13th Annual Snapshot Day
May 11, 2013

A Lake Tahoe Basin and Truckee River Watershed Citizen Monitoring Event

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Introduction

2013 Summary

The data collected for Snapshot Day 2013 demonstrates good water quality overall with very few major issues throughout the watershed. Parameters such as fecal coliform and dissolved oxygen were somewhat elevated, but the majority of samples collected meet the standards set for their region.

Snapshot Day has reached its 13th year anniversary. The program is continuing to successful engagement with the public in active watershed stewardship while providing valuable data to the responsible agencies.

As previous data sets are compiled and date storage is improved this program will have the ability to show long term trends and better assist agencies.

An addition to 2013, included recording and marking a number of sites with GPS points and rebar to provide for more consistent photo monitoring in future years.

What is Snapshot Day?

Snapshot Day is a one-day, volunteer-based event designed to collect watershed information during one point in time. Volunteer team leaders are trained, and these leaders accompany teams of volunteers to various pre-determined sites to collect information relative to the health of our watersheds.

This was the 13th Annual Snapshot Day held on May 11, 2013 and included the entire Truckee River Watershed, from Lake Tahoe to the terminus at Pyramid Lake. This event has been sustained and operated by the dedication of both paid and unpaid staff, the funding of a few grants and donations, but mostly by the commitment of hundreds of citizens who value the public involvement to protect the watershed they live in.

What are the objectives of Snapshot Day?

While there is a great deal of high quality agency and university-sponsored monitoring taking place in the region, there is still insufficient information to adequately assess the status of all aquatic resources in the Truckee River Hydrologic Unit which includes the Lake Tahoe Basin and Truckee River watersheds. With proper training and quality assurance, community volunteers can help fill this void by providing valuable information for watershed management and pollution prevention.

The primary goals of this effort are two-fold:

1. Promote environmental education and stewardship
2. Collect valuable water quality information

In addition this effort aims to:

- Screen for water quality problems, including the identification of sources of pollution and detection of illegal activities (i.e., chemical spills, filling of wetlands, diversions, illicit discharges, destruction of stream environment zones (SEZs), non-compliance with ordinances or regulations in place to protect natural resources, etc.)
- Provide water quality data that may be compared to water quality standards set by the TRPA for the Tahoe Basin, and the States of California and Nevada;

- Provide water quality data that may be used in status and trend analyses;
- Provide some pre and post data for evaluating the effectiveness of restoration activities

It is important to note that citizen monitoring is designed to supplement existing agency monitoring efforts; all information is provided to the regulatory and resource management agencies, whose responsibility it is to protect water quality.

Snapshot Day 2013

Volunteers and locations

Snapshot Day 2013 was a collaborative effort between the North Shore Lake Tahoe, South Shore Lake Tahoe, Middle Truckee River, and Lower Truckee River.

Volunteer and monitoring site location information:

	Volunteers	Locations
North Shore Lake Tahoe	36	19
South Shore Lake Tahoe	60	33
Middle Truckee River	61	26
Lower Truckee River	233	12
Totals for 2013	**390**	**90**

Table 1: Volunteer and monitoring site location

This collaborative effort was sponsored by Nevada Division of Environmental Protection, Incline Village General Improvement District, the League to Save Lake Tahoe, the Tahoe Resource Conservation District, and the Truckee River Watershed Council. For an expanded list of involved organizations, resource partners, and education partners please see **Appendix A**.

Snapshot Day is a bi-state event and as such falls under two state-wide citizen-monitoring programs: the California State Regional Water Quality Control Board's (SWQCB) *Clean Water Team*, (http://www.swrcb.ca.gov/water_issues/programs/swamp/cwt_volunteer.shtml) and The Nevada equivalent under *Project WET* (http://ndep.nv.gov/bwqp/wet01.htm). Through this bi-state collaborative Snapshot Day is able to achieve a larger watershed approach to successful data collection.

Volunteers gathered data at a total of 90 locations from the upper watershed from Lake Tahoe and the Truckee River to its terminus at Pyramid Lake. A list of site names and codes can be found in **Appendix B**.

For a map of Lake Tahoe Basin monitoring sites see **Appendix D**.

Lake Tahoe Tributaries, South Shore

- Angora Creek at Mouth
- Angora Creek at Washoe Meadow
- Angora Creek at Lake Tahoe Boulevard
- Bijou Park Drainage at Werner Salas
- Bijou Park Drainage Hansen's Resort
- Burke Creek at Mouth
- Burke Creek at Highway 50
- Cascade Creek at Mouth
- Cascade Creek Highway 89
- Cold Creek at Mouth
- Cold Creek below Pioneer
- Eagle Fall at Mouth
- Glen Alpine Creek at Mouth
- Heavenly Creek Trout Creek

- Heavenly Valley Creek Pioneer
- Tahoe Keys Marina at West Channel
- Meeks Creek at mouth
- Meeks Creek Meadow
- Meeks Creek
- North Zephyr Creek at Mouth
- South Zephyr Creek at Mouth
- Tallac Creek at Mouth
- Tallac Creek Highway 89
- Taylor Creek at Mouth
- Truckee River at Mouth
- Truckee River Lake Tahoe Boulevard
- Truckee River at Elks Club Bridge
- Upper Truckee River at Washoe Meadow
- Trout Creek at Mouth
- Trout Creek Grinding Stone
- Ski Run Marina at Marina
- Timber Cove

Lake Tahoe Tributaries, North Shore

- Quail Lake Creek on Forest Service lot
- Barton Creek at North of 28
- Rosewood Creek above Third
- Burton Creek at Star Harbor
- Snow Creek at mouth
- Homewood Creek at mouth
- Mill Creek Below Lakeshore Drive
- Carnelian Canyon Creek
- Dollar Creek at mouth
- Griff Creek at Mouth
- Second Creek above Lakeshore Drive
- Tunnel Creek at mouth
- Wood Creek at Southwood
- Tahoe City Urban Ditch at lake
- Madden Creek at mouth
- Lake Forest Creek at mouth
- Star Creek above boating channel
- Tahoe City State Park at Mouth
- Incline Creek at Mouth

Truckee River Watershed, Middle Truckee River

- Alder
- Bear Creek
- Truckee River in Big Chief Corridor
- Little Truckee River Below Boca Dam
- Little Truckee River at Boyington Mill
- Cabin Creek
- Cold Creek at Donner Creek
- Deep Creek
- Davies Creek
- Donner at Highway 89
- Donner at Donner Lake outflow
- East Martis Creek at bridge
- Union Valley Creek at SFFCC road
- Union Valley Creek above Pond
- Martis Creek at mouth
- Martis Creek at COE boundary
- Pole Creek
- Prosser Creek below dam
- Prosser at Highway 89
- Sagehen Creek at 89
- Squaw Creek
- Truckee River at Regional Park
- Truckee River near Tahoe City
- Trout Creek at mouth
- Trout Creek at Bennett Flat

Truckee River Watershed, Lower Truckee River

- Galena Creek
- Thomas Creek
- Whites Creek
- Dry Creek
- Steamboat Creek at Rhodes Rd.
- Steamboat Creek at Mira Loma
- North Truckee Drain
- Truckee River at Idlewild Park
- Truckee River at Rock Park
- Truckee River at McCarren Ranch
- Truckee River at Wadsworth
- Truckee River at Nixon

Methods of Data Collection

All observations, photos, field measurements and samples are taken between 9:00 a.m. and 12:00 pm; this maintains the 'Snapshot' aspect of the project. Any samples submitted past 1:00 pm are evaluated at that time to determine what the value is of samples submitted. Citizen monitoring "team leaders" are provided training prior to Snapshot Day each year prior to the event. Team leader trainings cover protocols for visual observations, photo-documentation, water quality field measurements (temperature, pH, conductivity, dissolved oxygen), and water sampling (grab samples sent into the laboratory for subsequent analysis of nutrients, coliform, and turbidity). Each monitoring "team leader" is required to attend at least one session prior to the field day. Training for the team leaders is usually taught by the coordinator for that region, with assistance as needed from the cooperating resource and regulatory agencies.

It is important to remember that the measurements made on Snapshot Day were designed to represent a single point in time and do not necessarily represent average conditions. Monitoring results are compiled in **Appendix B**, which includes both the field measurements collected by volunteers and nutrient and bacteria analysis. For the long term dataset, please refer to the Tahoe Integrated Information Management Systems on-line database and charting tool, accessible via (www.snapshotday.org/events/).

Visual observations and photo-documentation are performed according to the procedures developed by the SWRQB Clean Water Team. The standardized observation form, the *California Stream and Shore Walk Visual Assessment Form*, has been slightly revised to better apply to the region. At least three photos are taken at each sampling site (bed conditions, view across stream and view upstream from the starting point); however volunteers are encouraged to photograph as much as possible, especially of team members in the field. All stream-walks are initiated from a downstream position, traveling upstream.

A variety of instruments and kits are used on Snapshot Day by the volunteers. Much of the equipment has been purchased through the years with grants or donations; the remainder of the equipment was borrowed from various partners. All of the instruments and kits are calibrated and tested/standardized at a quality control session held prior to the event. For additional information on the monitoring equipment used see **Appendix C**.

Water Quality Standards

The US EPA has recommended criteria for nutrients and turbidity. Nevada, California, and the TRPA have specific water quality standards and indicators generally more stringent in certain subwatersheds and creeks, such as the Tahoe Basin, than elsewhere in the watershed. **Table 2** lists some of these standards for the Tahoe Basin. The selected standards shown in **Table 3** are from the Nevada Division of Environmental Protection for the Lower Truckee River Watershed.

Parameter	Standard
Temperature	Shall not exceed 15° C, surface waters of Fallen Leaf Lake (CA)
pH	7.0 - 8.4 in Lake Tahoe (CA and NV)
TDS	Shall not exceed 60 mg/L annual average in Lake Tahoe (CA and NV). The single value (grab) of <= 70; if either one is exceeded the standard is not met.
Dissolved Oxygen	Mean no less than 6.5 and minimum of 4.0 mg/L for Lahontan waters designated as “cold freshwater habitat” (CA)
Turbidity	Shallow water shall not exceed 3 NTU near tributaries and 1 NTU not directly influenced by streams (TRPA)
Secchi Depth	December-March average of not less than 33.4 meters for Lake Tahoe (TRPA), and a mean of 18.5 meters for Fallen Leaf Lake (Lahontan Region, CA)
Algae	Lahontan RWQCB waters shall not contain biostimulatory substances (nutrients) that cause algae to become a nuisance or to affect the water’s beneficial uses (CA)
Total Nitrogen	Mean of no more than 0.15-19 mg/l (CA)
Total Phosphorous	Annual average of no more than 0.05 mg/l for most tributaries, Nevada side of Lake Tahoe and no more than 0.03 mg/l for most tributaries, California side of Lake Tahoe
Soluble Reactive Phosphorous	Annual average of no more than .007 mg/l (combination of organic and inorganic)for Lake Tahoe, Nevada side (NDEP)
Fecal Coliform	Log mean of 20 CFU (30 day period) and maximum of 40 CFU, (Lahontan Region, CA)

Table 2: Examples of Lake Tahoe water quality standards

Parameter	Truckee River at Idlewild (LTR-IDL)	Truckee River at Wadsworth(LTR-WADS)
Temp	≤13º (month dependent)	≤14º (month dependent)
Dissolved Oxygen	≥5 mg/l (April-October) ≥ 6 mg/l November-June)	≥5 mg/l (April-October) ≥ 6 mg/l November-June)
pH	6.5-9.0	6.5-9.0
Chlorides	≤250 mg/l	≤250 mg/l
Total Phosphates	Annual average ≤ 0.10 mg/l	Annual average ≤ 0.05 mg/l
Ortho-phosphate	≤0.05 mg/l	NA
Nitrate	≤2.0 mg/l	≤2.0 mg/l
Nitrite	≤0.04 mg/l	≤0.04 mg/l
Total Nitrogen	NA	≤1.2 mg/l
Turbidity	≤10 NTU	≤10 NTU
Fecal coliform	≤1000 No./100ml	≤1000 No./100ml
E. coli	≤410 No./100ml single value or ≤ 126 No./100ml annual geometric mean	≤410 No./100ml single value or ≤ 126 No./100ml annual geometric mean

Table 3: Examples of Nevada state water quality standards for the Truckee River

For additional information on water quality objectives in California refer to the Lahontan Regional Water Quality Control Board *Basin Plan* at the following website: www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

For additional information on water quality standards in Nevada refer to the following website: www.leg.state.nv.us/NAC/NAC-445A.html#NAC445ASec11704

NDEP's Water Quality Standards Branch has created new web pages that educators and students may find useful. The Water Quality NAC Index page will help you and your students easily locate a specific water body or stream section and identify its designated beneficial use.

On the webpage under Resources find the new link to WQ Standards NAC Index. You are able to sort a column by clicking on the column header to easily search, for example, a particular water name or County.

Data Results

This section gives an overview of the parameters measured and the data results. All of the measured parameters will be discussed and some of the high and low measurements will be highlighted for each of the measured parameters. Specific sites in figures are referred to by code which can be cross referenced by site names in **Appendix B**.

Water temperature

Cooler water temperatures are considered better habitat for aquatic life in mountain streams and lakes since colder water contains more dissolved oxygen, an essential ingredient for fish and invertebrates. Higher temperatures promote nutrient solubility and can occur as a result of low flow (shallow) conditions, and/or a lack of canopy (vegetation) cover along stream banks, which acts to shade and thus prevent solar heating of the water.

In many Sierra streams, propagation of cold-water fish (i.e. trout or salmon) is a designated beneficial use of the water. In such streams, numerical and narrative water quality standards generally are set at levels that will "support the beneficial use" of a cold water fishery. Such streams generally require cooler temperatures and higher dissolved oxygen content than water in streams and lakes that do not have cold-water fishery as a designated beneficial use. Rainbow trout prefer water temperatures between 12.8 and 15.6°C and the upper incipient lethal temperature (temperature at which 50% of the population survives 60 days) is 14.3°C.

