)	**Collect Date/Time:**	4/6/2020 05:19
WETLAB Sample ID:	20040141-003	**Receive Date:**	4/6/2020 14:47

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.20	mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.094	mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	120	mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	2.2	mg/L	1	0.25	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	270	mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.51	mg/L	1	0.030	4/6/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.026	mg/L	1	0.020	4/6/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	1.7	mg/L	0.5	0.20	4/16/2020	NV00925

Customer Sample ID: D-16 (4) **Collect Date/Time:** 4/6/2020 07:27

WETLAB Sample ID: 20040141-004 **Receive Date:** 4/6/2020 14:47

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.15		mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.097		mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	42		mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	2.2		mg/L	1	0.30	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	580		mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography								
Nitrate Nitrogen	EPA 300.0	0.87		mg/L	2	0.060	4/6/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	2	0.040	4/6/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	1.3		mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: SDOE008936 (1)
WETLAB Sample ID: 20040141-005
Collect Date/Time: 4/6/2020 02:41
Receive Date: 4/6/2020 14:47

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.12		mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.20		mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	76		mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	12		mg/L	1	0.70	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	460		mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography								
Nitrate Nitrogen	EPA 300.0	9.8		mg/L	10	0.30	4/6/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	10	0.20	4/6/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	2.5		mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: SDOE008936 (2)
WETLAB Sample ID: 20040141-006

Collect Date/Time: 4/6/2020 05:50
Receive Date: 4/6/2020 14:47

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.28	mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.14	mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	140	mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	3.6	mg/L	1	0.25	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	190	mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.80	mg/L	1	0.030	4/6/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.053	mg/L	1	0.020	4/6/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	2.7	mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: SDOE008936 (3) **Collect Date/Time:** 4/6/2020 12:10
WETLAB Sample ID: 20040141-007 **Receive Date:** 4/6/2020 14:47

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.19	mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.13	mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	31	mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	2.5	mg/L	1	0.25	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	150	mg/L	1	25	4/8/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.77	mg/L	1	0.030	4/7/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.042	mg/L	1	0.020	4/7/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	1.7	mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: NTD@ORD
WETLAB Sample ID: 20040141-008

Collect Date/Time: 4/6/2020 13:30
Receive Date: 4/6/2020 14:47

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.14		mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.16	M	mg/L	1	0.020	4/7/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	20		mg/L	1	10	4/6/2020	NV00925
Total Nitrogen	Calc.	3.0		mg/L	1	0.22	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	930		mg/L	1	25	4/8/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	1.6		mg/L	1	0.020	4/9/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.5		mg/L	0.5	0.20	4/16/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20040203	Blank 1	Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC20040229	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20040253	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20040296	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20040313	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20040380	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20040607	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20040203	LCS 1	Nitrate Nitrogen	EPA 300.0	0.529	0.500	106	mg/L
		Nitrite Nitrogen	EPA 300.0	0.507	0.500	101	mg/L
QC20040229	LCS 1	Orthophosphate, as P	SM 4500-P E	0.241	0.250	96	mg/L
QC20040253	LCS 1	Total Phosphorous as P	SM 4500-P E	0.266	0.250	106	mg/L
QC20040296	LCS 1	Total Suspended Solids (TSS)	SM 2540D	200	200	100	mg/L
QC20040296	LCS 2	Total Suspended Solids (TSS)	SM 2540D	194	200	97	mg/L
QC20040313	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.02	1.00	102	mg/L
QC20040380	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	160	150	107	mg/L
QC20040380	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	137	150	91	mg/L
QC20040607	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.06	1.00	106	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC20040296	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20040070-003	ND	ND	mg/L	<1%
QC20040296	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20040101-004	ND	ND	mg/L	<1%
QC20040380	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20040121-003	725	733	mg/L	1 %
QC20040380	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20040147-002	1448	1486	mg/L	3 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20040203	MS 1	Nitrate Nitrogen	EPA 300.0	20040141-002	0.433		0.959	0.967	0.5	mg/L	105	107	<1
		Nitrite Nitrogen	EPA 300.0	20040141-002	0.033		0.154	0.159	0.125	mg/L	97	101	3
QC20040203	MS 2	Nitrate Nitrogen	EPA 300.0	20040141-007	0.770		1.27	1.27	0.5	mg/L	99	100	<1
		Nitrite Nitrogen	EPA 300.0	20040141-007	0.042		0.173	0.178	0.125	mg/L	105	109	3
QC20040229	MS 1	Orthophosphate, as P	SM 4500-P E	20040141-008	0.137		0.375	0.387	0.25	mg/L	95	100	3
QC20040253	MS 1	Total Phosphorous as P	SM 4500-P E	20040141-008	0.159	M	0.355	0.321	0.25	mg/L	NC	NC	NC
QC20040313	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20040140-003	ND		5.20	5.35	1	mg/L	104	107	3
QC20040313	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20040149-001	ND		5.22	5.20	1	mg/L	104	104	<1
QC20040607	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20040175-001	1.23	M	1.85	1.66	0.5	mg/L	NC	NC	NC
QC20040607	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20040296-001	0.688	M	1.30	1.35	0.5	mg/L	NC	NC	NC

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

WETLAB

WESTERN ENVIRONMENTAL TESTING LABORATORY *Specializing in Soil, Hazardous Waste and Water Analysis.*

475 E. Greg Street #119 | Sparks, Nevada 89431 | www.WETLaboratory.com
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1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 20040141
Sparks
Elko
LV
Report Due Date
Page 1 of 1

Client Balance Hydrologics
Address ON File
City, State & Zip
Contact
Phone
Collector's Name
Fax
Project
P.O. Number
PWS Number
Email btrustman@balancehydro.com

Turnaround Time Requirements

Standard X
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State? NV X CA ____ Other ____

Report Results Via [✓ PDF] EDD Other excel

Compliance Monitoring? Yes [✓ No]

Report to Regulatory Agency? Yes [✓ No]

Standard QC Required? Yes No

Billing Address (if different than Client Address)

Company Balance Hydrologics
Address on file
City, State & Zip
Contact
Phone ____ Fax ____
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	NO3	Ortho P	TSS	TDS					Spl. No.
D-16(1)	4/6/20	02:41		Aq	2	X	X	X	X	X	X					
D-16(2)	4/6/20	04:37			2	X	X	X	X	X	X					
D-16(3)	4/6/20	05:19			2	X	X	X	X	X	X					
D-16(4)	4/6/20	07:27			2	X	X	X	X	X	X					
SDOE 008936(1)	4/6/20	02:41			1	X	X	X	X	X	X					
SDOE 008936(2)	4/6/20	05:50			1	X	X	X	X	X	X					
SDOE 008936(3)	4/6/20	12:10			1	X	X	X	X	X	X					
NTD@ ORD	4/6/20	13:30			2	X	X		X	X	X					

2004 2
0141 8

Instructions/Comments/Special Requirements:

Sample Matrix Key** **DW** = Drinking Water **WW** = Wastewater **SW** = Surface Water **MW** = Monitoring Well **SD** = Solid/Sludge **SO** = Soil **HW** = Hazardous Waste **OTHER:** ____

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
6.4°C	[✓ Y] / N	Y / [✓ N]	4/6/20	14:47		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ________ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

4/21/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20040175*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 4/7/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jennifer Delaney

Jennifer Delaney
QA Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20040175

Specific Report Comments

None

Report Legend

B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank

D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.

HT -- Sample analyzed beyond the accepted holding time

J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.

K -- The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.

L -- The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.

M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.

NC -- Not calculated due to matrix interference

QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.

QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits

SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered

U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax
PO\Project: *213136*

Date Printed: 4/21/2020
OrderID: *20040175*

Customer Sample ID: NTD@BFD (1)
WETLAB Sample ID: 20040175-001
Collect Date/Time: 4/6/2020 01:00
Receive Date: 4/7/2020 11:40

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.028		mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.10		mg/L	1	0.020	4/8/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	20		mg/L	1	10	4/13/2020	NV00925
Total Nitrogen	Calc.	2.8		mg/L	1	0.22	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	990		mg/L	1	25	4/8/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	1.5	M	mg/L	1	0.020	4/15/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.2	M	mg/L	0.5	0.20	4/16/2020	NV00925

Customer Sample ID: NTD@BFD (2)
WETLAB Sample ID: 20040175-002
Collect Date/Time: 4/6/2020 05:00
Receive Date: 4/7/2020 11:40

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.051		mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.25		mg/L	1	0.020	4/8/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	21		mg/L	1	10	4/13/2020	NV00925
Total Nitrogen	Calc.	2.8		mg/L	1	0.22	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	890		mg/L	1	25	4/8/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	1.4		mg/L	1	0.020	4/15/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.4		mg/L	0.5	0.20	4/16/2020	NV00925

Customer Sample ID: NTD@BFD (3)
WETLAB Sample ID: 20040175-003
Collect Date/Time: 4/6/2020 09:00
Receive Date: 4/7/2020 11:40

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.086		mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.20		mg/L	1	0.020	4/8/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	30		mg/L	1	10	4/13/2020	NV00925
Total Nitrogen	Calc.	3.1		mg/L	1	0.22	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	750		mg/L	1	25	4/8/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: NTD@BFD (3) **Collect Date/Time:** 4/6/2020 09:00

WETLAB Sample ID: 20040175-003 **Receive Date:** 4/7/2020 11:40

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.5	mg/L	1	0.020	4/15/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.6	mg/L	0.5	0.20	4/16/2020	NV00925

Customer Sample ID: NTD@BFD (4) **Collect Date/Time:** 4/6/2020 15:00

WETLAB Sample ID: 20040175-004 **Receive Date:** 4/7/2020 11:40

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.068	mg/L	1	0.020	4/7/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.35	mg/L	1	0.020	4/8/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	44	mg/L	1	10	4/13/2020	NV00925
Total Nitrogen	Calc.	2.8	mg/L	1	0.22	4/16/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	560	mg/L	1	25	4/8/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.2	mg/L	1	0.020	4/15/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.6	mg/L	0.5	0.20	4/16/2020	NV00925

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20040246	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20040299	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20040381	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20040496	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20040599	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20040607	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20040246	LCS 1	Orthophosphate, as P	SM 4500-P E	0.250	0.250	100	mg/L
QC20040299	LCS 1	Total Phosphorous as P	SM 4500-P E	0.229	0.250	92	mg/L
QC20040381	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	143	150	95	mg/L
QC20040381	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	153	150	102	mg/L
QC20040496	LCS 1	Total Suspended Solids (TSS)	SM 2540D	199	200	99	mg/L
QC20040496	LCS 2	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20040599	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.02	1.00	102	mg/L
QC20040607	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.06	1.00	106	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC20040381	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20040176-001	573	589	mg/L	3 %
QC20040381	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20040182-001	61.0	55.0	mg/L	10 %
QC20040496	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20040286-003	ND	ND	mg/L	<1%
QC20040496	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20040338-001	ND	ND	mg/L	<1%

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20040246	MS 1	Orthophosphate, as P	SM 4500-P E	20040175-001	0.028		0.271	0.270	0.25	mg/L	97	97	<1
QC20040246	MS 2	Orthophosphate, as P	SM 4500-P E	20040207-001	0.076	HT	0.314	0.340	0.25	mg/L	95	106	8
QC20040299	MS 1	Total Phosphorous as P	SM 4500-P E	20040175-001	0.103		0.377	0.376	0.25	mg/L	110	109	<1
QC20040299	MS 2	Total Phosphorous as P	SM 4500-P E	20040207-002	0.137	M	0.184	0.094	0.25	mg/L	NC	NC	NC
QC20040599	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20040175-001	1.52	M	2.01	1.91	1	mg/L	NC	NC	NC
QC20040599	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20040243-001	10.7		21.4	20.9	1	mg/L	107	102	2
QC20040607	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20040175-001	1.23	M	1.85	1.66	0.5	mg/L	NC	NC	NC
QC20040607	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20040296-001	0.688	M	1.30	1.35	0.5	mg/L	NC	NC	NC

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY
Specializing in Soil, Hazardous Waste and Water Analysis.