90 sites were sampled for water temperature. The minimum recorded temperature recorded from Snapshot Day 2013 was 5.4°C in the Middle Truckee River subwatershed at Deep Creek. The highest recorded temperature was 20.05°C in the Lower Truckee River Watershed at Steamboat Creek at Mira Loma. 5 of the 90 sample sites had temperatures above 15.6°C and 73 sample sites had temperatures below 12.8°C.

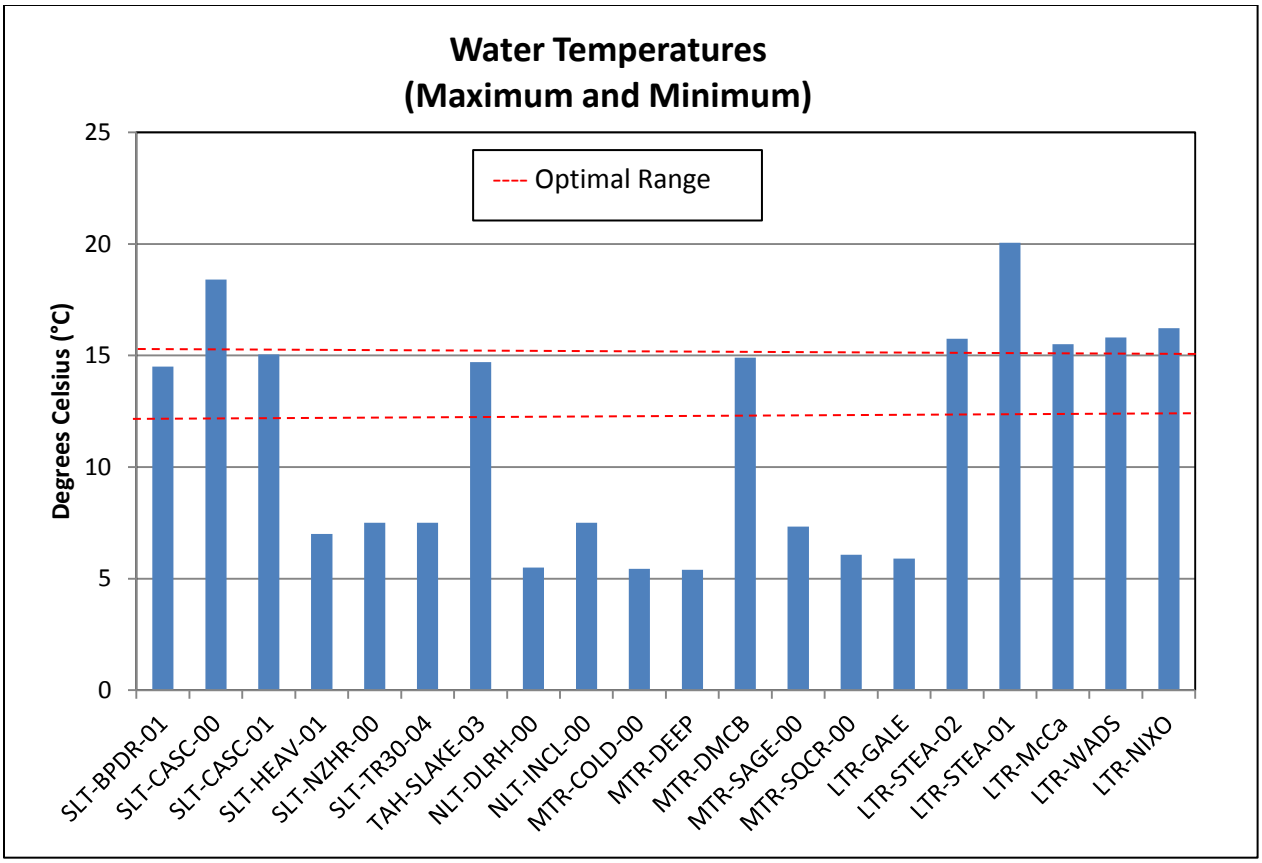

Figure 1: The maximum and minimum results recorded for water temperature.

pH

PH is a measurement of the degree to which water is "acidic" or "basic." PH is measured on a scale of 0 (very acidic) to 14 (very basic) with 7 in the middle as "neutral." Most aquatic life prefers a pH close to 7. **Figure 2** displays the pH ranges that support aquatic life.

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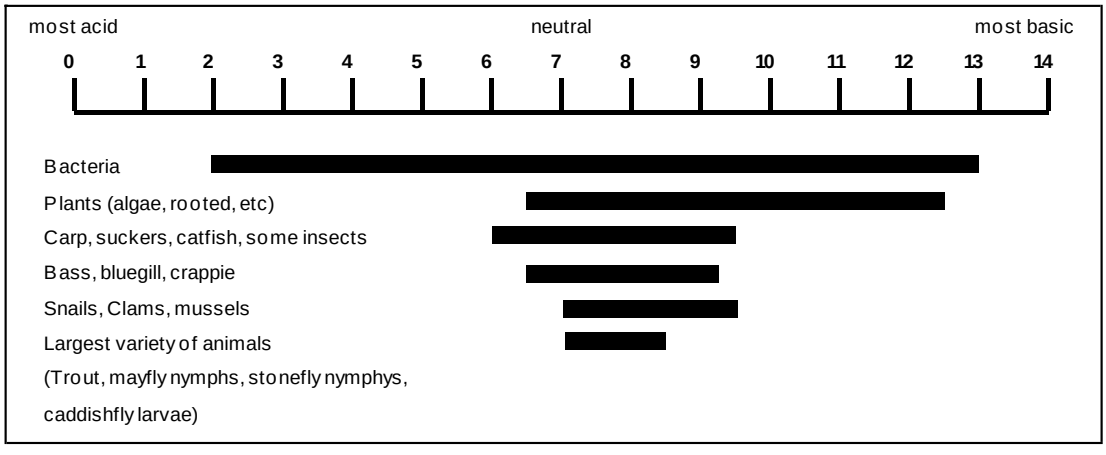


pH ranges that support aquatic life.

Figure 2: pH range that supports aquatic life

Water in California within the Lake Tahoe Basin should not be below 7 or above 8.4. Water within the Nevada Truckee Region should not be below 6.5 or above 9.0. The Regional Board recognizes that some waters of the Region may have natural pH levels outside the 7.0 to 8.5 range, and this is commonly found in the tributaries to Lake Tahoe.

The minimum recorded pH was 4.0 from the Middle Truckee at the Union Valley Creek at SFFCC road. The highest recorded pH was 8.6 from the Middle Truckee at Adler. Of the 85 sample sites 36 sites had recorded pH below the optimal range and 1 sample site had a recorded pH above the optimal range.

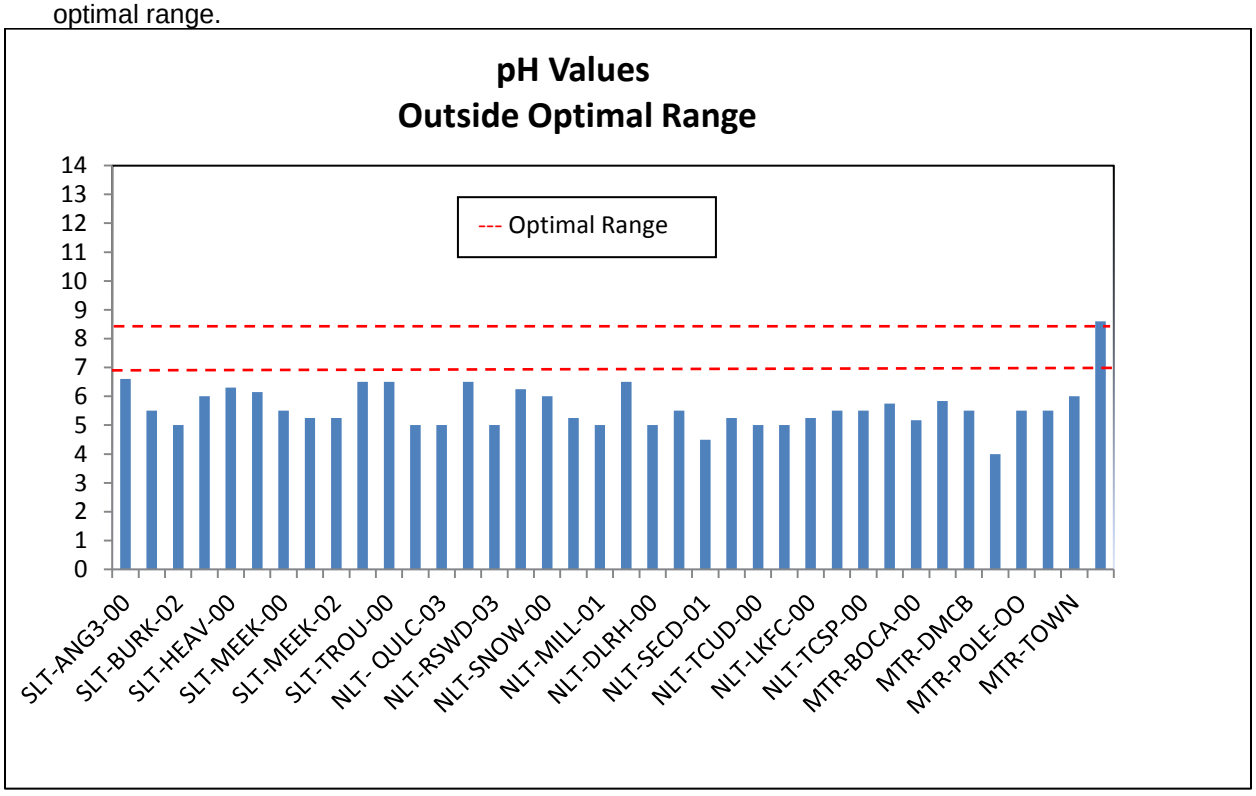


Figure 3: pH results outside optimal range for aquatic life.

Dissolved Oxygen (DO)

Dissolved oxygen is a measure of the amount of gaseous oxygen (O2) dissolved in water. Dissolved oxygen is necessary to maintain adequate water quality and support aquatic life. Stress occurs in aquatic life, especially fish, when dissolved oxygen levels drop too low.

Low dissolved oxygen concentrations are typically the result of:

- Warming water: warmer water is able to dissolve and hold less oxygen than cooler water
- Excess nutrients: too many nutrients in the water can fuel algae and bacteria growth which consume oxygen
- Slow or stagnant water: movement allows for oxygen and water to mix

Water quality objectives for dissolved oxygen vary from region to region, most water within the Lake Tahoe Basin must have a dissolved oxygen concentration of 8.0 mg/L. Water within the Truckee River basin must had a dissolved oxygen concentration of 5.0 mg/l or 6.0 mg/l depending on the reach of the river. Measurements below 5 mg/L are considered dangerous for cold water aquatic life.

The minimum dissolved oxygen content measured was 3.5 mg/L at the Middle Truckee River Dam. The highest recorded dissolved oxygen content was 11.5 mg/l at the South Lake Tahoe Angora Creek at Lake Tahoe Boulevard. Dissolved oxygen content was measured at 86 sites. Five of the 40 Nevada Dissolved Oxygen tests had a reading below 6.0 mg/l and only one test was below 5 mg/l.31 of the 76 sample tests from the Lake Tahoe Basin were below the 8.0 mg/l standard and 4 sample tests were below 5mg/l.

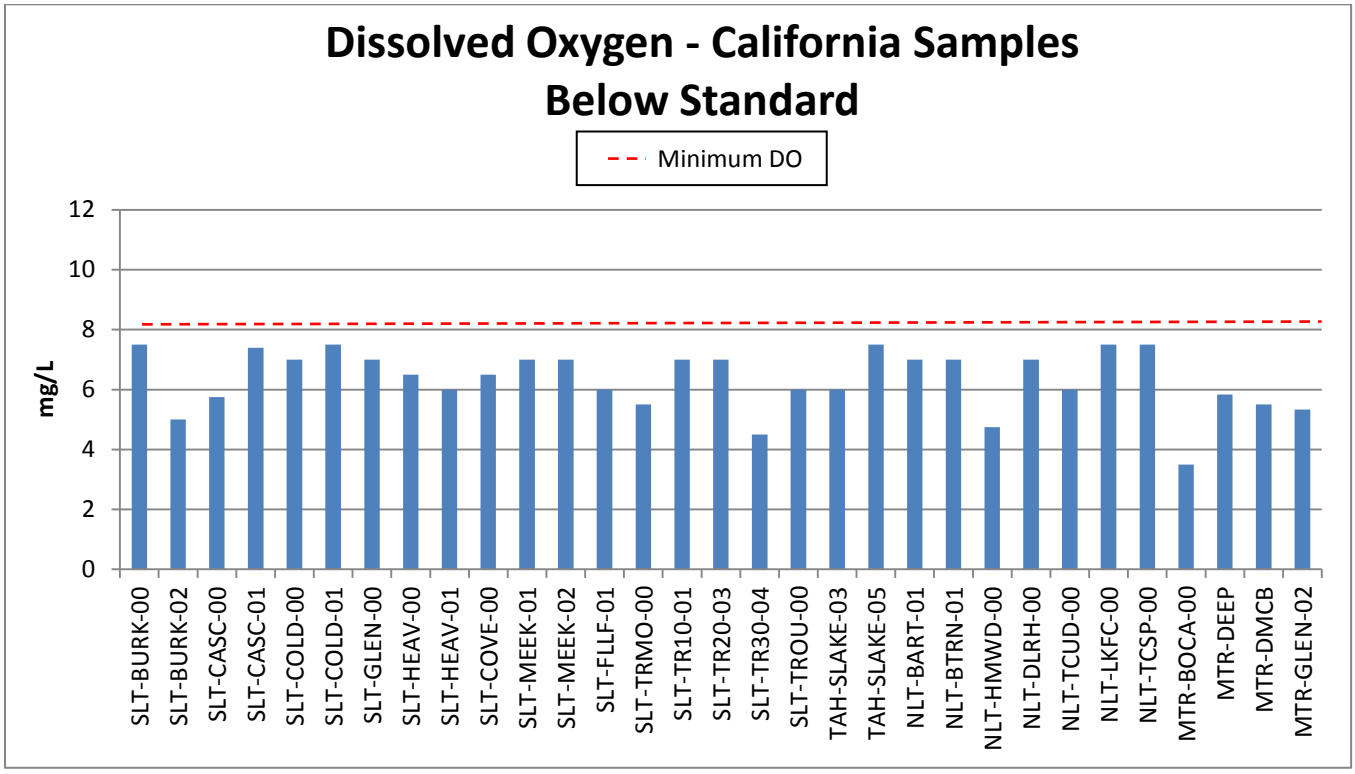


Figure 4: Dissolved oxygen concentrations California samples that were below the 8mg/L standard.