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tel (775) 355-0202 | fax (775) 355-0817
1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 2004017 5
Sparks Control #
Elko Control #
LV Control #
Report Due Date
Page 1 of 1

Client Balance Hydrologics
Address ON FILE
City, State & Zip
Contact
Phone
Collector's Name
Fax
PWS/Project Name
P.O. Number
PWS/Project Number 213136
Email btrustman@balancehydro.com

Turnaround Time Requirements
Standard ☑
5 Day* (25%) ☐ 72 Hour* (50%) ☐
48 Hour* (100%) ☐ 24 Hour* (200%) ☐
*Surcharges Will Apply

Samples Collected From Which State?
NV ☑ CA ☐ Other ☐

Compliance Monitoring?
Yes ☐ No ☑

Report Results Via
PDF ☑ EDD ☐
Other excel

Report to Regulatory Agency?
Yes ☐ No ☑

Standard QC Required?
Yes ☑ No ☐

Billing Address (if different than Client Address)
Company ON FILE
Address
City, State & Zip
Contact
Phone
Fax
Email btrustman@balancehydro.com

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TDS	TSS						Spl. No.
NTD@BFD (1)	4/6/20	01:00		aq	2	✓	✓	✓	✓	✓						
NTD@BFD (2)	4/6/20	05:00		aq	2	✓	✓	✓	✓	✓						
NTD@BFD (3)	4/6/20	09:00		aq	2	✓	✓	✓	✓	✓						
NTD@BFD (4)	4/6/20	15:00		aq	2	✓	✓	✓	✓	✓						

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER:

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
12 °C	Y N [✓ None]	8	4/7/20	11:40	Jack Jacquet	
°C	Y N None					
°C	Y N None					
°C	Y N None					

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Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). bdt initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. bdt initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. bdt initial

301.2E

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

6/22/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20060244*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 6/8/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Cory Baker

Cory Baker
QA Specialist

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20060244

Specific Report Comments

None

Report Legend

B	--	Blank contamination; Analyte detected above the method reporting limit in an associated blank
D	--	Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
HT	--	Sample analyzed beyond the accepted holding time
J	--	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.
K	--	The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.
L	--	The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.
M	--	The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
N	--	There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
NC	--	Not calculated due to matrix interference
QD	--	The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
QL	--	The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
S	--	Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
SC	--	Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
U	--	The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax
PO\Project: *213136*

Date Printed: 6/22/2020
OrderID: *20060244*

Customer Sample ID: WC@OVH
WETLAB Sample ID: 20060244-001
Collect Date/Time: 6/7/2020 22:20
Receive Date: 6/8/2020 08:53

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.026	mg/L	1	0.020	6/9/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.032	mg/L	1	0.020	6/12/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	6/8/2020	NV00925
Total Nitrogen	Calc.	ND	mg/L	1	0.22	6/9/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	62	mg/L	1	25	6/8/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	6/8/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	ND	mg/L	0.5	0.20	6/9/2020	NV00925

Customer Sample ID: TC@SMP
WETLAB Sample ID: 20060244-002
Collect Date/Time: 6/7/2020 21:55
Receive Date: 6/8/2020 08:53

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.068	mg/L	1	0.020	6/9/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.094	mg/L	1	0.020	6/12/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	6/8/2020	NV00925
Total Nitrogen	Calc.	0.46	mg/L	1	0.22	6/9/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	110	mg/L	1	25	6/8/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	6/8/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.44	mg/L	0.5	0.20	6/9/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20060410	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20060419	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20060438	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L
QC20060440	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20060481	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20060604	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20060410	LCS 1	Orthophosphate, as P	SM 4500-P E	0.254	0.250	101	mg/L
QC20060419	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.05	1.00	105	mg/L
QC20060438	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.946	1.00	95	mg/L
QC20060440	LCS 1	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20060440	LCS 2	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20060481	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	153	150	102	mg/L
QC20060481	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	164	150	109	mg/L
QC20060604	LCS 1	Total Phosphorous as P	SM 4500-P E	0.224	0.250	90	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC20060440	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20060226-004	ND	ND	mg/L	<1%
QC20060440	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20060230-002	ND	ND	mg/L	<1%
QC20060481	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20060230-001	1378	1324	mg/L	4 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20060410	MS 1	Orthophosphate, as P	SM 4500-P E	20060244-001	0.026		0.269	0.269	0.25	mg/L	97	97	<1
QC20060419	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20060173-010	0.164		5.35	5.37	1	mg/L	104	104	<1
QC20060419	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20060222-004	0.990		2.08	2.06	1	mg/L	109	107	1
QC20060438	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20060122-002	2.14	SC	2.84	2.73	0.5	mg/L	NC	NC	NC
QC20060438	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20060168-003	ND		0.534	0.550	0.5	mg/L	98	102	3
QC20060604	MS 1	Total Phosphorous as P	SM 4500-P E	20060244-001	0.032		0.299	0.297	0.25	mg/L	107	106	<1
QC20060604	MS 2	Total Phosphorous as P	SM 4500-P E	20060309-001	0.062		0.319	0.296	0.25	mg/L	103	94	8

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY
Specializing in Soil, Hazardous Waste and Water Analysis.
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tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 2006O244
Sparks
Elko
LV
Report Due Date
Page ____ of ____

Client: Balance Hydrologics
Address: on file
City, State & Zip:
Contact:
Phone:
Collector's Name:
Fax:
Project: 213136
P.O. Number:
PWS Number:
Email: btrustman@balancehydro.com

Turnaround Time Requirements
Standard X
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State?
NV X CA ____ Other ____

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Report Results Via
[✓ PDF] EDD Other Excel

Standard QC Required?
[✓ Yes] No

Billing Address (if different than Client Address)
Company: on file
Address:
City, State & Zip:
Contact:
Phone: ____ Fax:
Email: rboitano@balancehydro.com

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	total N	Total P	Ortho P	TSS	TDS						Spl. No.
WC @ OVH	6/7/20	22:20		Aq	2	X	X	X	X	X						
TC @ SMP	6/7/20	21:55		Aq	2	X	X	X	X	X						

2006 1
0244 2

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: ____

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
4.1 °C	[✓ Y] / N	Y / [✓ N]	6/8/20	8:53		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ________ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

3/31/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20030522*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 3/16/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jennifer Delaney
QA Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20030522

Specific Report Comments

The result for Orthophosphate on samples 20030522-001, 002, 004, 008, 009, and 010 is higher than expected, especially when compared to the Total Phosphorus results. The samples were reanalyzed for Total Phosphorus and all samples confirmed results less than Orthophosphate. Orthophosphate was not reaanlyzed due to the EPA recommended holding time being expired. The chemical irregularity may potentially be due to a sample matrix interference, but this cannot be confirmed at this time. We apologize for any inconveniece this may have caused.

Report Legend

B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank

D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.

HT -- Sample analyzed beyond the accepted holding time

J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.

K -- The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.

L -- The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.

M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.

NC -- Not calculated due to matrix interference

QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.

QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits

SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered

U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax
PO\Project: *213136*

Date Printed: 3/31/2020
OrderID: *20030522*

Customer Sample ID: D-16 (1)
WETLAB Sample ID: 20030522-001

Collect Date/Time: 3/15/2020 03:21
Receive Date: 3/16/2020 17:02

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.34		mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.24		mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	46		mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	5.3		mg/L	1	0.40	3/20/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	670		mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography								
Nitrate Nitrogen	EPA 300.0	1.2		mg/L	5	0.15	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.15		mg/L	5	0.10	3/16/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	3.9	SC	mg/L	0.5	0.20	3/20/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: D-16 (2)
WETLAB Sample ID: 20030522-002

Collect Date/Time: 3/15/2020 07:03
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.25	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.16	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	48	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	2.9	mg/L	1	0.24	3/20/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	320	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.62	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	2.3	mg/L	0.5	0.20	3/20/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: D-16 (3)
WETLAB Sample ID: 20030522-003

Collect Date/Time: 3/15/2020 07:46
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.25	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.33	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	72	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	3.0	mg/L	1	0.24	3/20/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	250	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.56	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.053	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	2.4	mg/L	0.5	0.20	3/20/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: D-16 (4)
WETLAB Sample ID: 20030522-004
Collect Date/Time: 3/15/2020 08:36
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.24	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.18	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	16	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	2.4	mg/L	1	0.24	3/20/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	180	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.51	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.045	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	1.8	mg/L	0.5	0.20	3/20/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: H-19 (1)
WETLAB Sample ID: 20030522-005

Collect Date/Time: 3/15/2020 07:02
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.43	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.49	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	26	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	3.3	mg/L	1	0.24	3/20/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	110	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.52	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	2.7	mg/L	0.5	0.20	3/20/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: H-19 (2)
WETLAB Sample ID: 20030522-006
Collect Date/Time: 3/15/2020 07:17
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.62	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.74	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	14	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	3.8	mg/L	1	0.24	3/20/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	110	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.59	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	3.2	mg/L	0.5	0.20	3/20/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: C-24 (1)
WETLAB Sample ID: 20030522-007

Collect Date/Time: 3/15/2020 04:24
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.27	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.40	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	1.5	mg/L	1	0.24	3/23/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	41	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.30	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.023	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	1.2	mg/L	0.5	0.20	3/23/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: C-24 (2) **Collect Date/Time:** 3/15/2020 05:05
WETLAB Sample ID: 20030522-008 **Receive Date:** 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.25	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.19	mg/L	1	0.020	3/17/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	28	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	1.9	mg/L	1	0.24	3/23/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	60	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.31	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.023	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	1.6	mg/L	0.5	0.20	3/23/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: C-24 (3)
WETLAB Sample ID: 20030522-009

Collect Date/Time: 3/15/2020 05:35
Receive Date: 3/16/2020 17:02

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.27		mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.11		mg/L	1	0.020	3/18/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	18		mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	1.5		mg/L	1	0.24	3/23/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	66		mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography								
Nitrate Nitrogen	EPA 300.0	0.35		mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	0.022		mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	1.1	M	mg/L	0.5	0.20	3/23/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: C-24 (4)
WETLAB Sample ID: 20030522-010
Collect Date/Time: 3/15/2020 06:06
Receive Date: 3/16/2020 17:02

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.24	mg/L	1	0.020	3/16/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.21	mg/L	1	0.020	3/18/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	20	mg/L	1	10	3/17/2020	NV00925
Total Nitrogen	Calc.	1.4	mg/L	1	0.24	3/23/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	68	mg/L	1	25	3/19/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.32	mg/L	1	0.030	3/16/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.020	3/16/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	1.1	mg/L	0.5	0.20	3/23/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20030634	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20030637	Blank 1	Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC20030694	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20030729	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20030747	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20030851	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L
QC20030866	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20030867	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20030894	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L
QC20030895	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20030634	LCS 1	Orthophosphate, as P	SM 4500-P E	0.254	0.250	102	mg/L
QC20030637	LCS 1	Nitrate Nitrogen	EPA 300.0	0.539	0.500	108	mg/L
		Nitrite Nitrogen	EPA 300.0	0.521	0.500	104	mg/L
QC20030694	LCS 1	Total Phosphorous as P	SM 4500-P E	0.254	0.250	102	mg/L
QC20030729	LCS 1	Total Suspended Solids (TSS)	SM 2540D	199	200	100	mg/L
QC20030729	LCS 2	Total Suspended Solids (TSS)	SM 2540D	199	200	100	mg/L
QC20030747	LCS 1	Total Phosphorous as P	SM 4500-P E	0.266	0.250	107	mg/L
QC20030851	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.01	1.00	101	mg/L
QC20030866	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	142	150	95	mg/L
QC20030866	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	145	150	97	mg/L
QC20030867	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	147	150	98	mg/L
QC20030867	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	137	150	91	mg/L
QC20030894	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.02	1.00	102	mg/L
QC20030895	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.02	1.00	102	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result		Units	RPD
QC20030729	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20030498-001	12.0	15.0	QD	mg/L	22 %
QC20030729	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20030522-008	28.0	28.0		mg/L	<1%
QC20030866	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20030552-011	525	527		mg/L	<1%
QC20030866	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20030552-015	514	499		mg/L	3 %
QC20030867	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20030512-003	776	787		mg/L	1 %
QC20030867	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20030552-007	496	520		mg/L	5 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20030634	MS 1	Orthophosphate, as P	SM 4500-P E	20030522-001	0.343		0.576	0.579	0.25	mg/L	93	94	<1
QC20030634	MS 2	Orthophosphate, as P	SM 4500-P E	20030519-002	0.092		0.329	0.322	0.25	mg/L	95	92	2
QC20030637	MS 1	Nitrate Nitrogen	EPA 300.0	20030522-010	0.316		0.807	0.826	0.5	mg/L	98	102	2
		Nitrite Nitrogen	EPA 300.0	20030522-010	ND		0.155	0.163	0.125	mg/L	108	115	5
QC20030694	MS 1	Total Phosphorous as P	SM 4500-P E	20030519-002	0.202		0.458	0.456	0.25	mg/L	102	101	<1
QC20030694	MS 2	Total Phosphorous as P	SM 4500-P E	20030522-007	0.398		0.666	0.617	0.25	mg/L	107	87	8
QC20030747	MS 1	Total Phosphorous as P	SM 4500-P E	20030522-009	0.107		0.367	0.446	0.25	mg/L	104	136	19
QC20030851	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20030464-007	0.251	M	0.664	0.805	0.5	mg/L	NC	NC	NC

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20030851	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20030522-001	3.90	SC	4.74	4.76	0.5	mg/L	NC	NC	NC
QC20030894	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20030661-001	ND	M	0.886	0.583	0.5	mg/L	NC	NC	NC
QC20030895	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20030522-009	1.12	M	1.74	1.75	0.5	mg/L	NC	NC	NC

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY
Specializing in Soil, Hazardous Waste and Water Analysis.