Turbidity

Turbidity is a measure of the amount of suspended particles in the water. Turbidity is measured in NTUs (Nephelometric Turbidity Units); high NTU levels often indicate poorer water clarity. Algae, suspended sediment, organic matter, and some pollutants can cloud the water making it more turbid. High sediment loads can clog the gills of fish, negatively affect gravel beds and smother fish eggs and benthic invertebrates. The sediment can also carry pathogens, pollutants and nutrients that affect Lake Tahoe's water quality.

The US EPA's recommended criteria for turbidity in streams in Eco-Region II (forested mountains in the western U.S.), is at or below 1.3 NTU. California is located within this Eco-Region, but the state of Nevada is located right outside this Eco-Region. The TRPA and the Lahontan Regional Water Quality Control Board (LRWQCB) have a near shore turbidity standard of 1-3 NTUs (measured by monthly means) in Lake Tahoe. This standard is rarely exceeded in Lake Tahoe. The standard for the Truckee River and many nearby streams in the State of Nevada is 10 NTU.

Most turbidity samples were indicative of good water quality. 13 of the18 reported turbidities for Nevada were below the 10 NTU standard; 62 of the 72 reported turbidities from California sites were below the 3 NTU standard and 31 samples had a turbidity below 1 NTU. The highest recorded turbidity was 22 NTU from the Lower Truckee, Truckee River at Rock Park.

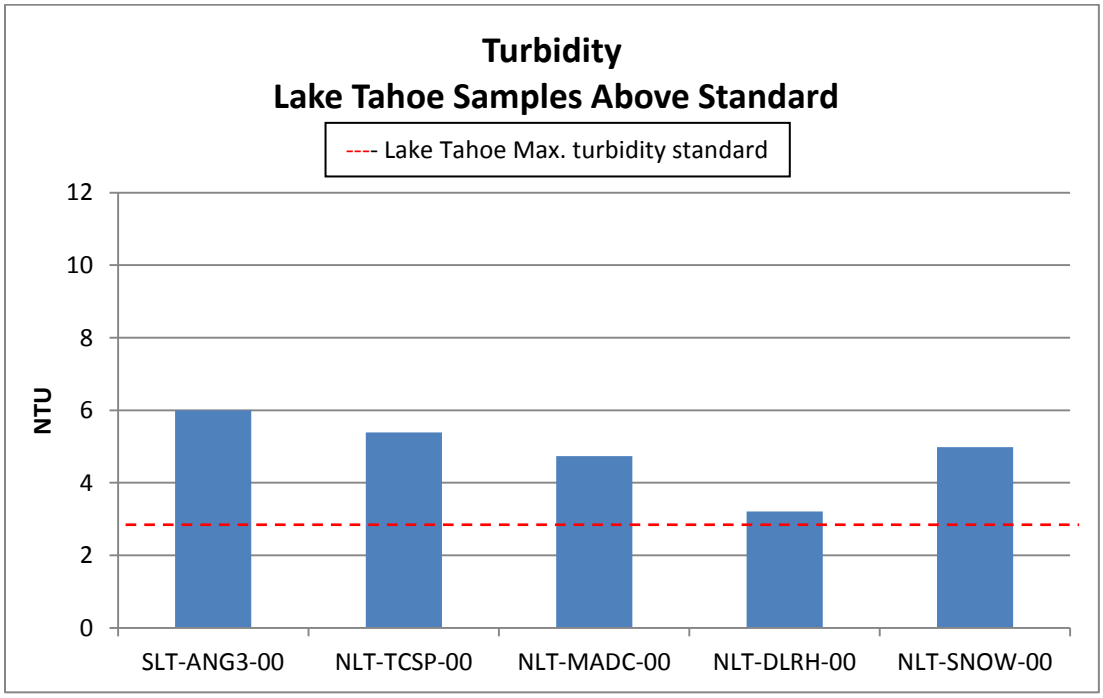


Figure 5: Turbidity readings from Lake Tahoe sites that did not meet standard.

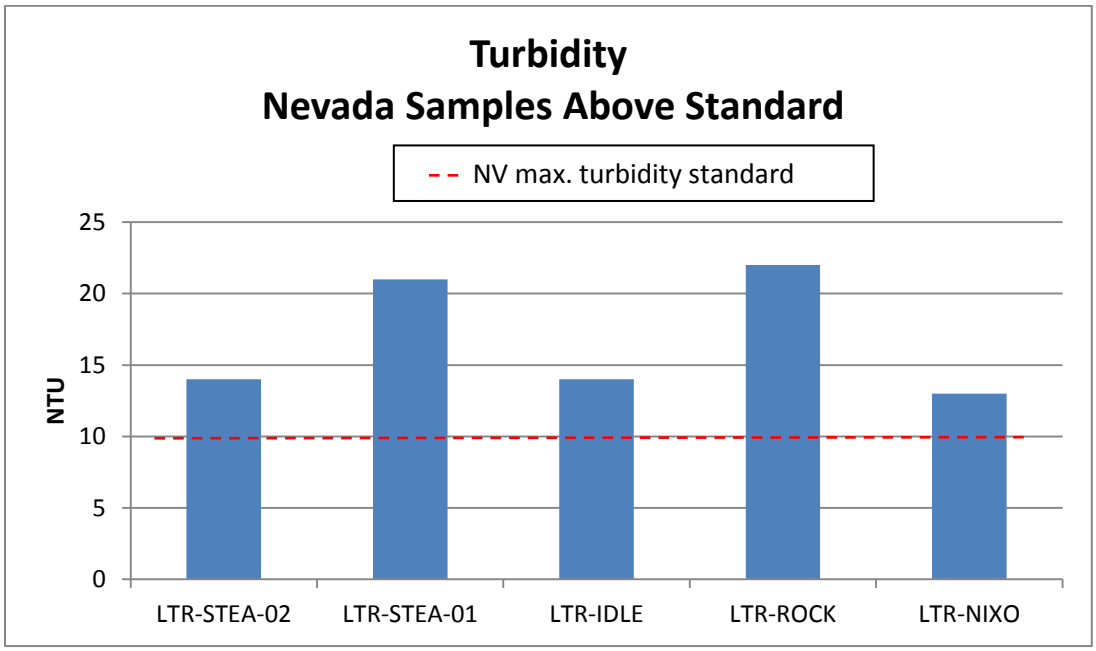


Figure 6: Turbidity readings from Nevada that did not meet standar

Stream Flow

Stream flow is the measure of the volume of water that is flowing, which varies with precipitation. Due to an extremely low snowpack, 4% of median as of May 9, 2013, flows on all rivers and streams in Nevada and Eastern California are expected to be far below normal this spring and summer. The National Weather Service Water Supply Outlook Report for the Lake Tahoe Basin states that the water year 2013 received an 82% of average precipitation. As of May 9, 2013 the most probably forecast from NRCS as of May 1, 2013 shows 31% of average stream flow in the Lake Tahoe Basin.

One of the major goals of Snapshot Day is to gain information on the vast numbers of streams and creeks that are not routinely measured for water quality or stream flow. 13 out of 64 streams in the Tahoe are regularly measured and the Middle and Lower Truckee have fewer streams under regular monitoring.

Volunteers classified the observed stream flow for 85 of the 90 sample sites. Stream flow was classified as follows:

Dry creek bed	Isolated pools	Trickle	Slow to smooth	Moderate to rippling	Rapid to turbulent	Flooding
0	2	1	19	42	21	0

Table 4: Number of monitored sites given the designated stream flow classification

Figures 8, 9, and 10 show the stream flow of selected streams on Snapshot Day.

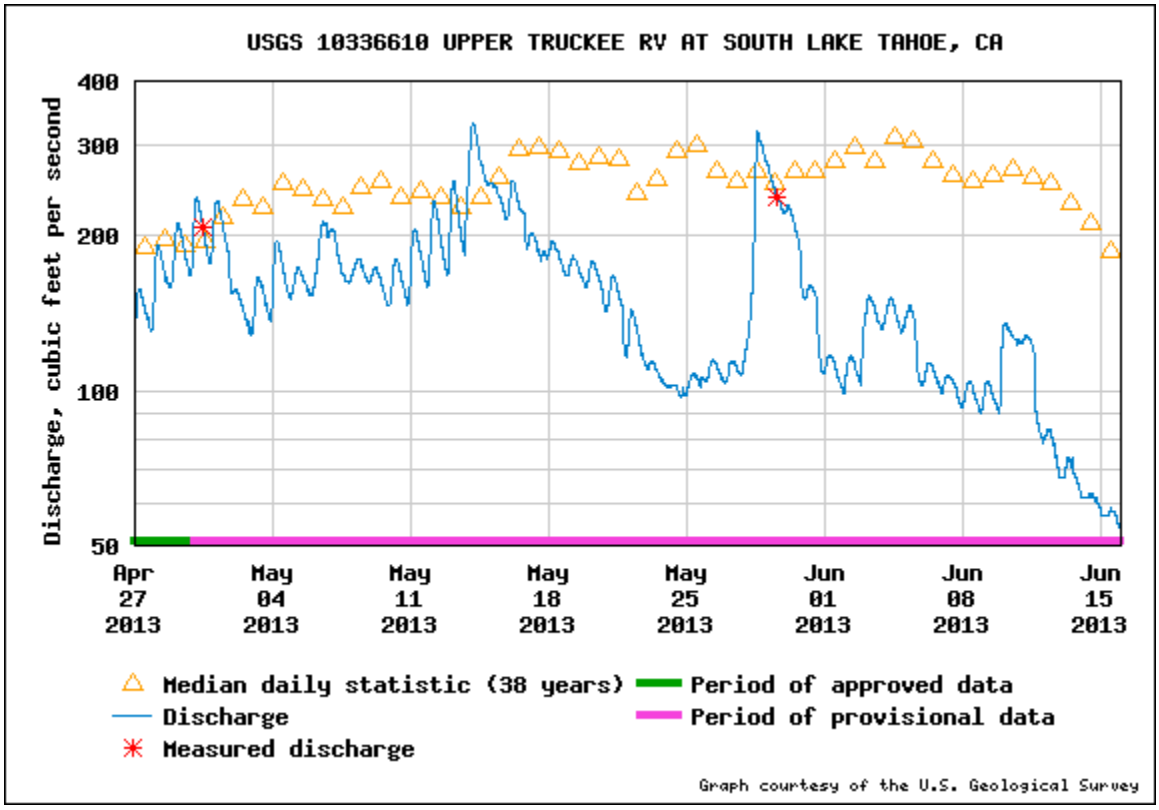


Figure 7: Stream flow data from Upper Truckee River at South Lake Tahoe, California