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3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 20030522
Sparks
Elko
LV
Report Due Date
Page 1 of 2

Client: Balance Hydrologics
Address: ON FILE
City, State & Zip:
Contact: Ben Trustman
Phone:
Collector's Name:
Fax:
Project: 213136
P.O. Number:
PWS Number:
Email: btrustman@ ~~Ba~~ balancehydro.com

Turnaround Time Requirements
Standard ✓
5 Day* (25%)
72 Hour* (50%)
48 Hour* (100%)
24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State? NV ✓ CA Other
Compliance Monitoring? Yes [✓ No]
Report to Regulatory Agency? Yes [✓ No]
Report Results Via [✓ PDF] EDD Other Excel
Standard QC Required? [✓ Yes] No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone
Fax
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	OrthoP	NO3	TSS	TDS					Spl. No.
D-16 (1)	3/15/20	3:21		Aq	2	X	X	X	X	X	X					
D-16 (2)		7:03			2	X	X	X	X	X	X					
D-16 (3)		~~8:36~~	7:46		2	X	X	X	X	X	X					
D-16 (4)	↓	8:36			2	X	X	X	X	X	X					
H-19 (1)	3/15/20	7:02			2	X	X	X	X	X	X					
H-19 (2)	3/15/20	7:17			2	X	X	X	X	X	X					

2003 2
0522 10

Instructions/Comments/Special Requirements:

Sample Matrix Key** **DW** = Drinking Water **WW** = Wastewater **SW** = Surface Water **MW** = Monitoring Well **SD** = Solid/Sludge **SO** = Soil **HW** = Hazardous Waste **OTHER:**

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
4.4 °C	[✓ Y] / N	Y / [✓ N]	3/16/20	3:16		
°C	Y / N	Y / N		5:02		
°C	Y / N	Y / N		ADA 3/16/20		
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ____ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ____ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ____ initial

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY
Specializing in Soil, Hazardous Waste and Water Analysis.

475 E. Greg Street #119 | Sparks, Nevada 89431 | www.WETLaboratory.com
tel (775) 355-0202 | fax (775) 355-0817
1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 20030522
Sparks
Elko
LV
Report Due Date
Page 2 of 2

Client Balance Hydrologics
Address ON File
City, State & Zip
Contact
Phone
Collector's Name
Fax
Project 213136
P.O. Number
PWS Number
Email

Turnaround Time Requirements
Standard X
5 Day* (25%)
72 Hour* (50%)
48 Hour* (100%)
24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State?
NV X CA
Other

Report Results Via
[✓ PDF] EDD
Other Excel

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Standard QC Required?
[✓ Yes] No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone
Fax
Email

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	NO3	TSS	TDS					Spl. No.
C-24(1)	3/15/20	4:24		Aq	2	X	X	X	X	X	X					
C-24(2)		5:05			2	X	X	X	X	X	X					
C-24(3)		5:35			2	X	X	X	X	X	X					
C-24(4)		6:06			2	X	X	X	X	X	X					

2003 2
0522 10

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER:

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
4.4 °C	[✓ Y] / N	Y / [✓ N]	3/16/20	5:02		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

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To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. initial

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

6/2/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20050455*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 5/18/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Cory Baker

Cory Baker
QA Specialist

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20050455

Specific Report Comments

The result for Orthophosphate on sample 20050455-002 is higher than expected, especially when compared to the Total Phosphorus result. Due to concentrations in the sample it can be inferred that all of the Total Phosphorus is Orthophosphate based.

Report Legend

B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank

D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.

HT -- Sample analyzed beyond the accepted holding time

J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.

K -- The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.

L -- The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.

M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.

NC -- Not calculated due to matrix interference

QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.

QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits

SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered

U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax
PO\Project: *213136*

Date Printed: 6/2/2020
OrderID: *20050455*

Customer Sample ID: TC@SMP
WETLAB Sample ID: 20050455-001

Collect Date/Time: 5/18/2020 12:10
Receive Date: 5/18/2020 13:45

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.089	mg/L	1	0.020	5/19/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.10	mg/L	1	0.020	5/20/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	5/18/2020	NV00925
Total Nitrogen	Calc.	0.26	mg/L	1	0.22	5/21/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	100	mg/L	1	25	5/19/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	5/19/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.25	mg/L	0.5	0.20	5/21/2020	NV00925

Customer Sample ID: AC@TR
WETLAB Sample ID: 20050455-002

Collect Date/Time: 5/18/2020 10:10
Receive Date: 5/18/2020 13:45

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.031	mg/L	1	0.020	5/19/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.028	mg/L	1	0.020	5/19/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	11	mg/L	1	10	5/18/2020	NV00925
Total Nitrogen	Calc.	ND	mg/L	1	0.25	5/21/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	160	mg/L	1	25	5/19/2020	NV00925
Microbiological Analyses							
Total Coliform (MPN)	SM 9223B (Quantitray)	>2419.6	MPN/100ml	1	1.0	5/18/2020	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	866.4	MPN/100ml	1	1.0	5/18/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	ND	mg/L	1	0.030	5/19/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.020	5/19/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	ND	mg/L	0.5	0.20	5/21/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: WC@OUH

WETLAB Sample ID: 20050455-003

Collect Date/Time: 5/18/2020 12:35

Receive Date: 5/18/2020 13:45

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.024		mg/L	1	0.020	5/19/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.055		mg/L	1	0.020	5/20/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND		mg/L	1	10	5/18/2020	NV00925
Total Nitrogen	Calc.	ND		mg/L	1	0.22	5/21/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	74		mg/L	1	25	5/19/2020	NV00925
Microbiological Analyses								
Total Coliform (MPN)	SM 9223B (Quantitray)	2419.6		MPN/100ml	1	1.0	5/18/2020	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	70.3		MPN/100ml	1	1.0	5/18/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	ND		mg/L	1	0.020	5/19/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	ND	M	mg/L	0.5	0.20	5/21/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20050702	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20050704	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20050705	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20050731	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20050737	Blank 1	Total Coliform (MPN)	SM 9223B (Quant	ND			MPN/100ml
		Escherichia Coli (MPN)	SM 9223B (Quant	ND			MPN/100ml
QC20050749	Blank 1	Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC20050780	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20050830	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20050844	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20050702	LCS 1	Orthophosphate, as P	SM 4500-P E	0.251	0.250	100	mg/L
QC20050704	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.06	1.00	106	mg/L
QC20050705	LCS 1	Total Phosphorous as P	SM 4500-P E	0.239	0.250	96	mg/L
QC20050731	LCS 1	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20050731	LCS 2	Total Suspended Solids (TSS)	SM 2540D	199	200	99	mg/L
QC20050749	LCS 1	Nitrate Nitrogen	EPA 300.0	0.476	0.500	95	mg/L
		Nitrite Nitrogen	EPA 300.0	0.471	0.500	94	mg/L
QC20050780	LCS 1	Total Phosphorous as P	SM 4500-P E	0.241	0.250	96	mg/L
QC20050830	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	148	150	99	mg/L
QC20050830	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	150	150	100	mg/L
QC20050844	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.950	1.00	95	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC20050731	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20050439-001	ND	ND	mg/L	<1%
QC20050731	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20050448-001	21.7	23.3	mg/L	7 %
QC20050830	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20050419-006	429	433	mg/L	1 %
QC20050830	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20050470-001	641	650	mg/L	1 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20050702	MS 1	Orthophosphate, as P	SM 4500-P E	20050455-002	0.031		0.276	0.278	0.25	mg/L	98	99	<1
QC20050704	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20050446-003	0.174	M	1.28	1.26	1	mg/L	NC	NC	NC
QC20050704	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20050470-002	ND	M	5.52	5.52	1	mg/L	NC	NC	NC
QC20050705	MS 1	Total Phosphorous as P	SM 4500-P E	20050455-002	0.028		0.298	0.307	0.25	mg/L	108	112	3
QC20050705	MS 2	Total Phosphorous as P	SM 4500-P E	20050438-001	ND	U	0.230	0.242	0.25	mg/L	92	97	5
QC20050749	MS 1	Nitrate Nitrogen	EPA 300.0	20050504-006	0.033		0.549	0.557	0.5	mg/L	103	105	1
		Nitrite Nitrogen	EPA 300.0	20050504-006	ND		0.132	0.130	0.125	mg/L	106	104	2
QC20050780	MS 1	Total Phosphorous as P	SM 4500-P E	20050455-001	0.101		0.384	0.364	0.25	mg/L	113	105	5
QC20050780	MS 2	Total Phosphorous as P	SM 4500-P E	20050479-001	0.046		0.278	0.298	0.25	mg/L	93	101	7
QC20050844	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20050447-003	0.954	M	1.31	1.31	0.5	mg/L	NC	NC	NC
QC20050844	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20050455-003	ND	M	0.524	0.518	0.5	mg/L	NC	NC	NC

WETLAB
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tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 20050455
Sparks
Elko
LV
Report Due Date
Page 1 of 1

Client Balance Hydrologics
Address ON File
City, State & Zip
Contact
Phone
Collector's Name
Fax
Project 213136
P.O. Number
PWS Number
Email btrustman@Balancehydro.com

Turnaround Time Requirements
Standard X
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State?
NV X CA ____ Other ____

Compliance Monitoring? Yes [✓ No]

Report to Regulatory Agency? Yes [✓ No]

Report Results Via
[✓ PDF] EDD
Other excel

Standard QC Required? [✓ Yes] No

Billing Address (if different than Client Address)
Company
Address on file
City, State & Zip
Contact
Phone ____ Fax ____
Email

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS	NO3	E coli			Spl. No.
TC@SMP	5/18/20	12:10		Ag	2	X	X	X	X	X					
AC@TR	↓	10:10		↓	3	X	X	X	X	X	X	X			
WC@OVH		12:35			3	X	X	X	X	X		X			

2005 6
0455 3

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: ____

*SAMPLE PRESERVATIVES: 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
5.6 °C	[✓ Y] N	Y [✓ N]	5/18/20	13:45		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

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To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

301.2E

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

12/6/2019

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *19110580*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 11/20/2019. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jennifer Delaney
QA Specialist

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 19110580

Specific Report Comments

The result for Orthophosphate on samples 19110580-002 and 003 is higher than expected, especially when compared to the Total Phosphorus result. It is thought that particulate matter contained in the sample interfered with the Orthophosphate result by deflecting the light used in the spectrophotometric method. The particulate matter did not interfere with the Total Phosphorus analysis since that procedure includes an acid digestion process.

Report Legend

B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank

D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.

HT -- Sample analyzed beyond the accepted holding time

J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.

K -- The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.

L -- The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.

M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.

NC -- Not calculated due to matrix interference

QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.

QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits

SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered

U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax
PO\Project: *213136*

Date Printed: 12/6/2019
OrderID: *19110580*

Customer Sample ID: H-19 (1)
WETLAB Sample ID: 19110580-001
Collect Date/Time: 11/19/2019 21:51
Receive Date: 11/20/2019 11:46

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	3.8	mg/L	10	0.20	11/20/2019	NV00925
Total Phosphorous as P	SM 4500-P E	4.2	mg/L	10	0.20	11/21/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	100	mg/L	1	10	11/21/2019	NV00925
Total Nitrogen	Calc.	15	mg/L	1	2.2	12/5/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	1100	mg/L	1	25	11/23/2019	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	3.1	mg/L	5	0.15	11/21/2019	NV00925
Nitrite Nitrogen	EPA 300.0	0.18	mg/L	1	0.010	11/21/2019	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	12	mg/L	5	2.0	12/5/2019	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: H-19 (2)
WETLAB Sample ID: 19110580-002

Collect Date/Time: 11/19/2019 22:03
Receive Date: 11/20/2019 11:46

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	2.9	mg/L	10	0.20	11/20/2019	NV00925
Total Phosphorous as P	SM 4500-P E	1.0	mg/L	10	0.20	11/21/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	82	mg/L	1	10	11/21/2019	NV00925
Total Nitrogen	Calc.	12	mg/L	1	2.0	12/5/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	940	mg/L	1	25	11/23/2019	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	2.4	mg/L	1	0.030	11/21/2019	NV00925
Nitrite Nitrogen	EPA 300.0	0.14	mg/L	1	0.010	11/21/2019	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	9.0	mg/L	5	2.0	12/5/2019	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: H-19 (3)
WETLAB Sample ID: 19110580-003

Collect Date/Time: 11/19/2019 22:20
Receive Date: 11/20/2019 11:46

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	3.4		mg/L	10	0.20	11/20/2019	NV00925
Total Phosphorous as P	SM 4500-P E	2.9		mg/L	10	0.20	11/21/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	56		mg/L	1	10	11/21/2019	NV00925
Total Nitrogen	Calc.	12		mg/L	1	2.0	12/5/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	840		mg/L	1	25	11/23/2019	NV00925
Anions by Ion Chromatography								
Nitrate Nitrogen	EPA 300.0	2.1	SC	mg/L	1	0.030	11/21/2019	NV00925
Nitrite Nitrogen	EPA 300.0	0.14	M	mg/L	1	0.010	11/21/2019	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	10		mg/L	5	2.0	12/5/2019	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: H-19 (4)
WETLAB Sample ID: 19110580-004

Collect Date/Time: 11/20/2019 10:36
Receive Date: 11/20/2019 11:46

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	2.8	mg/L	10	0.20	11/20/2019	NV00925
Total Phosphorous as P	SM 4500-P E	3.3	mg/L	10	0.20	11/21/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	120	mg/L	1	10	11/21/2019	NV00925
Total Nitrogen	Calc.	8.3	mg/L	1	0.44	12/5/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	610	mg/L	1	25	11/23/2019	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.98	mg/L	1	0.030	11/21/2019	NV00925
Nitrite Nitrogen	EPA 300.0	0.34	mg/L	1	0.010	11/21/2019	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	7.0	mg/L	1	0.40	12/5/2019	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Western Environmental Testing Laboratory
QC Report

QCBatchID	**QCType**	**Parameter**	**Method**	**Result**	**Actual**	**% Rec**	**Units**
QC19110866	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC19110891	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC19110920	Blank 1	Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC19110972	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC19111102	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC19111125	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC19120247	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	**QCType**	**Parameter**	**Method**	**Result**	**Actual**	**% Rec**	**Units**
QC19110866	LCS 1	Orthophosphate, as P	SM 4500-P E	0.259	0.250	104	mg/L
QC19110891	LCS 1	Total Phosphorous as P	SM 4500-P E	0.238	0.250	95	mg/L
QC19110920	LCS 1	Nitrate Nitrogen	EPA 300.0	0.477	0.500	95	mg/L
		Nitrite Nitrogen	EPA 300.0	0.504	0.500	101	mg/L
QC19110972	LCS 1	Total Suspended Solids (TSS)	SM 2540D	197	200	99	mg/L
QC19110972	LCS 2	Total Suspended Solids (TSS)	SM 2540D	194	200	97	mg/L
QC19111102	LCS 1	Total Suspended Solids (TSS)	SM 2540D	199	200	100	mg/L
QC19111102	LCS 2	Total Suspended Solids (TSS)	SM 2540D	199	200	99	mg/L
QC19111125	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	149	150	99	mg/L
QC19111125	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	147	150	98	mg/L
QC19120247	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.910	1.00	91	mg/L

QCBatchID	**QCType**	**Parameter**	**Method**	**Duplicate Sample**	**Sample Result**	**Duplicate Result**	**Units**	**RPD**
QC19110972	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	19110484-007	ND	ND	mg/L	13 %
QC19110972	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	19110537-005	ND	ND	mg/L	29 %
QC19111102	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	19110609-001	ND	ND	mg/L	33 %
QC19111102	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	19110624-001	ND	ND	mg/L	<1%
QC19111125	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	19110574-003	2648	2748	mg/L	4 %
QC19111125	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	19110584-002	598	591	mg/L	1 %

QCBatchID	**QCType**	**Parameter**	**Method**	**Spike Sample**	**Sample Result**		**MS Result**	**MSD Result**	**Spike Value**	**Units**	**MS %Rec**	**MSD %Rec**	**RPD %**
QC19110866	MS 1	Orthophosphate, as P	SM 4500-P E	19110608-001	8.67	M	9.03	8.02	0.25	mg/L	NC	NC	NC
QC19110891	MS 1	Total Phosphorous as P	SM 4500-P E	19110609-001	1.90		4.62	4.46	0.25	mg/L	109	103	4
QC19110920	MS 1	Nitrate Nitrogen	EPA 300.0	19110580-003	2.07	SC	1.75	1.68	0.5	mg/L	NC	NC	NC
		Nitrite Nitrogen	EPA 300.0	19110580-003	0.137	M	0.304	0.307	0.125	mg/L	NC	NC	NC
QC19120247	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	19110703-001	ND		0.530	0.555	0.5	mg/L	91	96	5
QC19120247	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	19120091-001	1.16	SC	1.72	1.78	0.5	mg/L	NC	NC	NC

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tel (775) 355-0202 | fax (775) 355-0817
1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

update person of contact on file
see below

WETLAB Order ID 19110580
Sparks ______
Elko ______
LV ______
Report Due Date ______
Page ______ of ______

Client BALANCE HYDROLOGICS
Address 12020 Donner Pass Rd Ste B1
City, State & Zip Truckee CA 96161
Contact Ben Trustman
Phone 530.550.9776 ext 228
Collector's Name BT
Fax —
Project 213136
P.O. Number
PWS Number
Email btrustman@balancehydro.com

Turnaround Time Requirements
Standard X
5 Day* (25%) ______ 72 Hour* (50%) ______
48 Hour* (100%) ______ 24 Hour* (200%) ______
*Surcharges Will Apply

Samples Collected From Which State?
NV X CA ____ Other ____

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Report Results Via
[✓ PDF] EDD Other ______

Standard QC Required?
[✓ Yes] No

Billing Address (if different than Client Address)
Company Balance Hydrologics
Address 800 Bancroft Way Ste 101
City, State & Zip Berkeley CA 94710
Contact Rachel Boitano
Phone 510-704-1000 ext 245 Fax ______
Email rboitano@balancehydro.com

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	NO3	Ortho P	TSS	TDS				Spl. No.
H-19 (1)	11/19/19	21:51		Aq	2	X	X	X	X	X	X				
H-19 (2)	11/19/19	22:03			2	X	X	X	X	X	X				
H-19 (3)	11/19/19	22:20			2	X	X	X	X	X	X				
H-19 (4)	11/20/19	10:36			2	X	X	X	X	X	X				

1911 1
0580 4

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: ______

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
8.8 °C	[✓ Y] / N	Y / [✓ N]	11/20/19	11:46		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ______ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ______ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ______ initial

301.2E

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

8/19/2019

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Brian Hastings

OrderID: *19080112*

Dear: Brian Hastings

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 8/5/2019. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

ASmith

Andy Smith
QA Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 19080112

Specific Report Comments

The result for Total Nitrogen has been calculated using the TKN result reported by the subcontract lab and the Nitrate/Nitrite results from WETLAB.

Subcontracting Comments

The analysis for Total Kjeldahl Nitrogen was performed by Silver State Analytical Laboratories of Reno, NV. Their report is attached.

Report Legend

B	--	Blank contamination; Analyte detected above the method reporting limit in an associated blank
D	--	Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
HT	--	Sample analyzed beyond the accepted holding time
J	--	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
K	--	The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.
L	--	The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.
M	--	The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
N	--	There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
NC	--	Not calculated due to matrix interference
QD	--	The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
QL	--	The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
S	--	Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
SC	--	Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
U	--	The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Brian Hastings
Phone: (510-704-1000 **Fax:** NoFax

Date Printed: 8/19/2019
OrderID: *19080112*

Customer Sample ID: NTD@ORD
WETLAB Sample ID: 19080112-001

Collect Date/Time: 8/5/2019 10:25
Receive Date: 8/5/2019 13:05

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.15	mg/L	1	0.020	8/5/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.22	mg/L	1	0.020	8/6/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	28	mg/L	1	10	8/6/2019	NV00925
Total Nitrogen	Calc.	2.2	mg/L	1	0.12	8/14/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	640	mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.5	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@RHR
WETLAB Sample ID: 19080112-002

Collect Date/Time: 8/5/2019 11:05
Receive Date: 8/5/2019 13:05

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.21	mg/L	1	0.020	8/5/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.29	mg/L	1	0.020	8/6/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	20	mg/L	1	10	8/6/2019	NV00925
Total Nitrogen	Calc.	0.67	mg/L	1	0.12	8/14/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	170	mg/L	1	25	8/8/2019	NV00925
Microbiological Analyses							
Total Coliform (MPN)	SM 9223B (Quantitray)	>2419.6	MPN/100ml	1	1.0	8/5/2019	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	410.6	MPN/100ml	1	1.0	8/5/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.070	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: WC@OVH
WETLAB Sample ID: 19080112-003

Collect Date/Time: 8/5/2019 11:30
Receive Date: 8/5/2019 13:05

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.027	mg/L	1	0.020	8/5/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.063	mg/L	1	0.020	8/6/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	18	mg/L	1	10	8/6/2019	NV00925
Total Nitrogen	Calc.	0.80	mg/L	1	0.12	8/14/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	74	mg/L	1	25	8/8/2019	NV00925
Microbiological Analyses							
Total Coliform (MPN)	SM 9223B (Quantitray)	>2419.6	MPN/100ml	1	1.0	8/5/2019	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	127.4	MPN/100ml	1	1.0	8/5/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@NAR
WETLAB Sample ID: 19080112-004

Collect Date/Time: 8/5/2019 12:00
Receive Date: 8/5/2019 13:05

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.28	mg/L	1	0.020	8/5/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.37	mg/L	1	0.020	8/6/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	31	mg/L	1	10	8/6/2019	NV00925
Total Nitrogen	Calc.	0.71	mg/L	1	0.12	8/14/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	370	mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC19080199	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC19080219	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC19080260	Blank 1	Total Coliform (MPN)	SM 9223B (Qu	ND			MPN/100ml
		Escherichia Coli (MPN)	SM 9223B (Qu	ND			MPN/100ml
QC19080319	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC19080476	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC19080641	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	Pending			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC19080199	LCS 1	Orthophosphate, as P	SM 4500-P E	0.251	0.250	101	mg/L
QC19080219	LCS 1	Total Phosphorous as P	SM 4500-P E	0.278	0.250	111	mg/L
QC19080319	LCS 1	Total Suspended Solids (TSS)	SM 2540D	196	200	98	mg/L
QC19080319	LCS 2	Total Suspended Solids (TSS)	SM 2540D	200	200	100	mg/L
QC19080476	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	138	150	92	mg/L
QC19080476	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	137	150	91	mg/L
QC19080641	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	Pending		97	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC19080319	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	19080094-001	37.0	41.0	mg/L	10 %
QC19080319	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	19080112-001	27.5	27.0	mg/L	2 %
QC19080476	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	19080094-001	3628	3452	mg/L	5 %
QC19080476	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	19080139-002	587	587	mg/L	<1%

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC19080199	MS 1	Orthophosphate, as P	SM 4500-P E	19080112-003	0.027	0.270	0.268	0.25	mg/L	98	97	<1
QC19080219	MS 1	Total Phosphorous as P	SM 4500-P E	19080027-001	0.032	0.298	0.280	0.25	mg/L	106	99	6
QC19080219	MS 2	Total Phosphorous as P	SM 4500-P E	19080028-001	ND	0.265	0.284	0.25	mg/L	106	114	7
QC19080641	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	19080093-005	0.01	0	0		mg/L	103	96	NA
QC19080641	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	19080139-003	1.699	0	0		mg/L	96	96	NA

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY *Specializing in Soil, Hazardous Waste and Water Analysis.*

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tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 19080112
Sparks Control #
Elko Control #
LV Control #
Report Due Date
Page ____ of ____

Client Balance Hydrologics
Address On file
City, State & Zip
Contact
Phone
Collector's Name
Fax
PWS/Project Name
P.O. Number
PWS/Project Number
Email

Turnaround Time Requirements
Standard ____
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State?
NV ____ CA ____ Other ____

Compliance Monitoring?
Yes No

Report to Regulatory Agency?
Yes No

Report Results Via
PDF EDD
Other ____

Standard QC Required?
Yes No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone Fax
Email

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS	[illegible]	E coli				Spl. No.
NTD @ ORD	8/5/19	10:25		Aq	2	X	X	X	X	X						
SBC @ ZHR	8/5/19	11:05		Aq	3	X	X	X	X	X		X				
WC @ OVH	8/5/19	11:30		Aq	3	X	X	X	X	X		X				
SBC @ NAR	8/5/19	12:00		Aq	3	X	X	X	X	X						

1908 2
0112 4

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: ____

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
15.6 °C	Y N [✓ None]		8/5/19	1305		
°C	Y N None					
°C	Y N None					
°C	Y N None					

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ________ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

301.2E

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY
www.WETLaboratory.com
Specializing in Soil, Hazardous Waste and Water Analysis

8/26/2019

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Brian Hastings

OrderID: *19080200*

Dear: Brian Hastings

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 8/6/2019. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Andy Smith
QA Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 19080200

Specific Report Comments

The result for Total Nitrogen has been calculated using the TKN result reported by the subcontract lab and the Nitrate/Nitrite results from WETLAB.

Subcontracting Comments

The analysis for TKN was performed by Silver State Analytical Laboratories of Reno, NV. Their report is attached.