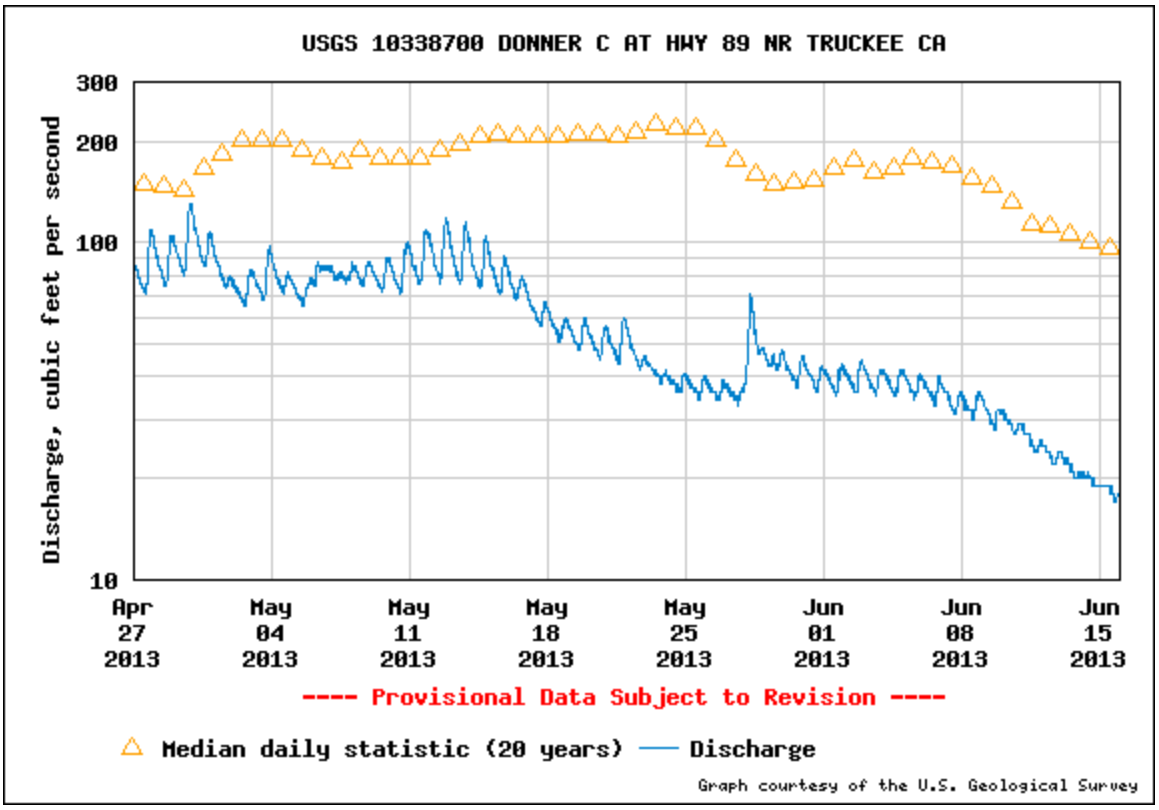


Figure 8: Stream flow data from Donner at Highway 89 near Truckee, California

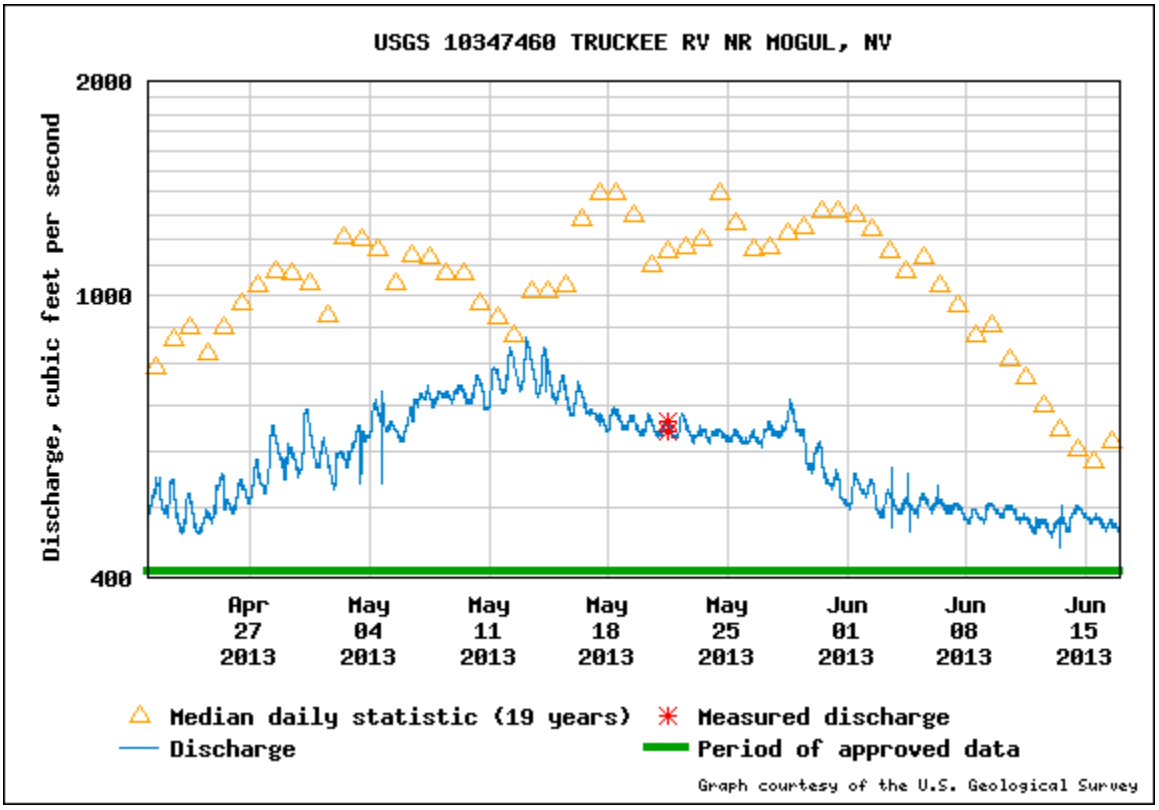


Figure 9: Stream flow data from Truckee River at Mogul, Nevada

Conductivity

Conductivity is a measure of waters ability to pass an electric current. In water conductivity is affected by the presence of inorganic dissolved solids such as chloride, nitrate, calcium, sulfate and others. Conductivity in rivers and streams is mainly influenced by the geology through which the water flows.

Water Type	**Conductivity** µS/cm (micro Siemens per centimeter**)**
Distilled Water	0.5 - 3.0
Melted snow	2 - 42
Potable water in U.S.	30 - 1500
Irrigation Supply Water	< 750

Table 5: Acceptable conductivity for different water types

Abrupt changes in conductivity may indicate that new water sources or wastes are being diverted into a stream or river. Acceptable ranges for water conductivity are dependent on the water type. **Table 5** displays acceptable conductivity ranges for several water types. Conductivity was measured at 44 sample sites. The minimum tested conductivity was 0.317 µS/cm at the Lower Truckee River at Nixon. The highest tested conductivity was 1070 µS/cm at the Lower Truckee River at Steamboat Creek at Mira Loma. However, Nevada only has a conductivity standard for Lake Tahoe and not for the Truckee River.

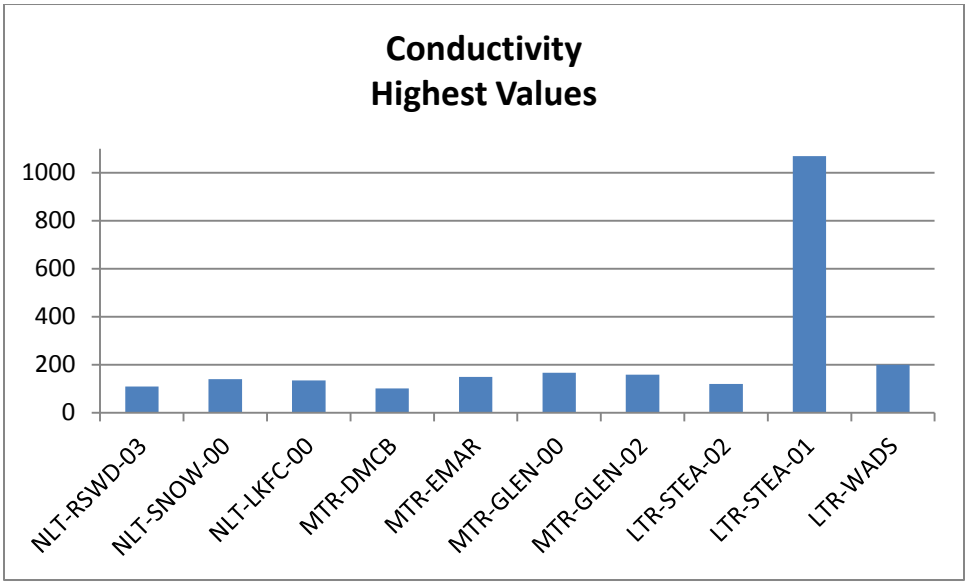


Figure 01: Ten highest conductivity values from Snapshot Day 2013

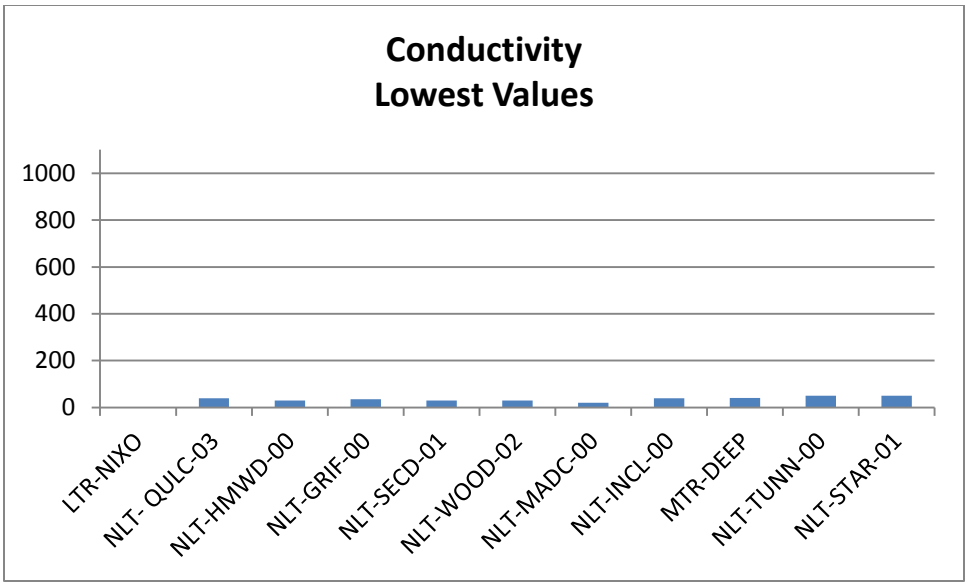


Figure 11: Eleven lowest conductivity values from Snapshot Day 2013

Total Dissolved Solids

Total dissolved solids is a measurement of the combine inorganic and organic substances suspended in a liquid. Similarly to conductivity, total dissolved solids is typically not considered a primary pollutant, but is considered an indicator for the presence of nutrients and particles that can affect water quality such as nitrate, phosphorus, silt and clay particles, and algae. Abrupt changes in total dissolved solids can indicate new sources of pollution. High total dissolved solids often make water difficult for fish to spawn in and can make it inhospitable to juvenile fish.

In Nevada most water bodies should have a total dissolved solids reading of less than 500 mg/L for both a single value reading an annual average. In California the total dissolved solids standards reading is dependent of the water body. For example in Lake Tahoe the standard is 70mg/L(single sample value), in the Upper Truckee River the standard is 55mg/L, and in Burton Creek the standard is 90 mg/L. The EPA has a maximum standard of 500mg/L for total dissolved solids in drinking water.

Total dissolved solids was measured at 46 sites. The minimum recorded measurement was 0.3 mg/L at South Lake Tahoe, Timber Cove. The highest recorded total dissolved solids measurement was 280 mg/L at South Lake Tahoe, Bijou Park Drainage at Werner Salsa. 11 of the 13 total dissolved solids measurements from Lake Tahoe fell below the 60mg/L standard.

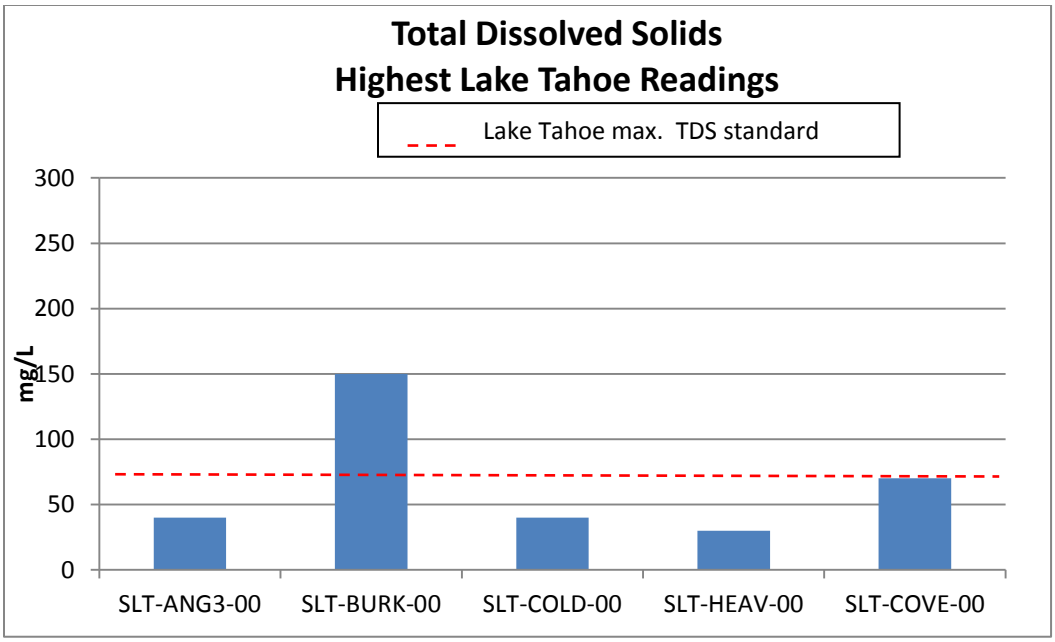


Figure 12: 5 highest total dissolved solids readings from Lake Tahoe

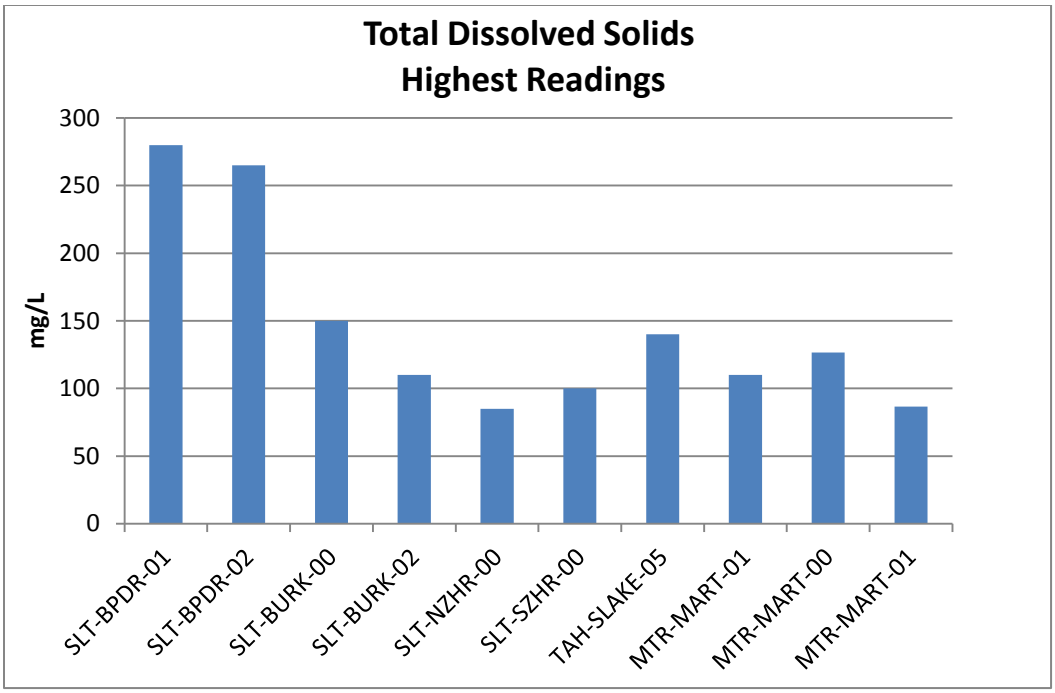


Figure 13: 10 highest TDS readings from Snapshot Day 2013

Fecal Coliform Bacteria

Coliform bacteria are found in the feces of warm-blooded animals, including humans, pets, livestock, beavers, and birds. Fecal Coliform is measured in colony forming units counted per 100 milliliters of water (CFU/100ml). CFU are roughly equivalent to the number of bacteria cells. The Lahontan Regional Water Quality Control Board standard for fecal coliform is 20 counts per 100 ml for a single occurrence.