Report Legend

B	--	Blank contamination; Analyte detected above the method reporting limit in an associated blank
D	--	Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
HT	--	Sample analyzed beyond the accepted holding time
J	--	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
K	--	The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.
L	--	The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.
M	--	The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
N	--	There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
NC	--	Not calculated due to matrix interference
QD	--	The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
QL	--	The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
S	--	Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
SC	--	Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
U	--	The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Brian Hastings
Phone: (510-704-1000 **Fax:** NoFax

Date Printed: 8/26/2019
OrderID: *19080200*

Customer Sample ID: AC@TR
WETLAB Sample ID: 19080200-001

Collect Date/Time: 8/6/2019 08:45
Receive Date: 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.035	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.10	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	20	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.93	mg/L	1	0.14	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	250	mg/L	1	25	8/7/2019	NV00925
Microbiological Analyses							
Total Coliform (MPN)	SM 9223B (Quantitray)	>2419.6	MPN/100ml	1	1.0	8/6/2019	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	137.4	MPN/100ml	1	1.0	8/6/2019	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	ND	mg/L	1	0.030	8/7/2019	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	8/7/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: CC@CB
WETLAB Sample ID: 19080200-002

Collect Date/Time: 8/6/2019 10:15
Receive Date: 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.39	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.43	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	17	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	1.3	mg/L	1	0.30	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	2400	mg/L	1	25	8/7/2019	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	0.74	mg/L	5	0.15	8/7/2019	NV00925
Nitrite Nitrogen	EPA 300.0	ND D	mg/L	5	0.050	8/7/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: TC@SMP **Collect Date/Time:** 8/6/2019 11:18

WETLAB Sample ID: 19080200-003 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.069	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.13	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	17	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.43	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	81	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.035	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: BS@SBC (1) **Collect Date/Time:** 8/5/2019 12:00

WETLAB Sample ID: 19080200-004 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.14	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.26	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	37	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.90	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	210	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.30	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: BS@SBC (2) **Collect Date/Time:** 8/5/2019 18:00

WETLAB Sample ID: 19080200-005 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.15	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.22	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	16	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.36	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	240	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.36	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: BS@SBC (3) **Collect Date/Time:** 8/6/2019 00:00

WETLAB Sample ID: 19080200-006 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.13	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.20	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	19	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.66	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	240	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.46	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: BS@SBC (4) **Collect Date/Time:** 8/6/2019 06:00

WETLAB Sample ID: 19080200-007 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.12	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.21	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	23	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.72	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	250	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.42	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: YD@SBC (1) **Collect Date/Time:** 8/5/2019 12:00

WETLAB Sample ID: 19080200-008 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	ND	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.21	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	40	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	1.4	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	260	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.63	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: YD@SBC (2) **Collect Date/Time:** 8/5/2019 18:00

WETLAB Sample ID: 19080200-009 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	ND	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.21	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	42	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	1.5	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	260	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.73	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: YD@SBC (3) **Collect Date/Time:** 8/6/2019 00:00

WETLAB Sample ID: 19080200-010 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.023	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.18	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	40	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	1.7	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	270	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.71	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: YD@SBC (4) **Collect Date/Time:** 8/6/2019 06:00

WETLAB Sample ID: 19080200-011 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.029	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.20	mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	45	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	1.7	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	270	mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.74	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@CWW (1) **Collect Date/Time:** 8/5/2019 12:00
WETLAB Sample ID: 19080200-012 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.16		mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.31		mg/L	1	0.020	8/7/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	43		mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.58		mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	320		mg/L	1	25	8/7/2019	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	0.084		mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses								
Total Kjeldahl Nitrogen	N/A	See Attached			1			

Customer Sample ID: SBC@CWW (2) **Collect Date/Time:** 8/5/2019 18:00
WETLAB Sample ID: 19080200-013 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.18		mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.31		mg/L	1	0.020	8/8/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	22		mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.41		mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	320		mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	0.11		mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses								
Total Kjeldahl Nitrogen	N/A	See Attached			1			

Customer Sample ID: SBC@CWW (3) **Collect Date/Time:** 8/6/2019 00:00
WETLAB Sample ID: 19080200-014 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.20		mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.25	M	mg/L	1	0.020	8/8/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	28		mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.54		mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	310		mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	0.14		mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses								
Total Kjeldahl Nitrogen	N/A	See Attached			1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@CWW (4) **Collect Date/Time:** 8/6/2019 06:00

WETLAB Sample ID: 19080200-015 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.21	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.22	mg/L	1	0.020	8/9/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	44	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	0.75	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	320	mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.15	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: NTD@BFD (1) **Collect Date/Time:** 8/5/2019 12:00

WETLAB Sample ID: 19080200-016 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.11	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.15 M	mg/L	1	0.020	8/9/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	67	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	2.0	mg/L	1	0.12	8/15/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	580	mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.1	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: NTD@BFD (2) **Collect Date/Time:** 8/5/2019 18:00

WETLAB Sample ID: 19080200-017 **Receive Date:** 8/6/2019 16:34

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.10	mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.15 M	mg/L	1	0.020	8/12/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	42	mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	1.4	mg/L	1	0.12	8/16/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	520	mg/L	1	25	8/8/2019	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.2	mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses							
Total Kjeldahl Nitrogen	N/A	See Attached		1			

Customer Sample ID: NTD@BFD (4)
Collect Date/Time: 8/6/2019 06:00
WETLAB Sample ID: 19080200-018
Receive Date: 8/6/2019 16:34

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.11		mg/L	1	0.020	8/7/2019	NV00925
Total Phosphorous as P	SM 4500-P E	0.20	M	mg/L	1	0.020	8/12/2019	NV00925
Total Suspended Solids (TSS)	SM 2540D	35		mg/L	1	10	8/7/2019	NV00925
Total Nitrogen	Calc.	2.1		mg/L	1	0.12	8/16/2019	NV00925
Total Dissolved Solids (TDS)	SM 2540C	520		mg/L	1	25	8/9/2019	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	1.2		mg/L	1	0.020	8/14/2019	NV00925
Subcontracted Analyses								
Total Kjeldahl Nitrogen	N/A	See Attached			1			

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC19080277	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC19080293	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC19080333	Blank 1	Total Coliform (MPN)	SM 9223B (Qu	ND			MPN/100ml
		Escherichia Coli (MPN)	SM 9223B (Qu	ND			MPN/100ml
QC19080342	Blank 1	Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC19080352	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC19080385	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC19080386	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC19080425	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC19080452	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC19080475	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC19080477	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC19080500	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC19080511	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC19080662	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC19080277	LCS 1	Orthophosphate, as P	SM 4500-P E	0.260	0.250	104	mg/L
QC19080293	LCS 1	Total Phosphorous as P	SM 4500-P E	0.271	0.250	108	mg/L
QC19080342	LCS 1	Nitrate Nitrogen	EPA 300.0	0.502	0.500	100	mg/L
		Nitrite Nitrogen	EPA 300.0	0.519	0.500	104	mg/L
QC19080352	LCS 1	Total Phosphorous as P	SM 4500-P E	0.254	0.250	102	mg/L
QC19080385	LCS 1	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC19080385	LCS 2	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC19080386	LCS 1	Total Suspended Solids (TSS)	SM 2540D	200	200	100	mg/L
QC19080386	LCS 2	Total Suspended Solids (TSS)	SM 2540D	200	200	100	mg/L
QC19080425	LCS 1	Total Phosphorous as P	SM 4500-P E	0.278	0.250	111	mg/L
QC19080452	LCS 1	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC19080452	LCS 2	Total Suspended Solids (TSS)	SM 2540D	199	200	99	mg/L
QC19080475	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	138	150	92	mg/L
QC19080475	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	140	150	93	mg/L
QC19080477	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	140	150	93	mg/L
QC19080477	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	137	150	91	mg/L
QC19080500	LCS 1	Total Phosphorous as P	SM 4500-P E	0.272	0.250	109	mg/L
QC19080511	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	137	150	91	mg/L
QC19080511	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	146	150	97	mg/L
QC19080662	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	0.944	1.00	94	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result		Units	RPD
QC19080333	Duplicate 1	Total Coliform (MPN)	SM 9223B (Quanti	19080179-001	6.30	17.1	QD	MPN/100ml	92 %
		Escherichia Coli (MPN)	SM 9223B (Quanti	19080179-001	ND	ND		MPN/100ml	<1%
QC19080333	Duplicate 2	Total Coliform (MPN)	SM 9223B (Quanti	19080186-001	980	921		MPN/100ml	6 %
		Escherichia Coli (MPN)	SM 9223B (Quanti	19080186-001	1.00	3.00	QD	MPN/100ml	100 %
QC19080333	Duplicate 3	Total Coliform (MPN)	SM 9223B (Quanti	19080186-002	1.00	ND	QD	MPN/100ml	200 %
		Escherichia Coli (MPN)	SM 9223B (Quanti	19080186-002	ND	ND		MPN/100ml	<1%

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC19080385	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	19080163-001	ND	ND	mg/L	50 %
QC19080385	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	19080200-005	15.7	15.7	mg/L	<1%
QC19080386	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	19080208-001	30.0	29.0	mg/L	3 %
QC19080452	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	19080200-018	35.3	36.7	mg/L	4 %
QC19080475	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	19080117-001	5600	5684	mg/L	2 %
QC19080475	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	19080200-011	268	267	mg/L	<1%
QC19080477	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	19080200-013	315	323	mg/L	2 %
QC19080477	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	19080201-008	388	370	mg/L	5 %
QC19080511	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	19080186-001	370	377	mg/L	2 %
QC19080511	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	19080233-001	307	296	mg/L	4 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC19080277	MS 1	Orthophosphate, as P	SM 4500-P E	19080200-001	0.035		0.281	0.284	0.25	mg/L	98	100	1
QC19080277	MS 2	Orthophosphate, as P	SM 4500-P E	19080200-011	0.029		0.268	0.274	0.25	mg/L	96	98	2
QC19080293	MS 1	Total Phosphorous as P	SM 4500-P E	19080200-001	0.105		0.352	0.370	0.25	mg/L	99	106	5
QC19080293	MS 2	Total Phosphorous as P	SM 4500-P E	19080200-011	0.198		0.435	0.435	0.25	mg/L	95	95	<1
QC19080342	MS 1	Nitrate Nitrogen	EPA 300.0	19080072-008	ND	HT	0.470	0.488	0.5	mg/L	94	98	4
		Nitrite Nitrogen	EPA 300.0	19080072-008	ND	HT	0.121	0.122	0.125	mg/L	97	97	<1
QC19080352	MS 1	Total Phosphorous as P	SM 4500-P E	19080200-013	0.308		0.587	0.601	0.25	mg/L	112	117	2
QC19080352	MS 2	Total Phosphorous as P	SM 4500-P E	19080200-014	0.249	M	0.444	0.444	0.25	mg/L	NC	NC	NC
QC19080425	MS 1	Total Phosphorous as P	SM 4500-P E	19080200-015	0.219		0.431	0.432	0.25	mg/L	85	85	<1
QC19080425	MS 2	Total Phosphorous as P	SM 4500-P E	19080200-016	0.147	M	0.284	0.283	0.25	mg/L	NC	NC	NC
QC19080500	MS 1	Total Phosphorous as P	SM 4500-P E	19080200-017	0.148	M	0.309	0.310	0.25	mg/L	NC	NC	NC
QC19080500	MS 2	Total Phosphorous as P	SM 4500-P E	19080200-018	0.197	M	0.369	0.376	0.25	mg/L	NC	NC	NC
QC19080662	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	19080200-003	0.035		1.07	1.04	1	mg/L	104	100	3
QC19080662	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	19080200-013	0.113		1.14	1.08	1	mg/L	103	96	5

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1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 19080200
Sparks Control #
Elko Control #
LV Control #
Report Due Date
Page 1 of 3

Client Balance Hydrologics
Address on file
City, State & Zip
Contact
Phone
Collector's Name
Fax
PWS/Project Name
P.O. Number
PWS/Project Number
Email

Turnaround Time Requirements
Standard
5 Day* (25%) 72 Hour* (50%)
48 Hour* (100%) 24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State?
NV CA Other

Compliance Monitoring? Yes No

Report to Regulatory Agency? Yes No

Report Results Via
PDF EDD Other

Standard QC Required? Yes No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone Fax
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	OrthoP	NO3	TSS	TDS	Ecoli				Spl. No.
AC @ TR	8/6/19	8:45		A	3	X	X	X	X	X	X	X				
CC @ CB	8/6/19	10:15			2	X	X	X	X	X	X					
TC @ SMP	8/6/19	11:18			2	X	X	X		X	X					
BS @ SBC (1)	8/5/19	12:00			2	X	X	X		X	X					
BS @ SBC (2)	8/5/19	18:00			2	X	X	X		X	X					
BS @ SBC (3)	8/6/19	0:00			2	X	X	X		X	X					
BS @ SBC (4)	8/6/19	06:00			2	X	X	X		X	X					

1908 2
0200 18

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER:

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
14.6 °C	Y N [✓ None]		8/6/19	1634		
°C	Y N None					
°C	Y N None					
°C	Y N None					

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ________ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

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WETLAB Order ID. 19080200
Sparks Control #
Elko Control #
LV Control #
Report Due Date
Page 2 of 3

Client
Address
City, State & Zip
Contact
Phone
Collector's Name
Fax
PWS/Project Name
P.O. Number
PWS/Project Number
Email

Turnaround Time Requirements
Standard
5 Day* (25%) 72 Hour* (50%)
48 Hour* (100%) 24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State?
NV CA Other

Compliance Monitoring?
Yes No

Report Results Via
PDF EDD Other

Report to Regulatory Agency?
Yes No

Standard QC Required?
Yes No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone Fax
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS						Spl. No.
YD@ SBC(1)	8/5/19	12:00		Ag	2											
YD@ SBC(2)	8/5/19	18:00			2											
YD@ SBC (3)	8/6/19	0:00			2											
YD@ SBC (4)	8/6/19	06:00			2											
SBC @ CWW (1)	8/5/19	12:00			2											
SBC @ CWW(2)	8/5/19	18:00			2											
SBC @ CWW (3)	8/6/19	0:00			2											
SBC@ CWW (4)	8/6/19	06:00			2											

1908 2
0200 18

Instructions/Comments/Special Requirements:

Sample Matrix Key** **DW** = Drinking Water **WW** = Wastewater **SW** = Surface Water **MW** = Monitoring Well **SD** = Solid/Sludge **SO** = Soil **HW** = Hazardous Waste **OTHER:**

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
14.0 °C	Y N [✓ None]		8/6/19	1634		
°C	Y N None					
°C	Y N None					
°C	Y N None					

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tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 19080200
Sparks Control #
Elko Control #
LV Control #
Report Due Date
Page 3 of 3

Client
Address
City, State & Zip
Contact
Phone
Collector's Name
Fax
PWS/Project Name
P.O. Number
PWS/Project Number
Email

Turnaround Time Requirements
Standard
5 Day* (25%)
72 Hour* (50%)
48 Hour* (100%)
24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State? NV ___ CA ___ Other ___
Compliance Monitoring? Yes No
Report to Regulatory Agency? Yes No
Report Results Via PDF EDD Other
Standard QC Required? Yes No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone
Fax
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS						Spl. No.
NTD @ BFD (1)	8/5/19	12:00		Aq	2	X	X	X	X	X						
NTD @ BFD (2)	8/5/19	18:00		|	|	|	|	|	|	|						
NTD @ BFD (4)	8/6/19	06:00		|	|	|	|	|	|	|						

1908 2
0200 18

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER:

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
14.6°C	Y N [✓ None]		8/6/19	1634		
°C	Y N None					
°C	Y N None					
°C	Y N None					

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ________ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

301.2E

Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400 FAX: (888) 398-7002
www.ssalabs.com

August 19, 2019
Workorder **19080304**

Logan Greenwood
WET-WESTERN ENVIRONMENTAL TESTING LAB
475 East Greg St.
Suite 119
Sparks, NV 89431

Project: 19080112/BHYO

Dear Logan Greenwood:

It is the policy of Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged with an appropriate explanation in the Analysis Report section of the Laboratory Report.