Fecal coliform was measured at 65 locations. 12 of these samples had readings greater than 20 CFU/100ml. 14 samples had zero bacteria recorded. 3 sample locations form the Lower Truckee region had fecal coliform readings of greater than 600 CFU/100ml. These three locations were: North Truckee drain, Steamboat Creek at Rhodes Road, and Dry Creek. The lower Truckee River standard has changed for the entire Truckee Basin to a single value standard of <=1000 No./100 ml. Lake Tahoe does not have a fecal standard.

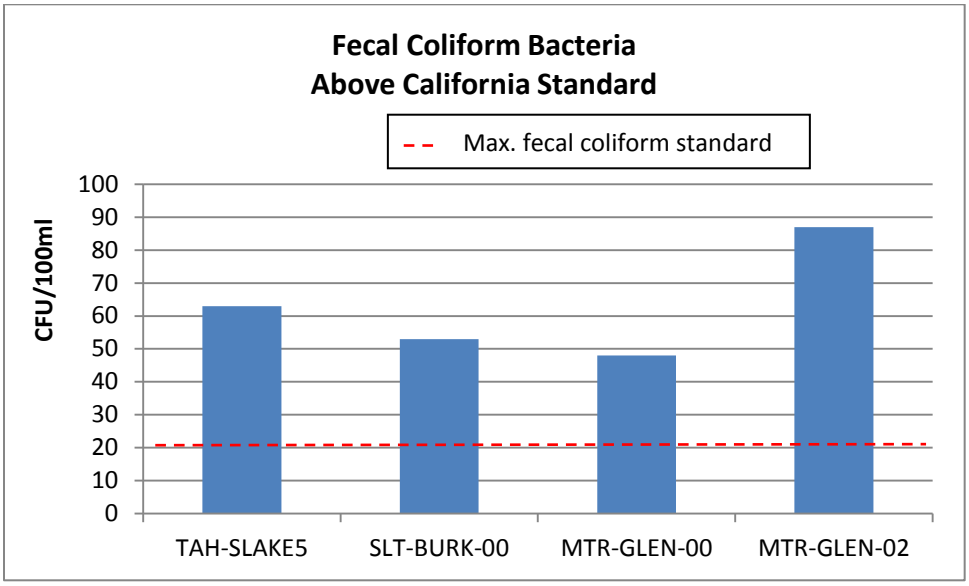


Figure 14: Fecal coliform bacteria counts above California standard

Nutrients

Fifty-three samples were analyzed for nitrogen and phosphorus, which are of most concern for algae growth and water clarity. Along with excess algae growth, nutrient concentrations that are too high can lead to odors, discolored waters, loss of clarity, and nighttime oxygen depletion, which can cause fish, kills in extreme cases.

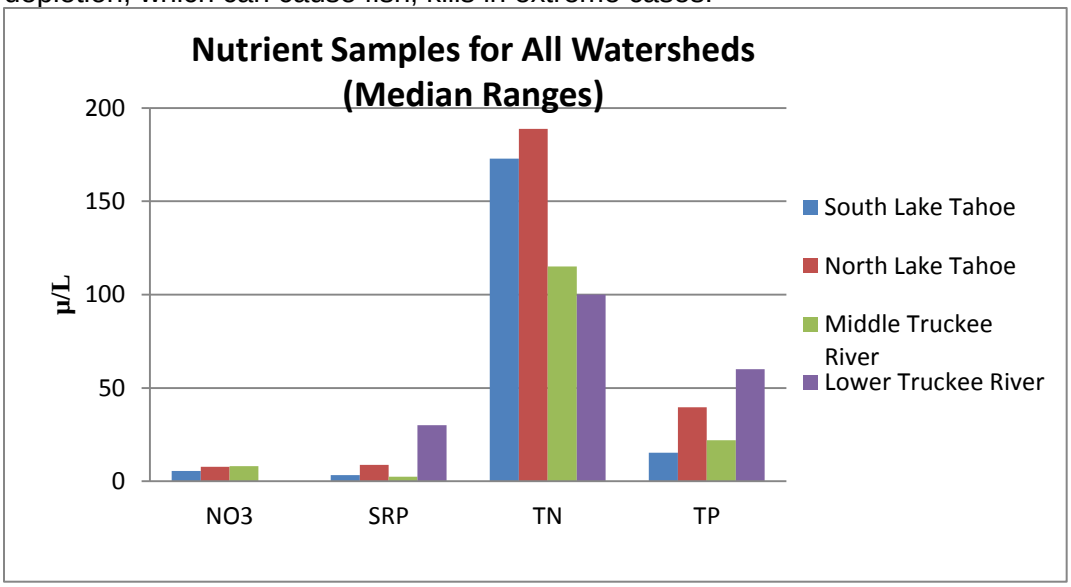


Figure 15: Median nutrient ranges for all watershed systems.

Nitrogen:

Nitrogen naturally occurs in any watershed but excessive amounts are damaging as stated above. Nitrogen is very mobile so the dissolved portion is generally of more concern.

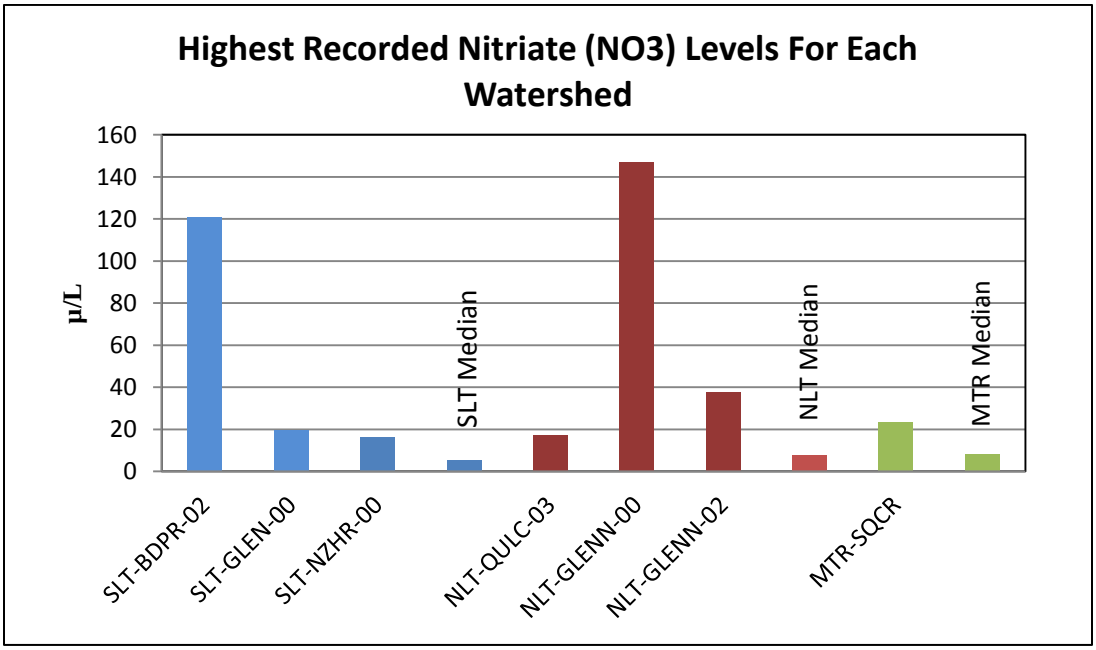


Figure 16: Highest recorded NO3 for each watershed in comparison to the median ranges.

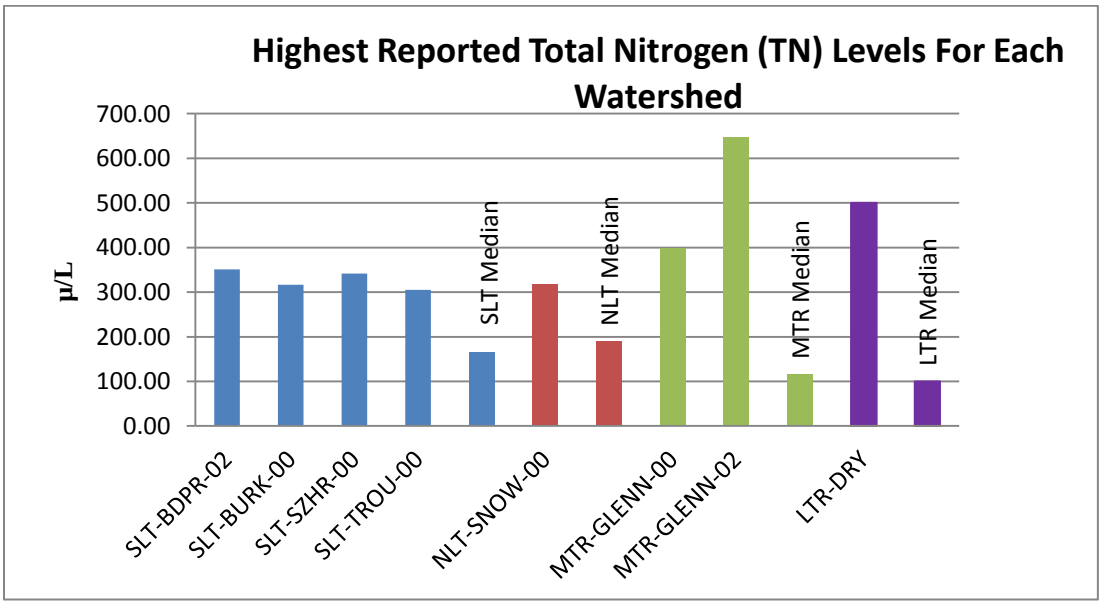


Figure 17: Highest Reported Nitrogen for each watershed in comparison to median ranges.

Phosphorus

Phosphorus is a nutrient that stimulates algal growth, and phosphorus pollution has been identified as a serious problem contributing to the degradation of water quality in Lake Tahoe and the Truckee River. Sediment entering streams and the lake from human caused erosion of soil along roads, or

from residential or commercial properties, is a common source of phosphorous. As more emphasis is placed on annual loads and TMDLs (Total Maximum Daily Loads), total phosphorous is not as much concern as the soluble and more reactive form that tends to cling to the smallest sediment particles.

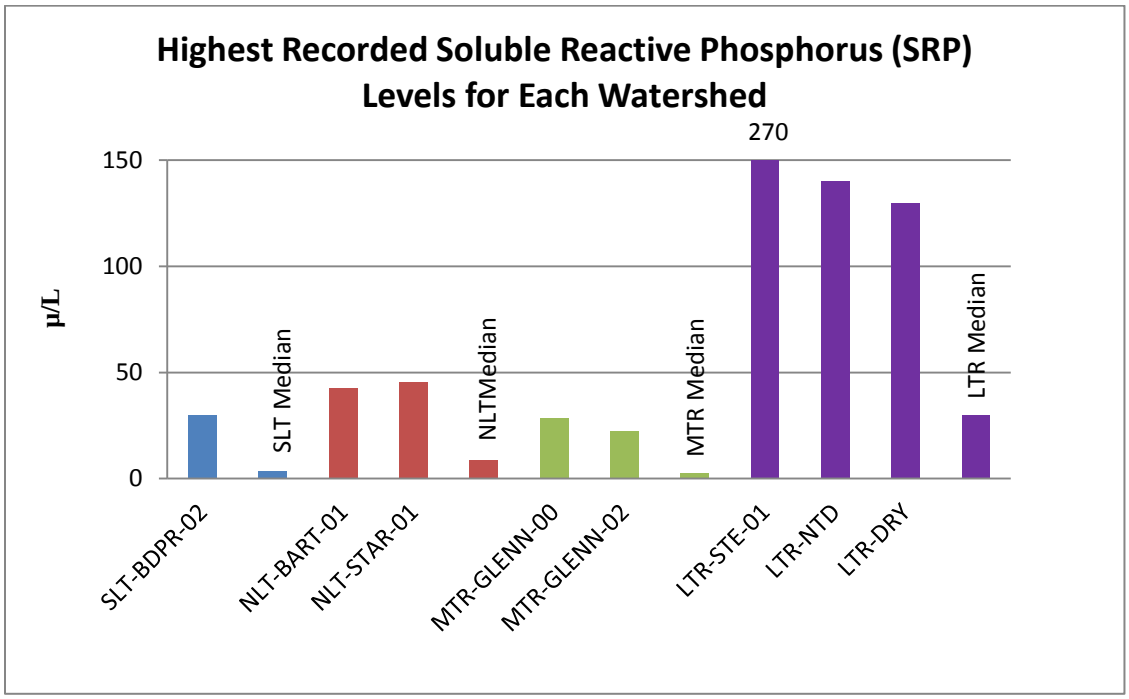


Figure 18: Highest recorded soluble reactive phosphorus for each watershed in comparison to median ranges.

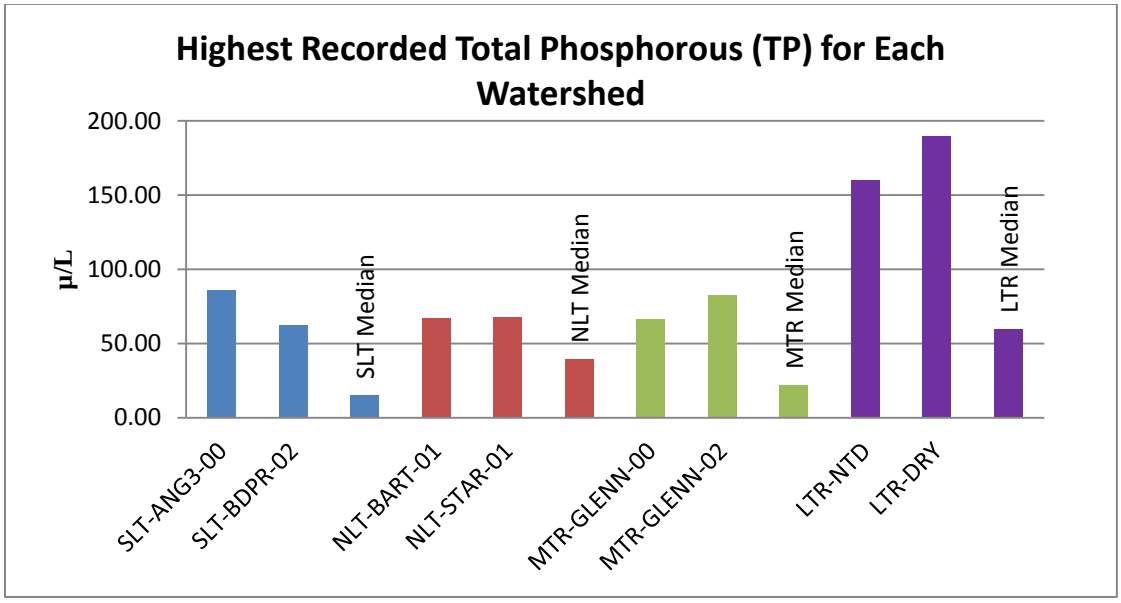


Figure 19: Highest Recorded Phosphorous for each watershed in comparison to the median ranges.