Sincerely,

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

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www.WETLaboratory.com
Specializing in Soil, Hazardous Waste and Water Analysis

2/25/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20020371*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 2/12/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Andy Smith
Lab Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20020371

Specific Report Comments

None

Report Legend

B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank

D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.

HT -- Sample analyzed beyond the accepted holding time

J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.

K -- The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.

L -- The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.

M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.

NC -- Not calculated due to matrix interference

QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.

QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits

SC -- Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered

U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax
PO\Project: *213136*

Date Printed: 2/25/2020
OrderID: *20020371*

Customer Sample ID: WC@OVH
WETLAB Sample ID: 20020371-001
Collect Date/Time: 2/12/2020 12:40
Receive Date: 2/12/2020 14:15

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.060		mg/L	1	0.020	2/12/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.077	QD	mg/L	1	0.020	2/13/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	25		mg/L	1	10	2/13/2020	NV00925
Total Nitrogen	Calc.	0.27		mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	67		mg/L	1	25	2/13/2020	NV00925
Microbiological Analyses								
Total Coliform (MPN)	SM 9223B (Quantitray)	2419.6		MPN/100ml	1	1.0	2/12/2020	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	107.1		MPN/100ml	1	1.0	2/12/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	ND		mg/L	1	0.020	2/20/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.26		mg/L	0.5	0.20	2/24/2020	NV00925

Customer Sample ID: SBC@RHR
WETLAB Sample ID: 20020371-002
Collect Date/Time: 2/12/2020 12:15
Receive Date: 2/12/2020 14:15

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.048	mg/L	1	0.020	2/12/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.074	mg/L	1	0.020	2/13/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	2/13/2020	NV00925
Total Nitrogen	Calc.	0.52	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	170	mg/L	1	25	2/13/2020	NV00925
Microbiological Analyses							
Total Coliform (MPN)	SM 9223B (Quantitray)	365.4	MPN/100ml	1	1.0	2/12/2020	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	26.6	MPN/100ml	1	1.0	2/12/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.19	mg/L	1	0.020	2/20/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.33	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Customer Sample ID: SBC@NAR **Collect Date/Time:** 2/12/2020 13:40

WETLAB Sample ID: 20020371-003 **Receive Date:** 2/12/2020 14:15

Analyte	**Method**	**Results**	**Units**	**DF**	**RL**	**Analyzed**	**LabID**
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.14	mg/L	1	0.020	2/12/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.21	mg/L	1	0.020	2/13/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	21	mg/L	1	10	2/13/2020	NV00925
Total Nitrogen	Calc.	0.60	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	480	mg/L	1	25	2/13/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.085	mg/L	1	0.020	2/20/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.51	mg/L	0.5	0.20	2/24/2020	NV00925

Customer Sample ID: NTD@ORD **Collect Date/Time:** 2/12/2020 23:15

WETLAB Sample ID: 20020371-004 **Receive Date:** 2/12/2020 14:15

Analyte	**Method**	**Results**	**Units**	**DF**	**RL**	**Analyzed**	**LabID**
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.092	mg/L	1	0.020	2/12/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.13	mg/L	1	0.020	2/13/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	2/13/2020	NV00925
Total Nitrogen	Calc.	3.3	mg/L	1	0.24	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	1200	mg/L	1	25	2/13/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	2.6	mg/L	2	0.040	2/20/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.71	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20020500	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20020547	Blank 1	Total Coliform (MPN)	SM 9223B (Quant	ND			MPN/100ml
		Escherichia Coli (MPN)	SM 9223B (Quant	ND			MPN/100ml
QC20020560	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20020634	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20020635	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20020636	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20020847	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20020983	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20020500	LCS 1	Orthophosphate, as P	SM 4500-P E	0.252	0.250	101	mg/L
QC20020560	LCS 1	Total Phosphorous as P	SM 4500-P E	0.250	0.250	100	mg/L
QC20020634	LCS 1	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20020634	LCS 2	Total Suspended Solids (TSS)	SM 2540D	197	200	99	mg/L
QC20020635	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	163	150	109	mg/L
QC20020635	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	159	150	106	mg/L
QC20020636	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	165	150	110	mg/L
QC20020636	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	153	150	102	mg/L
QC20020847	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.04	1.00	104	mg/L
QC20020983	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.04	1.00	104	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC20020634	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20020385-003	182	182	mg/L	<1%
QC20020634	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20020371-003	21.0	22.0	mg/L	5 %
QC20020635	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20020331-006	578	565	mg/L	2 %
QC20020635	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20020332-001	804	796	mg/L	1 %
QC20020636	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20020331-007	684	679	mg/L	1 %
QC20020636	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20020332-011	982	978	mg/L	<1%

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20020500	MS 1	Orthophosphate, as P	SM 4500-P E	20020371-001	0.060		0.296	0.297	0.25	mg/L	94	95	<1
QC20020500	MS 2	Orthophosphate, as P	SM 4500-P E	20020371-002	0.048		0.281	0.285	0.25	mg/L	93	95	1
QC20020560	MS 1	Total Phosphorous as P	SM 4500-P E	20020371-001	0.077	QD	0.286	0.164	0.25	mg/L	84	35	54
QC20020560	MS 2	Total Phosphorous as P	SM 4500-P E	20020371-002	0.074		0.316	0.327	0.25	mg/L	96	101	3
QC20020847	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20020344-001	0.602		5.95	6.00	1	mg/L	107	108	<1
QC20020847	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20020363-003	ND		5.29	5.30	1	mg/L	106	106	<1
QC20020983	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20020371-001	0.264		0.764	0.764	0.5	mg/L	100	100	<1
QC20020983	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20020437-002	0.850	M	1.44	1.50	0.5	mg/L	NC	NC	NC

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY
Specializing in Soil, Hazardous Waste and Water Analysis.

475 E. Greg Street #119 | Sparks, Nevada 89431 | www.WETLaboratory.com
tel (775) 355-0202 | fax (775) 355-0817
1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 2002 0371
Sparks
Elko
LV
Report Due Date
Page ____ of ____

Client Balance Hydrologics
Address ON FILE
City, State & Zip
Contact Ben Trustman
Phone
Collector's Name
Fax
Project 213136
P.O. Number
PWS Number
Email btrustman@balancehydro.com

Turnaround Time Requirements
Standard ✓
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State?
NV ____ CA ____
Other ____

Report Results Via
[✓ PDF] EDD
Other Excel

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Standard QC Required?
[✓ Yes] No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone ____ Fax ____
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS		E coli				Spl. No.
WC@OVH	2/12/20	12:40		Aq	3	X	X	X	X	X		X				
SBC@RHR	2/12/20	12:15		Aq	3	X	X	X	X	X		X				
SBC@NAR	2/12/20	13:40		Aq	2	X	X	X	X	X						
NTD@ORA	2/12/20	11:15		Aq	2	X	X	X	X	X						

2002 1
0371 4

Instructions/Comments/Special Requirements:

Sample Matrix Key** **DW** = Drinking Water **WW** = Wastewater **SW** = Surface Water **MW** = Monitoring Well **SD** = Solid/Sludge **SO** = Soil **HW** = Hazardous Waste **OTHER:** ____

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
4.3 °C	[✓ Y] / N	Y / [✓ N]	2/12/20	2:15		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ____ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ____ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ____ initial

301.2E

Client: WET-WESTERN ENVIRONMENTAL TESTING LAB
Sampled By: Client
Project Name: 19080112/BHYO
PO #:

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
19080304-01	NTD@ORD	08/05/2019 10:25	8/7/2019

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Kjeldahl, Nitrogen	SM 4500 Norg D	0.7	mg/L	0.1	KL	08/07/2019 12:26	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
19080304-02	SBC@RHR	08/05/2019 11:05	8/7/2019

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Kjeldahl, Nitrogen	SM 4500 Norg D	0.6	mg/L	0.1	KL	08/07/2019 12:26	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
19080304-03	WC@OVH	08/05/2019 11:30	8/7/2019

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Kjeldahl, Nitrogen	SM 4500 Norg D	0.8	mg/L	0.1	KL	08/07/2019 12:26	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
19080304-04	SBC@NAR	08/05/2019 12:00	8/7/2019

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Kjeldahl, Nitrogen	SM 4500 Norg D	0.7	mg/L	0.1	KL	08/07/2019 12:26	

Quality Control Report

WO#: **19080304**
8/19/2019

Analysis: Kjeldahl Nitrogen, Total (TKN)
Method: SM 4500 Norg D **Batch ID:** **R32001**

Method Blank

RunID: 32001 SeqNo 739159 Units: mg/L
Analysis Date: 8/7/2019 12:26:00 PM Analyst: KL

Analyte	Result	Rep Limit	Rep Qual
Kjeldahl, Nitrogen	< 0.1	0.1	

Laboratory Control Sample (LCS)

RunID: 32001 SeqNo 739160 Units: mg/L
Analysis Date: 8/7/2019 12:26:00 PM Analyst: KL

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	19.00	16.9	88.9								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 19080287-01B
RunID: 32001 SeqNo 739161 Units: mg/L
Analysis Date: 8/7/2019 12:26:00 PM Analyst: KL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	0.1000	10.00	11.2	111	10.00	12.0	119	6.90	20	80	120	

WETLAB
WESTERN ENVIRONMENTAL
TESTING LABORATORY

19080304

Subcontracting Chain of Custody

Analysis to be subcontracted to: Silver State

Lab Number:
Report Due Date: 8/19/2019
Page 1 of 1

Client:	Western Environmental Testing Laboratory
Address:	475 E. Greg St. Suite #117
City, State Zip:	Sparks, NV 89431
Contact:	Kat Langford
Phone: (775) 355-0202	Collector's Name:
PWS/Site:	
WETLab Job ID: 19080112	WETLab Client Code: BHYO
Email:	Reporting@wetlaboratory.com

CLIENT REQUIREMENTS

Turnaround Time Requirements		Reporting Results Via	
Standard	X	Fax	
5 Day*		PDF	X
3 Day*		EDD	X
48 Hour*		Mail Only	
24 Hour*		Other:	

Compliance Monitoring		Samples Collected From Which State?				Standard Level QC Required?			
Yes	X	NV		CA	X	Yes	X	No	
No		Other:				Level IV QC:			

Billing Address (if different than Client Address)

Client:	Western Environmental Testing Laboratory
Address:	475 E. Greg St. Suite #117
City, State Zip:	Sparks, NV 89431
Contact:	Accounts Payable
Phone: (775) 355-0202	Fax: (775) 355-0817
Email:	Reporting@wetlaboratory.com

SAMPLE ID/LOCATION	WETLAB SampleID	Date	Time	SAMPLE TYPE *(Key found below)	NO. OF CONTAINERS	ANALYSES REQUESTED Total Kjeldahl Nitrogen												SAMPLE NUMBER (LAB USE ONLY)
NTD@ORD	19080112-001	8/5/2019	10:25:00 AM	SW		X												
SBC@RHR	19080112-002	8/5/2019	11:05:00 AM	SW		X												
WC@OVH	19080112-003	8/5/2019	11:30:00 AM	SW		X												
SBC@NAR	19080112-004	8/5/2019	12:00:00 PM	SW		X												

Instructions/Comments/Special Requirements: **Please send Sample Receipts, Reports and Invoices to Reporting@wetlaboratory.com**

Sample Matrix/Type Key** DW=Drinking water WW=Waste Water SW=Surfacewater MW=Monitoring Well SD=Solid/Sludge SO=Soil HW=Hazardous Waste OT=Other:

SAMPLE RECEIPT CONDITIONS	DATE	TIME	SAMPLES RELINQUISHED BY	SAMPLES RECEIVED BY
Temperature 8°C c	8-7-19	9:15		
Custody Seals Intact ? [✓ Y] N None	8/7/19	9:15		
Number of Containers				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30 for established customers. Pre-payment is required for clients without an account.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location or date/time of collection will be considered fraud and may be subject to legal action (NAC445.0636)

Samples are discarded 90 days after receipt unless other arrangements have been made with the laboratory.

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other arrangements are made in writing.

This limitation shall apply regardless of the cause of action or legal theory pled or asserted.

Definitions & Qualifiers

WO#: **19080304**
Date: **8/19/2019**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.