Visual Observations

Visual observations were recorded at 43 of 90 sample locations. Most recorded observations were indicative of good water quality conditions. 36 samples locations noted that water samples had no odor and 2 sample locations noted a fresh algae sample. 19 sample locations noted the presence of algae or water plants, 2 locations noted foam or suds, and zero sites noted an oily sheen. Litter or trash was noted at 1 Middle Truckee River location, 3 North Lake Tahoe locations, and 1 South Lake Tahoe location.

Sample Odor

None	Fresh algae	Chlorine	Rotten eggs	Sewage	Other
36	2	0	0	0	1

Table 6: Number of monitored sites given the sample odor classification

Other presence

Algae or other water plants	Oily Sheen	Foam or suds	Litter or trash	Other
19	0	2	5	3

Table 7: Number of monitored sites with the presence of the objects noted

For additional information on visual observations see **Appendix D**.

Discussion

The data collected for Snapshot Day 2013 is indicative of overall water quality with very few major issues. As discussed in previous sections, the majority of the samples collected meet the standards for their region. Parameters such as fecal coliform and dissolved oxygen were somewhat elevated, and many of the "hot spot" sites from previous years continue to need closer scrutiny. As previous data sets are compiled and date storage is improved this program will have the ability to show long term trends and better assist agencies.

This event is in its 13th year and has been funded primarily through local and state agencies The largest source of continued support are from the Nevada State Lands Commission through the selling of license plates for conservation. The event coordination and participation is almost entirely volunteer based and yet the collaboration and continued dedication of those involved to engage citizen volunteers makes the event happen. The successes of this type of event shows how community members can provide invaluable data collection and learn about their watershed at the same time.

For more information about how to get involved with water quality monitoring activities contact the following agencies and organizations:

- *North Lake Tahoe - Incline Village* – Contact Incline Village GID Waste Not/Incline Village Clean Water Team, (775) 832-1284.
- *South Lake Tahoe* – Contact League to Save Lake Tahoe at 530-541-5388 or Tahoe Resource Conservation District at 530-543-1501
- *Middle Truckee River (Tahoe City to Nevada State Line)* – Contact Andy Otto, Truckee River Watershed Council, (530) 550-8760
- *Lower Truckee River (Nevada Stateline to Pyramid Lake)* – Contact Mary Kay Wagner, Nevada Division of Environmental Protection, (775) 687-9454

References

Ambient Water Quality Criteria Recommendations: Rivers and Streams in Nutrient Ecoregion II, U.S. Environmental Protection Agency, December 2000

California State Water Resources Control Board Clean Water Team website: http://www.swrcb.ca.gov/water_issues/programs/swamp/cwt_volunteer.shtml

EPA's Draft Volunteer Stream Monitoring: A Methods Manual, U.S. Environmental Protection Agency

Nevada Administrative Code (NAC), Chapter 445A, Nevada Division of Environmental Protection, 1995 Revision

Standard Methods for Water and Wastewater Collection, 21st Edition, 2007

The California Streamside Biosurvey: An Introduction to Using Aquatic Invertebrates as Water Quality Indicators, California State Water Resources Control Board, September 2001

Water Quality Control Plan for the Lahontan Region, California Regional Water Quality Control Board, Lahontan Region, 1993 Revision

Water Supply Outlook, Natural Resource Conservation Service website, www.nrcs.us.gov

Appendix A – Resource Partners

2013 Snapshot Day sponsors

- California State Water Resource Control Board
- Lahontan Regional Water Quality Control Board
- Lake Tahoe Community College
- Nevada Division of Environmental Protection
- Nevada Division of State Lands
- Nevada State Health Laboratory
- Pyramid Lake Paiute Tribe
- Soroptimists
- Tahoe Environmental Research Center
- Tahoe Regional Planning Agency
- Tahoe Resource Conservation District
- Tahoe Water Suppliers Association
- Truckee River Watershed Council
- University of California Cooperative Extension
- University of Nevada Cooperative Extension
- United States Geologic Survey
- Washoe County
- League to Save Lake Tahoe
- Waste Not, Incline Village General Improvement District

Citizen Monitoring Working Group Snapshot Day Planning Committee

- Andy Otto (Truckee River Watershed Council)
- Rebecca Sawyer (Incline Village General Improvement District)
- Kim Gorman (Tahoe Resource Conservation District)
- Mary Kay Wagner (Nevada Division of Environmental Protection)
- Susie Kocher (University of California Cooperative Extension)
- Nicole Gergans (League to Save Lake Tahoe)
- Emily Mathews (League to Save Lake Tahoe)

Organizations involved in putting on Snapshot Day 2013 include

- Waste Not, Incline Village General Improvement District

- Tahoe Resource Conservation District
- League to Save Lake Tahoe
- Nevada Division of Environmental Protection
- Truckee River Watershed Council
- Tahoe Water Suppliers Association (TWSA)
- The City of South Lake Tahoe
- Lahontan Regional Water Quality Control Board
- Nevada Division of State Lands (NDSL)
- Pyramid Lake Paiute Tribe (PLPT)
- University of California Berkeley, Sagehen Creek Field Station
- University of California Cooperative Extension (UCCE)
- University of Nevada Cooperative Extension (UNCE)
- University of Nevada Reno (UNR) Electrical Engineering Department
- US Geological Survey, Carnelian Bay Field Station

Laboratory Analysis (Nutrients and Bacteria)

- Tahoe Environmental Research Center/Sierra Nevada College
- Nevada State Health Laboratory
- Lahontan Regional Water Quality Control
- United States Geologic Survey

Equipment and Contact

- Alpine Watershed Group, Sarah Green
- CA State Water Resource Clean Water Team, Erick Burres
- Incline Village General Improvement District, Rebecca Williams
- Lake Tahoe Community College, Kathy Strain
- Nevada Division of Environmental Protection, Mary Kay Wagner
- Tahoe Regional Planning Agency, Rita Whitney
- Truckee River Watershed Council, Beth Christman
- United States Geological Survey, Paul Honeywell
- University of California, Davis

Education Partners

- Lake Tahoe Community College (LTCC)
- Stead Elementary
- Galena High School
- Mountain View Montessori
- Legacy Christian School
- Rainshadow Charter School
- Washoe Innovation High School
- Bailey Charter School
- Sage Ridge School
- Reed High School
- Dilworth Middle School
- O'Brien Middle School
- Washoe County On-line School
- Pyramid Lake High School

Resource Partners

- Soil Tech Inc.
- NDEP staff
- U.S. Geological Survey
- Great Basin Institute
- WET Laboratory
- Washoe County School District
- Sierra Nevada Journeys
- City of Sparks Public Works
- City of Reno Public Works
- The Nature Conservancy

- NV Dept. of Transportation

Special thanks to

Lake Tahoe Community College and Sierra Nevada College for the use of their campus and instruments

Nevada Division of Environmental Protection for funding nutrient analysis for the Lower Truckee River monitoring sites

Nevada Division of State Lands for funding nutrient analysis

Nevada State Health Lab for Lower Truckee River laboratory analyses

Paul Honeywell, U.S. Geologic Survey, Carnelian Bay office, for coordinating Lake Tahoe bacterial analysis

Marie Bledsoe, TRPA, for development of the Tahoe Integrated Information Management System data site for Snapshot Day

Truckee Meadows Water Reclamation Facility for nutrient analysis, Lower Truckee River

Lisa Petrusa, LRWQCB, bacteria and turbidity sampling and analysis

And all the volunteers that make Snapshot Day possible!

Appendix B – Site names and codes

Snapshot Day site and site code are listed below.

South Lake Tahoe	
SLT-ANG2-01	Angora Creek - at Washoe Meadow
SLT-ANG3-00	Angora Creek - Mouth
SLT-BPDR-02	Bijou Park Drainage Hansen's Resort
SLT-BURK-00	Burke Creek at Mouth
SLT-BPDR-01	Bijou Park Drainage at Werner Salas
SLT-BURK-02	Burke Creek at Hwy 50
SLT-CASC-00	Cascade Creek at Mouth
SLT-CASC-01	Cascade Creek HWY 89
SLT-COLD-00	Cold Creek at Mouth
SLT-COLD-01	Cold Creek below Pioneer
SLT-COVE-00	Tahoe Keys Marina West Channel
SLT-EAGL-00	Eagle Fall at Mouth
SLT-FLLF-01	Tallac Creek Hwy 89
SLT-GLEN-00	Glen Alpine Creek at Mouth

SLT-HEAV-00	Heavenly Creek Trout Creek
SLT-HEAV-01	Heavenly Valley Creek Pioneer
SLT-MEEK-00	Meeks Creek at mouth
SLT-MEEK-01	Meeks Creek Meadow
SLT-MEEK-02	Meeks Creek
SLT-NZHR-00	North Zephyr Creek at Mouth
SLT-SZHR-00	South Zephyr Creek at Mouth
SLT-TALL-00	Tallac Creek at Mouth
SLT-TALR-00	Taylor Creek at Mouth
SLT-TR10-01	Truckee River LT BLVD
SLT-TR20-03	Truckee River Elks Club Bridge
SLT-TR30-04	Upper Truckee River at Washoe Meadow
SLT-TR30-04	Trout Creek at Mouth
SLT-TRMO-00	Truckee River at Mouth
SLT-TROU-00	Trout Creek Grinding Stone
TAH-SLAKE-01	Ski Run Marina at marina
TAH-SLAKE-03	Timber Cove
TAH-SLAKE-05	Lake Tahoe at Nevada Beach
North Lake Tahoe	
NLT-BART-01	Barton Creek at North of 28
NLT-BTRN-01	Burton Creek at Star Harbor
NLT-CACN-03	Carnelian Canyon Creek
NLT-DLRH-00	Dollar Creek at mouth
NLT-GRIF-00	Griff Creek at Mouth
NLT-HMWD-00	Homewood Creek at mouth
NLT-INCL-00	Incline Creek at Mouth
NLT-LKFC-00	Lake Forest Creek at mouth
NLT-MADC-00	Madden Creek at mouth
NLT-MILL-01	Mill Creek below Lakeshore Drive
NLT- QULC-03	Quail Lake Creek on Forest Service lot
NLT-RSWD-03	Rosewood Creek above Third
NLT-SECD-01	Second Creek above Lakeshore Drive
NLT-SNOW-00	Snow Creek at mouth
NLT-STAR-01	Star Creek above boating channel
NLT-TCSP-00	Tahoe City State Park at Mouth
NLT-TCUD-00	Tahoe City Urban Ditch at lake
NLT-TUNN-00	Tunnel Creek at mouth
NLT-WOOD-02	Wood Creek at Southwood
Middle Truckee River	
MTR-ALDR	Alder
MTR-BEAR-00	Bear Creek
MTR-BIGC	Truckee River in Big Chief Corridor
MTR-BOCA-00	Little Truckee River Below Boca Dam

MTR-BOCA-01	Little Truckee River at Boyington Mill
MTR-CABN	Cabin Creek
MTR-COLD-00	Cold Creek at Donner Creek
MTR-DEEP	Deep Creek
MTR-DMCB	Davies Creek
MTR-DONN-01	Donner at Highway 89
MTR-DONN-03	Donner at Donner Lake outflow
MTR-EMAR	East Martis Creek at bridge
MTR-GLEN-00	Union Valley Creek at SFFCC road
MTR-GLEN-02	Union Valley Creek above Pond
MTR-MART-00	Martis Creek at mouth
MTR-MART-01	Martis Creek at COE boundary
MTR-POLE-OO	Pole Creek
MTR-PROS-01	Prosser Creek below dam
MTR-PROS-02	Prosser at Highway 89
MTR-SAGE-00	Sagehen Creek at 89
MTR-SQCR-00	Squaw Creek
MTR-TOWN	Truckee River at Regional Park
MTR-TRO1	Truckee River near Tahoe City
MTR-TROU-00	Trout Creek at mouth
MTR-TROU-02	Trout Creek at Bennett Flat
MTR-ULTB	Upper Little Truckee
Lower Truckee River	
LTR-DRY	Dry Creek
LTR-GALE	Galena Creek
LTR-IDLE	Truckee River at Idlewild Park
LTR-McCa	Truckee River at McCarren Ranch
LTR-NIXO	Truckee River at Nixon
LTR-NoTrD	North Truckee Drain
LTR-ROCK	Truckee River at Rock Park
LTR-STEA-01	Steamboat Creek at Mira Loma
LTR-STEA-02	Steamboat Creek at Rhodes Rd
LTR-THOM	Thomas Creek
LTR-WADS	Truckee River at Wadsworth
LTR-WHIT	Whites Creek

Appendix C – Monitoring equipment

The majority of the monitoring teams are assigned these typical field instruments: armored Envirosafe thermometers (alcohol filled, 0.5° C resolution); standard pH indicator strips (0.5 pH unit resolution) or handheld Hannah pH meters (0.02 unit resolution); hand-held Oakton TDS Tester Conductivity meters (10 µS/cm resolution or Oakton Conductivity Low+ meters (1 µS/cm resolution); and Chemet dissolved oxygen kits (colorimetric, indigo carmine dye

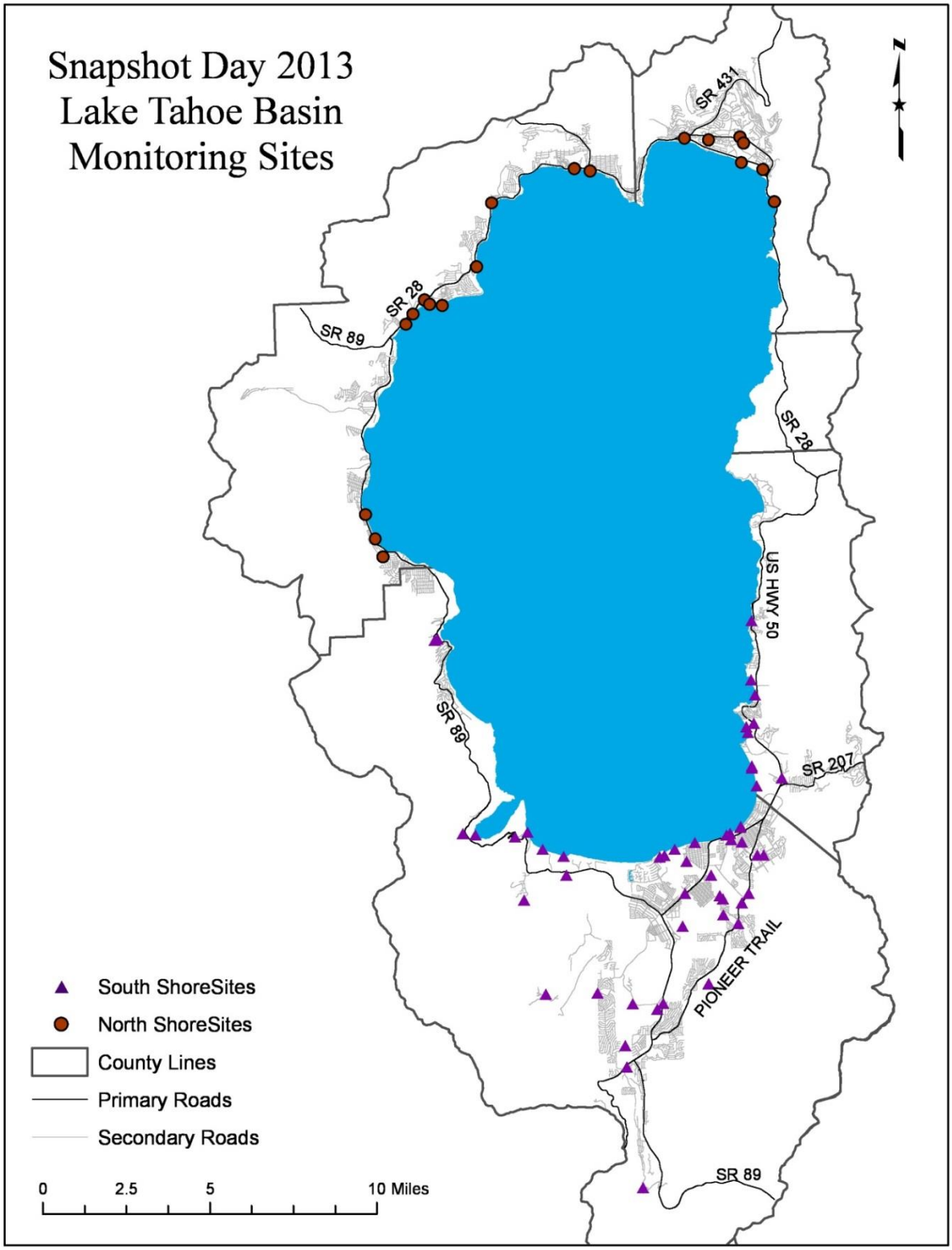
reaction, 1 mg/L resolution below 6 mg/L and 2 mg/L resolution above 6 mg/L). Turbidity meters, used at the staging locations, were supplied by TRWC and TRPA.

Nutrient and bacteria samples are kept chilled with ice or blue ice in coolers from the point of collection until arrival at the lab for analysis.. Bacteria samples are collected in sterile Whirl-paks and nutrient and turbidity samples were collected in clean (acid rinsed) Nalgene® plastic bottles.

Bacteria samples are then transported from drop off points at Lake Tahoe and Truckee to either the Lahontan Water Quality Lab in South Lake Tahoe or the U.S. Geologic Survey in Carnelian Bay. Bacteria samples collected from the Lower Truckee River were transported to the Nevada State Health Laboratory. The need for multiple labs for such a large area is to ensure sample analysis within the allotted 4 hour holding time. Quality assurance is comparable as each lab uses the same method, SM9222 from Standard Methods for Water and Wastewater Analysis, 21 Edition, 2007.

Nutrient samples collected from Lake Tahoe and the Middle Truckee River were delivered to Tahoe Environmental Research Center Laboratory in Incline Village within the allotted hold time, and can be several days as long as they are kept chilled to 4° Celsius. Lower Truckee River nutrient samples were taken to the Nevada State Health Lab for analysis.

Appendix D – Lake Tahoe Basin Monitoring Sites 2013



Appendix E – Monitoring Data

Site Code	H2O temp	pH	DO	Turbidity	Total Dissolved Solids	Conductivity	NO3-N_py	NH4-N	TKN	SRP	DP	TP	Fecal Coliform
South Lake Tahoe													
SLT-ANG3-00	12.65	6.6	4.5	6	40	-	4.46	5.58	267.65	5.92	22.58	85.58	1
SLT-ANG2-01	10.5	7.6	5.5	1	20	-	2.89	4.68	69.87	4.78	7.6	10.35	0
SLT-ANG1-02	10.55	7.25	11.5	0	10	-	3.67	6.02	174.94	2.52	6.38	7.91	2
SLT-BPDR-01	14.5	7.8	-	0	280	-	2.69	6.25	265.59	11.35	17.69	18.55	2
SLT-BPDR-02	11.3	7.8	-	8	265	-	120.94	18.35	229.89	29.9	39.1	62.03	18
SLT-BURK-00	11.5	5.5	7.5	1	150	-	4.07	7.59	312.7	9.76	18.3	21.97	53
SLT-BURK-02	10	5	5	2	110	-	-	-	219.93	-	-	-	11
SLT-CASC-00	18.4	7.9	5.75	0	10	-	2.29	4.68	83.95	-0.19	1.18	2.4	5
SLT-CASC-01	15.05	7.55	7.4	0	10	-	2.69	4.23	80.57	0.48	1.84	1.79	6
SLT-COLD-00	11.25	7.65	7	2	40	-	6.43	6.25	129.64	10.89	14.94	32.37	9
SLT-COLD-01	7.55	7.9	7.5	2	35	-	13.33	5.35	230.45	7.27	13.1	33.59	2
SLT-EAGL-00	8.15	6	8.5	0	-	-	13.92	3.11	112.2	-0.19	1.79	3.01	5
SLT-GLEN-00	8.3	7.1	7	0	10	-	19.44	3.56	63.55	-0.19	2.4	2.4	1
SLT-HEAV-00	9	6.3	6.5	1	30	-	3.28	4.68	160.06	10.22	14.63	16.47	15
SLT-HEAV-01	7	6.15	6	1	30	-	10.57	4.68	113.65	6.37	10.05	13.72	16
SLT-COVE-00	13.7	7	6.5	1	70	-	2.69	4.23	209.49	0.26	3.62	6.68	1
SLT-MEEK-00	11	5.5	8	1	10	-	2.89	3.33	206.85	1.39	5.15	6.07	1
SLT-MEEK-01	12.25	5.25	7	1	10	-	2.69	3.78	233.53	1.16	3.93	4.85	1
SLT-MEEK-02	12	5.25	7	1	10	-	6.24	10.28	102	2.75	3.93	3.93	
SLT-NZHR-00	7.5	7	10	1	85	-	16.09	5.13	131.25	2.29	13.72	14.02	4
SLT-SZHR-00	10	6.5	7.5	3	100	-	5.45	7.37	335.94	6.82	13.1	28.39	14
SLT-TALL-00	13.4	7	8	1	20	-	3.87	4.01	198.12	1.16	6.38	7.43	5
SLT-FLLF-01	11.7	7.8	6	0	10	-	2.49	5.58	64.34	2.07	2.4	3.01	0
SLT-TALR-00	12.1	7.8	9.5	0	20	-	2.49	5.58	43.97	-0.42	0.87	3.32	2
SLT-TRMO-00	9.55	7	5.5	3	20	-	6.43	4.68	185.17	3.88	7.91	43.69	3
SLT-TR10-01	8	7.65	7	3	20	-	7.22	4.23	174.45	3.2	10.96	29.31	3
SLT-TR20-03	7.6	7.7	7	2	20	-	6.24	4.01	160.85	5.46	10.05	21.06	0
SLT-TR30-04	7.5	7.4	8	2	20	-	5.45	5.13	118.45	3.43	8.52	13.72	2

Site Code	H2O temp	pH	DO	Turbidity	Total Dissolved Solids	Conductivity	NO3-N_py	NH4-N	TKN	SRP	DP	TP	Fecal Coliform
SLT-TROU-00	8.5	6.5	6	4	20	-	5.64	7.37	299.33	10.44	13.46	27.54	1
TAH-SLAKE-01	13.15	8.5	8	1	0.75	-	10.37	6.25	73.51	1.62	6.99	19.53	6
TAH-SLAKE-03	14.7	8.55	6	0	0.3	-	7.81	7.37	128.68	0.48	2.09	17.69	0
TAH-SLAKE-05	9.5	5	7.5	1	140	-	4.86	4.9	256.18	11.8	17.39	25.34	63
North Lake Tahoe													
NLT- QULC-03	8	5	10	0.658	-	40	17.08	5.13	216.85	2.29	11.85	24.8	0
NLT-BART-01	10	6.5	7	0.813	-	80	4.07	8.49	108.28	42.8	59.96	66.74	-
NLT-RSWD-03	9	5	8	3.12	-	110	10.57	5.35	166.34	11.8	31.28	51.01	3
NLT-BTRN-01	11	6.25	7	0.8	-	70	-	-	-	-	-	-	-
NLT-SNOW-00	14	6	8	4.98	-	140	5.84	3.56	311.96	8.86	30.66	54.1	-
NLT-HMWD-00	8.5	5.25	4.75	0.604	-	30	10.18	5.35	198.45	3.88	14.63	24.8	-
NLT-MILL-01	9	5	7	1.74	-	60	2.89	6.02	97.29	13.38	17.94	25.11	0
NLT-CACN-03	9	6.5	11	0.97	-	-	-	-	-	-	-	-	-
NLT-DLRH-00	5.5	5	7	3.21	-	70	-	-	-	-	-	-	-
NLT-GRIF-00	8	5.5	8	2.96	-	35	4.66	10.06	196.55	7.95	28.2	35.29	10
NLT-SECD-01	8	4.5	9	3.21	-	30	-	-	-	-	-	-	0
NLT-TUNN-00	9	5.25	10.5	0.155	-	50	-	-	-	-	-	-	-
NLT-WOOD-02	9	7.75	8	2.73	-	30	-	-	-	-	-	-	3
NLT-TCUD-00	10	5	6	1.24	-	70	7.81	5.35	259.65	7.54	23.26	52.56	0
NLT-MADC-00	8	5	8	4.74	-	20	9.19	4.23	83.65	4.11	16.79	16.79	
NLT-LKFC-00	11	5.25	7.5	1.25	-	135	-	-	-	-	-	-	-
NLT-STAR-01	8	5.5	8.5	1.31	-	50	3.08	7.59	103.57	45.74	67.66	67.97	1
NLT-TCSP-00	11	5.5	7.5	5.39	-	80	-	-	-	-	-	-	11
NLT-INCL-00	7.5	7.5	6	2.39	-	40	15.89	5.8	172.85	8.86	23.88	39.6	-

Site Code	H2O temp	pH	DO	Turbidity	Total Dissolved Solids	Conductivity	NO3-N_py	NH4-N	TKN	SRP	DP	TP	Fecal Coliform
Middle Truckee River													
MTR-ALDR	10.8	8.6	8.2333	1.1133	60	-	-	-	-	-	-	-	0
MTR-BEAR-00	7.57	7.8	9.1	0.63	30	-	3.08	4.45	34.12	0.94	7.54	10.62	0
MTR-BIGC	9.67	5.75	6.67	0.1467	50	-	-	-	-	-	-	-	-
MTR-BOCA-00	10.03	5.17	3.5	0.7867	-	63.7	-	-	-	-	-	-	-
MTR-BOCA-01	8.77	7.6667	10	0.14	-	65.7	-	-	-	-	-	-	-
MTR-CABN	8.3333	5.8333	8	0.3933	-	77	-	-	-	-	-	-	-
MTR-COLD-00	5.4333	7.4333	9.2667	1.2267	23.3	-	-	-	-	-	-	-	-
MTR-DEEP	5.4	8.1	5.8333	0.6167	-	40.667	-	-	-	-	-	-	-
MTR-DMCB	14.9	5.5	5.5	0.1867	-	102	-	-	-	-	-	-	-
MTR-DONN-01	7.6333	7.4	9.2	0	30	-	8.01	6.47	40.52	2.52	5.81	9.64	0
MTR-DONN-03	12.867	7.9	8.1	0.5133	-	100	2.29	5.58	127.18	-0.42	7.54	22.03	0
MTR-EMAR	9.3667	7.8	8.5	2.4967	-	150	-	-	-	-	-	-	-
MTR-GLEN-00	11.4	4	8.63	2.3333	-	166.7	147.0	6.7	250.5	28.6	45.2	66.1	48
MTR-GLEN-02	13.433	7.3333	5.33	9.97	-	158.3	37.4	15.4	609.7	22.4	45.2	82.8	87
MTR-MART-00	9.8	7.7	10	0.85	110	-	6.43	7.59	162.05	15.19	32.2	42.07	10
MTR-MART-01	9.6	7.7333	9.1333	1.3233	80	-	22	9.61	-	12.93	27.89	33.44	0
MTR-POLE-OO	8.3333	5.5	8	0.4867	38.3	-	-	-	-	-	-	-	-
MTR-PROS-01	10	7.8333	7.6	0.6167	46.7	-	-	-	-	-	-	-	-
MTR-PROS-02	8.5667	5.5	9.7	1	-	32.3	-	-	-	-	-	-	-
MTR-SAGE-00	7.3333	8.2333	10.25	0.84	-	85.7						-	-
MTR-SQCR-00	6.0667	7.7	9.53	1.38	30	-	23.28	4.45	45.94	1.62	7.23	14.63	1
MTR-TOWN	8.2667	6	7.6667	0.5167	-	63	9	4.23	91.65	2.52	10.31	25.11	-
MTR-TRO1	11.467	8.2333	7	0	-	100	0.91	3.33	40.52	0.03	7.84	10.31	-
MTR-TROU-00	12.23	7.5	6.5	0.04	127	-	7.02	2.38	124.22	16.78	21.11	21.73	10
MTR-TROU-02	10	7.8	7.87	1.0467	86.7	-	8.6	7.37	244.85	8.18	15.55	40.32	-
MTR-ULTB	9.8	7.90	9.6	0.92	30	-	-	-	-	-	-	-	-