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www.WETLaboratory.com

Specializing in Soil, Hazardous Waste and Water Analysis

3/2/2020

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman

OrderID: *20020437*

Dear: Ben Trustman

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 2/13/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jennifer Delaney
QA Manager

Western Environmental Testing Laboratory
Report Comments

Balance Hydrologics - 20020437

Specific Report Comments

None

Report Legend

B	--	Blank contamination; Analyte detected above the method reporting limit in an associated blank
D	--	Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
HT	--	Sample analyzed beyond the accepted holding time
J	--	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.
K	--	The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.
L	--	The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.
M	--	The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
N	--	There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
NC	--	Not calculated due to matrix interference
QD	--	The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
QL	--	The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
S	--	Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
SC	--	Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
U	--	The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

Western Environmental Testing Laboratory
Analytical Report

Balance Hydrologics
800 Baucroft Ave. Suite 101
Berkeley, CA 94710
Attn: Ben Trustman
Phone: (510-704-1000 **Fax:** NoFax

Date Printed: 3/2/2020
OrderID: *20020437*

Customer Sample ID: YD@SBC (1)
WETLAB Sample ID: 20020437-001

Collect Date/Time: 2/12/2020 12:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.032	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.13	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	39	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.5	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	360	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.4	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.1	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: YD@SBC (2)
WETLAB Sample ID: 20020437-002

Collect Date/Time: 2/12/2020 18:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.031		mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.086		mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	24		mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.2		mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	380		mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	1.4		mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.85	M	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: YD@SBC (3) **Collect Date/Time:** 2/13/2020 00:00

WETLAB Sample ID: 20020437-003 **Receive Date:** 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.040	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.078	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	29	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.2	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	380	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.4	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.82	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: YD@SBC (4)
WETLAB Sample ID: 20020437-004

Collect Date/Time: 2/13/2020 06:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.046	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.054	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	43	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.6	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	380	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.4	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.2	mg/L	0.5	0.20	2/24/2020	NV00925

Customer Sample ID: SBC@CWW (1)
WETLAB Sample ID: 20020437-005

Collect Date/Time: 2/12/2020 12:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.13	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.23	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	41	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	1.3	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	460	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.45	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.86	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@CWW (2) **Collect Date/Time:** 2/12/2020 18:00
WETLAB Sample ID: 20020437-006 **Receive Date:** 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.12	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.21	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	26	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	0.98	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	450	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.39	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.59	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@CWW (3) **Collect Date/Time:** 2/13/2020 00:00
WETLAB Sample ID: 20020437-007 **Receive Date:** 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.13	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.20	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	30	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	1.1	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	460	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.43	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.62	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: SBC@CWW (4)
WETLAB Sample ID: 20020437-008

Collect Date/Time: 2/13/2020 11:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.12	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.16	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	20	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	1.0	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	450	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	0.48	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.53	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: CC@CB
WETLAB Sample ID: 20020437-009

Collect Date/Time: 2/13/2020 09:10
Receive Date: 2/13/2020 16:19

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.32		mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.32		mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND		mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	0.71		mg/L	1	0.40	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	2400		mg/L	1	25	2/14/2020	NV00925
Anions by Ion Chromatography								
Nitrate Nitrogen	EPA 300.0	ND	D	mg/L	5	0.15	2/13/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	5	0.050	2/13/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	0.71		mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: BS@SBC (1)
WETLAB Sample ID: 20020437-010

Collect Date/Time: 2/12/2020 12:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.11	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.15	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	47	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.6	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	420	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.5	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.1	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID:	BS@SBC (2)	**Collect Date/Time:**	2/12/2020 18:00
WETLAB Sample ID:	20020437-011	**Receive Date:**	2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.10	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.17	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	28	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.2	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	430	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.5	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.72	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: BS@SBC (3)
WETLAB Sample ID: 20020437-012
Collect Date/Time: 2/13/2020 00:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Orthophosphate, as P	SM 4500-P E	0.099		mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.14		mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	18		mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	2.1		mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	410		mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses								
Nitrate + Nitrite Nitrogen	EPA 353.2	1.5		mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.56	M	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: NTD@BFD (1)
WETLAB Sample ID: 20020437-013

Collect Date/Time: 2/12/2020 12:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.045	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.13	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	88	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	4.3	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	1100	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.9	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	2.4	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: NTD@BFD (2)
WETLAB Sample ID: 20020437-014

Collect Date/Time: 2/12/2020 18:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.050	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.17	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	50	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	3.2	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	1100	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.7	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.4	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: NTD@BFD (3)
WETLAB Sample ID: 20020437-015

Collect Date/Time: 2/13/2020 00:00
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.036	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.12	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	26	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	3.0	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	1100	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	1.7	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	1.3	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: AC@TR
WETLAB Sample ID: 20020437-016

Collect Date/Time: 2/13/2020 10:10
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	ND	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	ND	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	ND	mg/L	1	0.24	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	710	mg/L	1	25	2/14/2020	NV00925
Microbiological Analyses							
Total Coliform (MPN)	SM 9223B (Quantitray)	71.7	MPN/100ml	1	1.0	2/13/2020	NV00925
Escherichia Coli (MPN)	SM 9223B (Quantitray)	ND	MPN/100ml	1	1.0	2/13/2020	NV00925
Anions by Ion Chromatography							
Nitrate Nitrogen	EPA 300.0	ND	mg/L	1	0.030	2/13/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	2/13/2020	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	ND	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: TC@SMP
WETLAB Sample ID: 20020437-017

Collect Date/Time: 2/13/2020 11:20
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.036	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.037	mg/L	1	0.020	2/14/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	ND	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	88	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	ND	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: TC@WEN
WETLAB Sample ID: 20020437-018

Collect Date/Time: 2/13/2020 11:45
Receive Date: 2/13/2020 16:19

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Orthophosphate, as P	SM 4500-P E	0.036	mg/L	1	0.020	2/13/2020	NV00925
Total Phosphorous as P	SM 4500-P E	0.055	mg/L	1	0.020	2/28/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	ND	mg/L	1	10	2/14/2020	NV00925
Total Nitrogen	Calc.	0.27	mg/L	1	0.22	2/24/2020	NV00925
Total Dissolved Solids (TDS)	SM 2540C	92	mg/L	1	25	2/14/2020	NV00925
Flow Injection Analyses							
Nitrate + Nitrite Nitrogen	EPA 353.2	ND	mg/L	1	0.020	2/22/2020	NV00925
Total Kjeldahl Nitrogen	EPA 351.2	0.27	mg/L	0.5	0.20	2/24/2020	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20020550	Blank 1	Orthophosphate, as P	SM 4500-P E	ND			mg/L
QC20020574	Blank 1	Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC20020579	Blank 1	Total Coliform (MPN)	SM 9223B (Quant	ND			MPN/100ml
		Escherichia Coli (MPN)	SM 9223B (Quant	ND			MPN/100ml
QC20020631	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20020639	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20020640	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20020677	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20020680	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND			mg/L
QC20020928	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20020929	Blank 1	Nitrate + Nitrite Nitrogen	EPA 353.2	ND			mg/L
QC20020983	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L
QC20020984	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20020550	LCS 1	Orthophosphate, as P	SM 4500-P E	0.258	0.250	103	mg/L
QC20020574	LCS 1	Nitrate Nitrogen	EPA 300.0	0.495	0.500	99	mg/L
		Nitrite Nitrogen	EPA 300.0	0.513	0.500	103	mg/L
QC20020631	LCS 1	Total Phosphorous as P	SM 4500-P E	0.255	0.250	102	mg/L
QC20020639	LCS 1	Total Suspended Solids (TSS)	SM 2540D	196	200	98	mg/L
QC20020639	LCS 2	Total Suspended Solids (TSS)	SM 2540D	196	200	98	mg/L
QC20020640	LCS 1	Total Suspended Solids (TSS)	SM 2540D	194	200	97	mg/L
QC20020640	LCS 2	Total Suspended Solids (TSS)	SM 2540D	196	200	98	mg/L
QC20020677	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	156	150	104	mg/L
QC20020677	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	146	150	97	mg/L
QC20020680	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	142	150	95	mg/L
QC20020680	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	137	150	91	mg/L
QC20020928	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.01	1.00	101	mg/L
QC20020929	LCS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	1.02	1.00	102	mg/L
QC20020983	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.04	1.00	104	mg/L
QC20020984	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	1.05	1.00	105	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result		Units	RPD
QC20020639	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20020344-005	13.7	17.0	QD	mg/L	22 %
QC20020639	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20020415-004	ND	ND		mg/L	25 %
QC20020640	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20020437-010	47.0	49.0		mg/L	4 %
QC20020677	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20020418-001	1016	984		mg/L	3 %
QC20020677	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20020435-002	788	860		mg/L	9 %
QC20020680	Duplicate 1	Total Dissolved Solids (TDS)	SM 2540C	20020437-016	711	702		mg/L	1 %
QC20020680	Duplicate 2	Total Dissolved Solids (TDS)	SM 2540C	20020436-001	447	438		mg/L	2 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20020550	MS 1	Orthophosphate, as P	SM 4500-P E	20020437-001	0.032	0.276	0.276	0.25	mg/L	97	98	<1
QC20020550	MS 2	Orthophosphate, as P	SM 4500-P E	20020437-011	0.104	0.344	0.346	0.25	mg/L	96	97	<1

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20020574	MS 1	Nitrate Nitrogen	EPA 300.0	20020382-001	0.394		0.911	0.914	0.5	mg/L	103	104	<1
		Nitrite Nitrogen	EPA 300.0	20020382-001	ND		0.147	0.150	0.125	mg/L	118	120	2
QC20020631	MS 1	Total Phosphorous as P	SM 4500-P E	20020437-001	0.126		0.378	0.367	0.25	mg/L	101	97	3
QC20020631	MS 2	Total Phosphorous as P	SM 4500-P E	20020437-011	0.166		0.409	0.425	0.25	mg/L	97	104	4
QC20020928	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20020424-005	80.5	SC	99.0	99.1	1	mg/L	NC	NC	NC
QC20020928	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20020433-001	ND		5.18	5.19	1	mg/L	104	104	<1
QC20020929	MS 1	Nitrate + Nitrite Nitrogen	EPA 353.2	20020437-003	1.41		2.43	2.42	1	mg/L	103	102	<1
QC20020929	MS 2	Nitrate + Nitrite Nitrogen	EPA 353.2	20020437-014	1.71		2.73	2.73	1	mg/L	102	102	<1
QC20020983	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20020371-001	0.264		0.764	0.764	0.5	mg/L	100	100	<1
QC20020983	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20020437-002	0.850	M	1.44	1.50	0.5	mg/L	NC	NC	NC
QC20020984	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20020437-012	0.561	M	1.17	1.17	0.5	mg/L	NC	NC	NC

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Report Due Date
Page 1 of 2

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City, State & Zip
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Phone
Collector's Name
Fax
Project 213156
P.O. Number
PWS Number
Email btrustman@balancehydro.com

Turnaround Time Requirements
Standard X
5 Day* (25%)
72 Hour* (50%)
48 Hour* (100%)
24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State?
NV X CA
Other

Report Results Via
[✓ PDF] EDD
Other Excel

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Standard QC Required?
Yes No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone
Fax
Email

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS	NO3					Spl. No.
YD@SBC (1)	2/12/20	12:00		dw	2	X	X	X	X	X						1
YD@SBC (2)	2/12/20	18:00			2	X	X	X	X	X						2
YD@SBC (3)	2/13/20	0:00			2	X	X	X	X	X						3
YD@SBC (4)	2/13/20	06:00			2	X	X	X	X	X						4
SBC@CWW (1)	2/12/20	12:00			2	X	X	X	X	X						5
SBC@CWW (2)	2/12/20	18:00			2	X	X	X	X	X						6
SBC@CWW (3)	2/13/20	0:00			2	X	X	X	X	X						7
SBC@CWW (4)	2/13/20	11:00			1	X	X	X	X	X						8
CC@CB	2/13/20	9:10			2	X	X	X	X	X	X					9

2002 2
0437 18

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER:

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
5.8°C	[✓ Y] / N	Y / [✓ N]	2/13/20	4:14		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ______ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ______ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ______ initial

301.2E

WETLAB
WESTERN ENVIRONMENTAL TESTING LABORATORY *Specializing in Soil, Hazardous Waste and Water Analysis.*

475 E. Greg Street #119 | Sparks, Nevada 89431 | www.WETLaboratory.com
tel (775) 355-0202 | fax (775) 355-0817
1084 Lamoille Highway | Elko, Nevada 89801
tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 20020437
Sparks
Elko
LV
Report Due Date
Page 2 of 2

Client
Address
City, State & Zip
Contact
Phone
Collector's Name
Fax
Project
P.O. Number
PWS Number
Email

Turnaround Time Requirements
Standard
5 Day* (25%) 72 Hour* (50%)
48 Hour* (100%) 24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State?
NV CA Other

Compliance Monitoring?
Yes No

Report Results Via
PDF EDD Other

Report to Regulatory Agency?
Yes No

Standard QC Required?
Yes No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone Fax
Email

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Total N	Total P	Ortho P	TSS	TDS	NO3	Ecoli					Spl. No.
BS @ SBC (1)	2/12/20	12:00		Aq	2	X	X	X	X	X							10
BS @ SBC (2)	2/12/20	18:00		Aq	2	X	X	X	X	X							11
BS @ SBC (3)	2/13/20	0:00			2	X	X	X	X	X							12
NTD @ BFD (1)	2/12/20	12:00			2	X	X	X	X	X							13
NTD @ BFD (2)	2/12/20	18:00			2	X	X	X	X	X							14
NTD @ BFD (3)	2/13/20	0:00			2	X	X	X	X	X							15
AC @ TR	2/13/20	10:10			3	X	X	X	X	X	X	X					16
TC @ SMP	2/13/20	11:20			2	X	X	X	X	X							17
TC @ WEN	2/13/20	11:45			2	X	X	X	X	X							18