Site Code	H2O temp	pH	DO	Turbidity	Total Dissolved Solids	Conductivity	NO3-N_py	NH4-N	TKN	SRP	DP	TP	Fecal Coliform
Lower Truckee River													
LTR-GALE	5.9	7.15	6.5	2	-	100	-	-	300	-	-	30	10
LTR-THOM	7.05	-	8	4.9	-	85	-	-	300	-	-	50	20
LTR-WHIT	10.7	7.2	10.5	5.4	-	65	-	-	<200	-	-	10	240
LTR-DRY	8.8	-	9	4.4	-	-	-	-	900	-	-	190	600
LTR-STEA-02	15.75	7.9	11	14	-	120	-	-	600	-	-	90	600
LTR-STEA-01	20.05	8.3	9	21	-	1070	-	-	1200	-	-	490	50
LTR-NoTrD	-	-	-	10	-	-	-	-	1600	-	-	160	600
LTR-IDLE	-	-	-	14	-	-	-	-	200	-	-	40	20
LTR-ROCK	13.5	-	8	22	-	80	-	-	300	-	-	10	60
LTR-McCa	15.5	-	7	7.5	-	-	-	-	400	-	-	60	70
LTR-WADS	15.8	8.35	5.5	8.3	-	200	-	-	<200	-	-	90	10
LTR-NIXO	16.225	7.95	8.945	13	-	0.317	-	-	700	-	-	100	70
LTR-PYRL	-	-	-	2.1	-	-	-	-	700	-	-	80	10

South Lake Tahoe	Stream flow							Sample odor					
	dry creekbed	isolated pools	trickle	slow/smooth	moderate or rippling	rapid or turbulent	flooding	Sample odor none	fresh algae smell	chlorine	rotten eggs	sewage	other
SLT-ANG3-00	-	X	-	-	-	-	-	-	X	-	-	-	-
SLT-ANG2-01	-	-	-	X	-	-	-	X	-	-	-	-	-
SLT-ANG1-02	-	-	-	-	-	X	-	X	-	-	-	-	-
SLT-BPDR-01	-	-	-	X	-	-	-	-	-	-	-	-	-
SLT-BPDR-02	-	-	-	X	X	-	-	-	-	-	-	-	-
SLT-BURK-00	-	-	-	X	-	-	-	X	-	-	-	-	-
SLT-BURK-02	-	-	-	-	X	-	-	X	-	-	-	-	-
SLT-CASC-00	-	-	-	-	-	X	-	X	-	-	-	-	-
SLT-CASC-01	-	-	-	-	X	-	-	X	-	-	-	-	-
SLT-COLD-00	-	-	-	-	X	-	-	X	-	-	-	-	-
SLT-COLD-01	-	-	-	-	X	-	-	X	-	-	-	-	-
SLT-EAGL-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-GLEN-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-HEAV-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-HEAV-01	-	-	-	-	X	-	-	X	-	-	-	-	-
SLT-COVE-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-MEEK-00	-	-	-	X	-	-	-	-	-	-	-	-	-
SLT-MEEK-01	-	-	-	-	-	-	-	-	-	-	-	-	-
SLT-MEEK-02	-	-	-	-	-	X	-	X	-	-	-	-	-
SLT-NZHR-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-SZHR-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-TALL-00	-	-	-	X	-	-	-	X	-	-	-	-	-
SLT-FLLF-01	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-TALR-00	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-TRMO-00	-	-	-	X	-	-	-	X	-	-	-	-	-
SLT-TR10-01	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-TR20-03	-	-	-	-	X	-	-	-	-	-	-	-	-
SLT-TR30-04	-	-	-	-	X	-	-	-	-	-	-	-	-

	dry creekbed	isolated pools	trickle	slow/smooth	moderate or rippling	rapid or turbulent	flooding	Sample odor none	fresh algae smell	chlorine	rotten eggs	sewage	other
SLT-TR30-04	-	-	-	-	X	-	-	X	-	-	-	-	-
SLT-TROU-00	-	-	-	X	-	-	-	X	-	-	-	-	-
TAH-SLAKE-01	-	-	-	-	-	-	-	X	-	-	-	-	-
TAH-SLAKE-03	-	-	-	-	-	-	-	-	-	-	-	-	-
TAH-SLAKE-05	-	-	-	-	-	-	-	-	X	-	-	-	-
North Lake Tahoe													
NLT- QULC-03	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-BART-01	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-RSWD-03	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-BTRN-01	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-SNOW-00	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-HMWD-00	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-MILL-01	-	X	X	-	-	-	-	X	-	-	-	-	-
NLT-CACN-03	-	-	-	X	-	-	-	X	-	-	-	-	-
NLT-DLRH-00	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-GRIF-00	-	-	-	-	-	X	-	X	-	-	-	-	-
NLT-SECD-01	-	-	-	-	-	X	-	X	-	-	-	-	-
NLT-TUNN-00	-	-	-	X	-	-	-	X	-	-	-	-	-
NLT-WOOD-02	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-TCUD-00	-	-	-	-	X	-	-	X	-	-	-	-	-
NLT-MADC-00	-	-	-	-	-	X	-	X	-	-	-	-	-
NLT-LKFC-00	-	-	-	X	-	-	-	X	-	-	-	-	-
NLT-STAR-01	-	-	-	-	-	X	-	X	-	-	-	-	-
NLT-TCSP-00	-	-	-	-	-	X	-	-	-	-	-	-	X
NLT-INCL-00	-	-	-	-	X	-	-	X	-	-	-	-	-

Middle Truckee	dry creekbed	isolated pools	trickle	slow/smooth	moderate or rippling	rapid or turbulent	flooding	Sample odor none	fresh algae smell	chlorine	rotten eggs	sewage	other
MTR-ALDR	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-BEAR-00	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-BIGC	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-BOCA-00	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-BOCA-01	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-CABN	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-COLD-00	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-DEEP	-	-	-	-	-	X	-	X	-	-	-	-	-
MTR-DMCB	-	-	-	X	-	-	-	-	-	-	-	-	-
MTR-DONN-01	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-DONN-03	-	-	-	X	-	-	-	X	-	-	-	-	-
MTR-EMAR	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-GLEN-00	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-GLEN-02	-	-	-	X	-	-	-	-	-	-	-	-	-
MTR-MART-00	-	-	-	X	-	-	-	-	-	-	-	-	-
MTR-MART-01	-	-	-	X	-	-	-	-	-	-	-	-	-
MTR-POLE-OO	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-PROS-01	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-PROS-02	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-SAGE-00	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-SQCR-00	-	-	-	-	-	X	-	-	-	-	-	-	-
MTR-TOWN	-	-	-	-	-	X	-	X	-	-	-	-	-
MTR-TRO1	-	-	-	X	-	-	-	-	-	-	-	-	-
MTR-TROU-00	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-TROU-02	-	-	-	-	X	-	-	-	-	-	-	-	-
MTR-ULTB	-	-	-	-	X	-	-	-	-	-	-	-	-

Lower Truckee	dry creekbed	isolated pools	trickle	slow/smooth	moderate or rippling	rapid or turbulent	flooding	Sample odor none	fresh algae smell	chlorine	rotten eggs	sewage	other
LTR-GALE	-	-	-	-	-	X	-	-	-	-	-	-	-
LTR-THOM	-	-	-	-	-	-	-	-	-	-	-	-	-
LTR-WHIT	-	-	-	-	X	-	-	-	-	-	-	-	-
LTR-DRY	-	-	-	X	-	-	-	-	-	-	-	-	-
LTR-STEA-02	-	-	-	-	X	-	-	-	-	-	-	-	-
LTR-STEA-01	-	-	-	X	-	-	-	-	-	-	-	-	-
LTR-NoTrD	-	-	-	X	-	-	-	-	-	-	-	-	-
LTR-IDLE	-	-	-	-	X	-	-	-	-	-	-	-	-
LTR-ROCK	-	-	-	-	X	-	-	-	-	-	-	-	-
LTR-McCa	-	-	-	-	-	X	-	-	-	-	-	-	-
LTR-WADS	-	-	-	-	-	X	-	-	-	-	-	-	-
LTR-NIXO	-	-	-	-	X	-	-	-	-	-	-	-	-

South Lake Tahoe	Other presence	algae or water plants	oily sheen	foarm or suds	litter or trash	other
SLT-ANG3-00		-	-	-	-	-
SLT-ANG2-01		-	-	-	-	-
SLT-ANG1-02		X	-	-	-	-
SLT-BPDR-01		-	-	-	-	-
SLT-BPDR-02		-	-	-	-	X
SLT-BURK-00		X	-	-	-	-
SLT-BURK-02		X	-	-	-	-
SLT-CASC-00		-	-	-	-	-
SLT-CASC-01		-	-	-	-	-
SLT-COLD-00		-	-	-	-	-
SLT-COLD-01		-	-	-	-	-
SLT-EAGL-00		-	-	-	-	-
SLT-GLEN-00		-	-	-	-	-
SLT-HEAV-00		-	-	-	-	-
SLT-HEAV-01		-	-	-	-	-
SLT-COVE-00		-	-	-	-	-
SLT-MEEK-00		-	-	-	-	-
SLT-MEEK-01		-	-	-	-	-
SLT-MEEK-02		-	-	-	-	-
SLT-NZHR-00		-	-	-	-	-
SLT-SZHR-00		-	-	-	X	-
SLT-TALL-00		X	-	-	-	-
SLT-FLLF-01		_	-	-	-	-
SLT-TALR-00		_	-	-	-	-
SLT-TRMO-00		X	-	-	-	-
SLT-TR10-01		X	-	-	-	-
SLT-TR20-03		-	-	-	-	-
SLT-TR30-04		-	-	-	-	-

South Lake Tahoe	algae or water plants	oily sheen	foarm or suds	litter or trash	other
SLT-TR30-04	-	-	-	-	-
SLT-TROU-00	-	-	-	-	-
TAH-SLAKE-01	-	-	-	-	-
TAH-SLAKE-03	-	-	-	-	-
TAH-SLAKE-05	-	-	-	-	-

Noth Lake Tahoe	Other Presence				
NLT- QULC-03	X	-	X	X	-
NLT-BART-01	X	-	-	-	-
NLT-RSWD-03	X	-	-	-	-
NLT-BTRN-01	X	-	-	-	-
NLT-SNOW-00		-	-	X	-
NLT-HMWD-00	X	-	-	X	-
NLT-MILL-01		-	-	-	X
NLT-CACN-03	X	-	-	-	-
NLT-DLRH-00	X	-	-	-	-
NLT-GRIF-00	X	-	-	-	-
NLT-SECD-01	-	-	-	-	-
NLT-TUNN-00	-	-	-	-	-
NLT-WOOD-02	-	-	-	-	-
NLT-TCUD-00	X	-	-	-	-
NLT-MADC-00	-	-	-	-	-
NLT-LKFC-00	X	-	-	-	-
NLT-STAR-01	X	-	X	-	-
NLT-TCSP-00	-	-	-	-	X
NLT-INCL-00	-	-	-	-	-

Middle Truckee	algage or water plants	oily sheen	foarm or suds	litter or trash	other
	Other Presence				
MTR-ALDR	-	-	-	-	-
MTR-BEAR-00	-	-	-	-	-
MTR-BIGC	-	-	-	-	-
MTR-BOCA-00	-	-	-	-	-
MTR-BOCA-01	-	-	-	-	-
MTR-CABN	-	-	-	-	-
MTR-COLD-00	-	-	-	-	-
MTR-DEEP	X	-	-	-	-
MTR-DMCB	-	-	-	-	-
MTR-DONN-01	-	-	-	-	-
MTR-DONN-03	-	-	-	-	-
MTR-EMAR	-	-	-	-	-
MTR-GLEN-00	-	-	-	-	-
MTR-GLEN-02	-	-	-	-	-
MTR-MART-00	-	-	-	-	-
MTR-MART-01	X	-	-	-	-
MTR-POLE-OO	-	-	-	-	-
MTR-PROS-01	-	-	-	-	-
MTR-PROS-02	-	-	-	-	-
MTR-SAGE-00	-	-	-	-	-
MTR-SQCR-00	-	-	-	-	-
MTR-TOWN	-	-	-	X	-
MTR-TRO1	-	-	-	-	-
MTR-TROU-00	-	-	-	-	-
MTR-TROU-02	-	-	-	-	-
MTR-ULTB	-	-	-	-	-

Lower Truckee	algage or water plants	oily sheen	foarm or suds	litter or trash	other
	Other Presence				
LTR-GALE	-	-	-	-	-
LTR-THOM	-	-	-	-	-
LTR-WHIT	-	-	-	-	-
LTR-DRY	-	-	-	-	-
LTR-STEA-02	-	-	-	-	-
LTR-STEA-01	-	-	-	-	-
LTR-NoTrD	-	-	-	-	-
LTR-IDLE	-	-	-	-	-
LTR-ROCK	-	-	-	-	-
LTR-McCa	-	-	-	-	-
LTR-WADS	-	-	-	-	-
LTR-NIXO	-	-	-	-	-

Note: Data collected as part of the Snapshot activities is available electronically. Contact Kim Gorman, Tahoe Resource Conservation District or go to www.snapshotday.org