2002 2
0437 18

Instructions/Comments/Special Requirements:

Sample Matrix Key** **DW** = Drinking Water **WW** = Wastewater **SW** = Surface Water **MW** = Monitoring Well **SD** = Solid/Sludge **SO** = Soil **HW** = Hazardous Waste **OTHER:**

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=NH4Cl 9=H3PO4

Temp	On Ice	Custody Seal	DATE	TIME	Samples Relinquished By	Samples Received By
5.8°C	[✓ Y] N	Y / [✓ N]	2/13/20	4:14		
°C	Y / N	Y / N				
°C	Y / N	Y / N				
°C	Y / N	Y / N				

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ____ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ____ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ____ initial

301.2E

APPENDIX E

Nevada Water Quality Standards

STANDARDS OF WATER QUALITY
Steamboat Creek at the gaging station (Rhodes Road)

PARAMETER	REQUIREMEN TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use[a]										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern													
Temperature - °C ΔT^b - °C		S.V. ≤ 34 ΔT ≤ 3			*	X							
pH - SU		S.V. 6.5 - 9.0	X	X	*	*		X	X	*			
Dissolved Oxygen - mg/l		S.V. ≥ 5.0	X		*	X	X	X		X			
Total Phosphorus (as P) - mg/l		S.V. ≤ 0.33			*	*	X	X					
Total Ammonia (as N) - mg/l		c			*			X					
Total Dissolved Solids - mg/l		S.V. ≤ 500 or the 95th percentile (whichever is less).	X	X				*					
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. ≤ 410				*	X						
Fecal Coliform - No./100 ml		S.V. ≤ 1,000	X	*			X	X		X			

* = The most restrictive beneficial

X = Beneficial use.

a Refer to NAC 445A.122 and 445A.1622 for

b Maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the

c The ambient water quality criteria for ammonia are specified in NAC 445A.118.

A.G.M the annual geometric mean

A-AVG annual average

ΔT change in temperature

S.V. single value

STANDARDS OF WATER QUALITY

Truckee River at Idlewild

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use[a]										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern			Juvenile and adult rainbow trout and brown trout.										
Temperature - °C ΔT[b] - °C	ΔT= 0	S.V. Nov-Mar ≤ 7 S.V. Apr ≤ 13 S.V. May ≤ 17 S.V. Jun ≤21 S.V. Jul ≤ 22 S.V. Aug ≤ 23 S.V. Sep-Oct ΔT ≤ 2			*	X							
pH - SU	S.V. 7.2 - 8.3	S.V. 6.5 - 9.0 ΔpH ± 0.5	X	X	X	*		X	X	*			
Dissolved Oxygen - mg/l		S.V. Nov-Mar ≤ 6.0 S.V. Apr-Oct ≤ 5.0	X		*	X	X	X		X			
Total Phosphates (as P) - mg/l	A-Avg.≤ 0.05	A-Avg.≤ 0.10			*	*	X	X					
Ortho Phosphates (as P) - mg/l	S.V. ≤ 0.02	S.V. ≤ 0.05			*	*	X	X					
Nitrogen Species (as N) - mg/l	Total N A-Avg. ≤ 0.3 Total N S.V. ≤ 0.43	Nitrate S.V. ≤ 2.0 Nitrite S.V. ≤ 0.04			*	*	X	X					
Total Ammonia (as N) - mg/l		c			*								
Suspended Solids - mg/l	A-Avg.≤ 15.0	S.V.≤ 25			*								
Turbidity - NTU	A-Avg. ≤ 80.0 S.V. ≤ 9.0	S.V. ≤ 10			*			X					
Color - PCU	d	S.V. ≤ 75						*					
Total Dissolved Solids - mg/l	A-Avg. ≤ 80.0 S.V. ≤ 95.0	A-Avg.≤ 500	X	X				*					
Chloride - mg/l	A-Avg. ≤ 7.0 S.V. ≤ 10.0	S.V.≤ 250	X	X				*		X			
Sulfate - mg/l	A-Avg. ≤ 7.0 S.V. ≤ 8.0	S.V.≤ 250						*					
Sodium - SAR	A-Avg. ≤ 0.5 S.V. ≤ 0.6	A-Avg.≤ 8		*				X					
Alkalinity (as CaCO3) - mg/l		< 25% change from natural conditions			*					X			
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. ≤ 410				*	X						
Fecal Coliform - No./100 ml	A.G.M. ≤ 50.0 S.V. ≤ 200.0	S.V.≤ 1000	X	*			X	X		X			
BOD- mg/l		A.G.M. ≤ 2.5 S.V. ≤ 3.0						*					

* = The most restrictive beneficial use.

X = Beneficial use.

[a] Refer to NAC 445A.122 and 445A.1622 for beneficial use terminology.

[b] Maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of the single

[c] The ambient water quality criteria for ammonia are specified in NAC 445A.118.

[d] Increase in color must not be more than 10 PCU above natural conditions.

A.G.M annual geometric mean

A-AVG means annual average

ΔT change in temperature

NTU nephelometric turbidity units, a measure of turbidity

PCU platimun cobalt unit, a measure of color

S.V. single value

STANDARDS OF WATER QUALITY
Truckee River at Lockwood Bridge

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use[a]										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern			Juvenile and adult rainbow trout and brown trout.										
Temperature - °C		S.V. Nov-Mar ≤ 13 S.V. Apr ≤ 21c S.V. May ≤ 22c,d S.V. Jun-Oct ≤ 23c,d			*	X							
ΔT^b - °C	ΔT= 0	ΔT ≤ 2											
pH - SU	S.V. 7.1 - 8.5	S.V. 6.5 - 9.0 ΔpH ± 0.5	X	X	X	*		X	X	*			
Dissolved Oxygen - mg/l		S.V. Nov-Mar ≤ 6.0 S.V. Apr-Oct ≤ 5.0	X		*	X	X	X		X			
Total Phosphates (as P) - mg/l		A-Avg.≤ 0.05			*	*	X	X					
Nitrogen Species (as N) - mg/l		Total N A-Avg.≤ 0.75 Total N S.V.≤ 1.2 Nitrate S.V.≤ 2.0 Nitrite S.V.≤ 0.04			*	*	X	X					
Total Ammonia (as N) - mg/l		e			*								
Suspended Solids - mg/l	A-Avg.≤ 25.0	S.V.≤ 50			*								
Turbidity - NTU		S.V. ≤ 10			*			X					
Color - PCU	f	S.V. ≤ 75						*					
Total Dissolved Solids - mg/l	A-Avg. ≤ 210.0 S.V. ≤ 260.0	A-Avg.≤ 500	X	X				*					
Chloride - mg/l	A-Avg. ≤ 26.0 S.V. ≤ 30.0	S.V.≤ 250	X	X				*		X			
Sulfate - mg/l	A-Avg. ≤ 39.0 S.V. ≤ 46.0	S.V.≤ 250						*					
Sodium - SAR	A-Avg. ≤ 1.5 S.V. ≤ 2.0	A-Avg.≤ 8		*				X					
Alkalinity (as CaCO3) - mg/l		< 25% change from natural conditions			*					X			
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. ≤ 410				*	X						
Fecal Coliform - No./100 ml	A.G.M. ≤ 90.0 S.V. ≤ 300.0	S.V.≤ 1000	X	*			X	X		X			

* = The most restrictive beneficial use.
X = Beneficial use.

a Refer to NAC 445A.122 and 445A.1622 for beneficial use terminology.

b Maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of the

c When flows are adequate to induce spawning runs of cui-ui and Lahontan cutthroat trout, the standard is 14°C from April through June.

d The desired temperature for the protection of juvenile Lahontan cutthroat trout is 21°C, even though that temperature is not attainable at all times.

e The ambient water quality criteria for ammonia are specified in NAC 445A.118.

f Increase in color must not be more than 10 PCU above natural conditions.

A.G.M annual geometric mean

A-AVG annual average

ΔT change in temperature

NTU nephelometric turbidity units, a measure of turbidity
PCU platimun cobalt unit, a measure of color
S.V. single value

STANDARDS OF WATER QUALITY
Truckee River at East McCarran

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use[a]										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern			Juvenile and adult rainbow trout and brown trout.										
Temperature - °C ΔT^b - °C	 ΔT= 0	S.V. Nov-Mar ≤ 7 S.V. Apr ≤ 13 S.V. May ≤ 17 S.V. Jun ≤21 S.V. Jul ≤ 22 S.V. Aug ≤ 23 S.V. Sep-Oct ΔT ≤ 2			*	X							
pH - SU	S.V. 7.0 - 8.5	S.V. 6.5 - 9.0 ΔpH ± 0.5	X	X	X	*		X	X	*			
Dissolved Oxygen - mg/l		S.V. Nov-Mar ≤ 6.0 S.V. Apr-Oct ≤ 5.0	X		*	X	X	X		X			
Total Phosphates (as P) - mg/l	A-Avg.≤ 0.05	A-Avg.≤ 0.10			*	*	X	X					
Ortho Phosphates (as P) - mg/l	S.V. ≤ 0.02	S.V. ≤ 0.05			*	*	X	X					
Nitrogen Species (as N) - mg/l	Total N A-Avg. ≤ 0.3 Total N S.V. ≤ 0.43	Nitrate S.V. ≤ 2.0 Nitrite S.V. ≤ 0.04			*	*	X	X					
Total Ammonia (as N) - mg/l		c			*								
Suspended Solids - mg/l	A-Avg.≤ 15.0	S.V.≤ 250			*								
Turbidity - NTU	A-Avg. ≤ 6.0	S.V. ≤ 10			*			X					
Color - PCU	d	S.V. ≤ 75						*					
Total Dissolved Solids - mg/l	A-Avg. ≤ 90.0 S.V. ≤ 120.0	A-Avg.≤ 500	X	X				*					
Chloride - mg/l	A-Avg. ≤ 7.0 S.V. ≤ 10.0	S.V.≤ 250	X	X				*		X			
Sulfate - mg/l	A-Avg. ≤ 7.0 S.V. ≤ 8.0	S.V.≤ 250						*					
Sodium - SAR	A-Avg. ≤ 0.5 S.V. ≤ 0.6	A-Avg.≤ 8		*				X					
Alkalinity (as CaCO3) - mg/l		< 25% change from natural conditions			*					X			
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. ≤ 410				*	X						
Fecal Coliform - No./100 ml	A.G.M. ≤ 75.0 S.V. ≤ 350.0	S.V.≤ 1000	X	*			X	X		X			
BOD- mg/l		A.G.M. ≤ 3.0 S.V. ≤ 5.0						*					

* = The most restrictive beneficial use.

X = Beneficial use.

a Refer to NAC 445A.122 and 445A.1622 for beneficial use terminology.

b Maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of the

c The ambient water quality criteria for ammonia are specified in NAC 445A.118.

d Increase in color must not be more than 10 PCU above natural conditions.

A.G.M the annual geometric mean

A-AVG annual average

ΔT change in temperature

NTU nephelometric turbidity units, a measure of turbidity

PCU platimun cobalt unit, a measure of color

S.V. single value

STANDARDS OF WATER QUALITY

Steamboat Creek at Truckee River

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use[a]										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern			Juvenile and adult rainbow trout and brown trout.										
pH - SU		S.V. 6.0 - 9.0	X	X	*	X		X	X	*			
Dissolved Oxygen - mg/l		S.V. ≤ 3.0	X		*	X	X			X			
Total Ammonia (as N) - mg/l		b			*								
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. 576				*	X						

* = The most restrictive beneficial use.
X = Beneficial use.
a Refer to NAC 445A.122 and 445A.1622 for beneficial use terminology.
b The ambient water quality criteria for ammonia are specified in NAC 445A.118.
A.G.M the annual geometric mean
A-AVG annual average
S.V. single value

STANDARDS OF WATER QUALITY
Whites Creek at Steamboat Creek

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use[a]										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern			Juvenile and adult rainbow trout and brown trout.										
Temperature - °C ΔT[b] - °C		S.V. ≤ 24 ΔT = 0			*	X							
pH - SU		S.V. 6.5 - 9.0	X	X	*	*		X	X	*			
Dissolved Oxygen - mg/l		S.V. ≤ 5.0	X		*	X	X	X		X			
Total Phosphates (as P) - mg/l		S.V. ≤ 0.10			*	*	X	X					
Total Ammonia (as N) - mg/l		c			*			X					
Total Dissolved Solids - mg/l		S.V. ≤ 500 or the 95th percentile (whichever is less)	X	X				*					
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. ≤ 410				*	X						
Fecal Coliform - No./100 ml		S.V.≤ 1000	X	*			X	X		X			

* = The most restrictive beneficial use.

X = Beneficial use.

a Refer to NAC 445A.122 and 445A.1622 for beneficial use terminology.

b Maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of

c The ambient water quality criteria for ammonia are specified in NAC 445A.118.

A.G.M the annual geometric mean

A-AVG annual average

ΔT change in temperature

S.V. single value